

The Benefits of Natural Gas Production and Exports for U.S. Small Businesses

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Executive Summary

The U.S. natural gas market has changed dramatically in recent years, as evidenced by a 55 percent decline in the annual average price of natural gas occurring between 2005 and 2011. While assorted market factors come into play, this reduction in natural gas prices has been a direct result of expanded natural gas production in the U.S. Increased production has been a boon for the energy sector, including for employment and business growth, especially in those states where natural gas production has expanded, with indirect benefits across the nation.

Export Opportunities. Looking ahead, the opportunity exists for exporting liquefied natural gas (LNG), given the large differential in natural gas prices in the U.S. versus elsewhere in the world, and rising global demand. Unfortunately, though, there is a movement afoot to have government limit LNG exports, based on the unfounded fear that LNG exports will dramatically drive up domestic natural gas prices. But the economy is not a zero-sum game. Expanded demand for U.S. natural gas internationally will be a net positive, resulting in greater U.S. natural gas production, increased investment, enhanced GDP growth, rising incomes, and more jobs.

Several studies have validated the abundance of domestic natural gas for international export. The International Energy Administration recently projected that “the United States becomes a net exporter of natural gas by 2020 and is almost self-sufficient in energy, in net terms, by 2035.” In addition, a recent study for the Brookings Institution noted, “In their analyses, both Deloitte and EIA found that the majority – 63 percent, according to both studies – of the exported natural gas will come from new production as opposed to displaced consumption from other sectors.”

This report looks at some of the tremendous benefits that have emerged for the U.S. economy due to a vast expansion in natural gas production in less than a decade. In particular, this report focuses on the growth in jobs and the number of small and midsize businesses in key energy sectors, including in states where natural gas production has increased and where such production is expected to expand. It follows that the U.S. becoming a leader in meeting global natural gas demand would be a clear benefit to the overall U.S. economy, and again, particularly in those states leading the way in natural gas production.

Rising Production. Natural gas production increased by 27 percent from 2005 to 2011. This increase in natural gas has come from high production levels from shale gas, which

Expanded demand for U.S. natural gas internationally will be a net positive, resulting in greater U.S. natural gas production, increased investment, enhanced GDP growth, rising incomes, and more jobs.

increased by 947 percent, due to a combination of horizontal drilling and hydraulic fracturing.

Jobs Growth. For the U.S. overall, while total employment *declined* by 3.7 percent from 2005 to 2010, jobs *grew* by 27.6 percent in the oil and gas extraction sector; by 15.1 percent in the drilling oil and gas wells sector; by 38.5 percent in the support sector for oil and gas operations; by 47 percent in the oil and gas pipeline and related structures construction sector; and by 62 percent in the oil and gas field machinery and equipment manufacturing sector.

Small Business Growth. Meanwhile, the same contrast held in terms of changes in the number of businesses, including small business. For all of the U.S., total employer firms *declined* by 4.2 percent from 2005 to 2010, including a 3.7 percent decline in firms with less than 20 workers, and a 4.2 percent fall in firms with less than 500 workers. But within the energy sector, business growth in key industries has been striking:

- The number of oil and gas extraction employer firms grew by 3.1 percent, including growth of 2.5 percent among firms with less than 20 workers and 3 percent among firms with less than 500 workers.

- The number of drilling oil and gas wells employer firms grew by 7.2 percent, including 4.7 percent among firms with less than 20 workers and 7.3 percent among firms with less than 500.
- The number of oil and gas operations employer firms grew by 24.5 percent, including 24.5 percent among firms with less than 20 workers and 24.6 percent among firms with less than 500.
- The number of oil and gas pipeline and related structures construction employer firms grew by 5.1 percent, including growth of 3.5 percent among firms with less than 500 workers.
- The number of oil and gas field machinery and equipment manufacturing employer firms grew by 61.0 percent, including growth of 59.0 percent among firms with less than 20 workers and 62.7 percent among firms with less than 500 workers.

Small Business Population. At the same time, small and midsize firms overwhelmingly populate each of the energy sectors considered. Businesses with less than 20 workers came in at

- 91.3 percent of oil and gas extraction employer firms;
- 80.4 percent of drilling oil and gas wells employer firms;
- 84.7 percent of oil and gas operations employer firms;
- 63 percent of oil and gas pipeline and related structures construction employer firms; and
- 60.3 percent of oil and gas field machinery and equipment manufacturing employer firms.

It follows that the U.S. becoming a leader in meeting global natural gas demand would be a clear benefit to the overall U.S. economy, and again, particularly in those states leading the way in natural gas production.

In the 11 states examined in this report, the dominance of small and midsize firms populating energy industries held as well. Interestingly, the contrast between a national decline in overall jobs and businesses, and growth in key energy sectors often was even far more striking than the national differences. The general case of energy industries adding jobs and small businesses, as opposed to national declines, held in the 10 states – that is, in Arkansas, Colorado, Louisiana, North Dakota, Oklahoma, Pennsylvania, Texas, Utah, West Virginia, and Wyoming – where natural gas production was up markedly. (*A Summary Sheet for each state is available.*)

Opportunities Ahead. The expectation that nearly two-thirds of LNG exports would be met via new production speaks to further strong growth for small and midsize businesses, and for employment. At the same time, the minimal price impact that expanded exports might have on domestic prices would have small effects on domestic consumers of natural gas, especially given the enormous declines we’ve already experienced in natural gas prices. And even those small, potential price increases must be further offset against the effect of the overall positive for economic growth coming via expanded natural gas production. **Clearly, LNG exports guided by market forces mean further expanding opportunity for small and midsize businesses to be created, to grow, and to create jobs.**

Introduction

The U.S. natural gas market has changed dramatically in recent years. Consider the drop in natural gas prices. For example, the annual average price of natural gas (dollars/mil. BTUs) went from \$9.014 in 2005 to \$4.026 in 2011. That 55 percent decline generated considerable savings for U.S. households and businesses via electricity prices – given that 25 percent of electric power is generated via natural gas – as well as for a wide array of industries that use natural gas in their production processes.

While assorted market factors come into play, lower natural gas prices have resulted directly from expanded U.S. natural gas production. That increased production has been good news for the energy sector, including for employment and business growth, especially in those states where natural gas production has expanded, with indirect benefits spreading across the nation.

Looking ahead, the opportunity exists for exporting liquefied natural gas (LNG)¹, given the large differential in natural gas prices in the U.S. versus elsewhere in the world, and rising global demand. For example, in November 2012, the International Energy Administration reported: “The WEO finds that the extraordinary growth in oil and natural gas output in the United States will mean a sea-change in global energy flows. In the **New Policies Scenario**, the WEO’s central scenario, the United States becomes a net exporter of natural gas by 2020 and is almost self-sufficient in energy, in net terms, by 2035... While the regional picture for natural gas varies, the global outlook over the coming decades looks to be bright, as demand increases by 50% to 5 trillion cubic metres in 2035. Nearly half of the increase in production to 2035 is from unconventional gas, with most of this coming from the United States, Australia and China.”²

Looking ahead, the opportunity exists for exporting liquefied natural gas (LNG), given the large differential in natural gas prices in the U.S. versus elsewhere in the world, and rising global demand.

The U.S. becoming a leader in meeting global natural gas demand would be a clear benefit to the overall U.S. economy, and particularly in states leading the way in natural gas production.

It’s important to consider the benefits that accrue to workers, small businesses, individual states, and the U.S. economy when domestic energy production, such as in natural gas, expands. Let’s review key points.

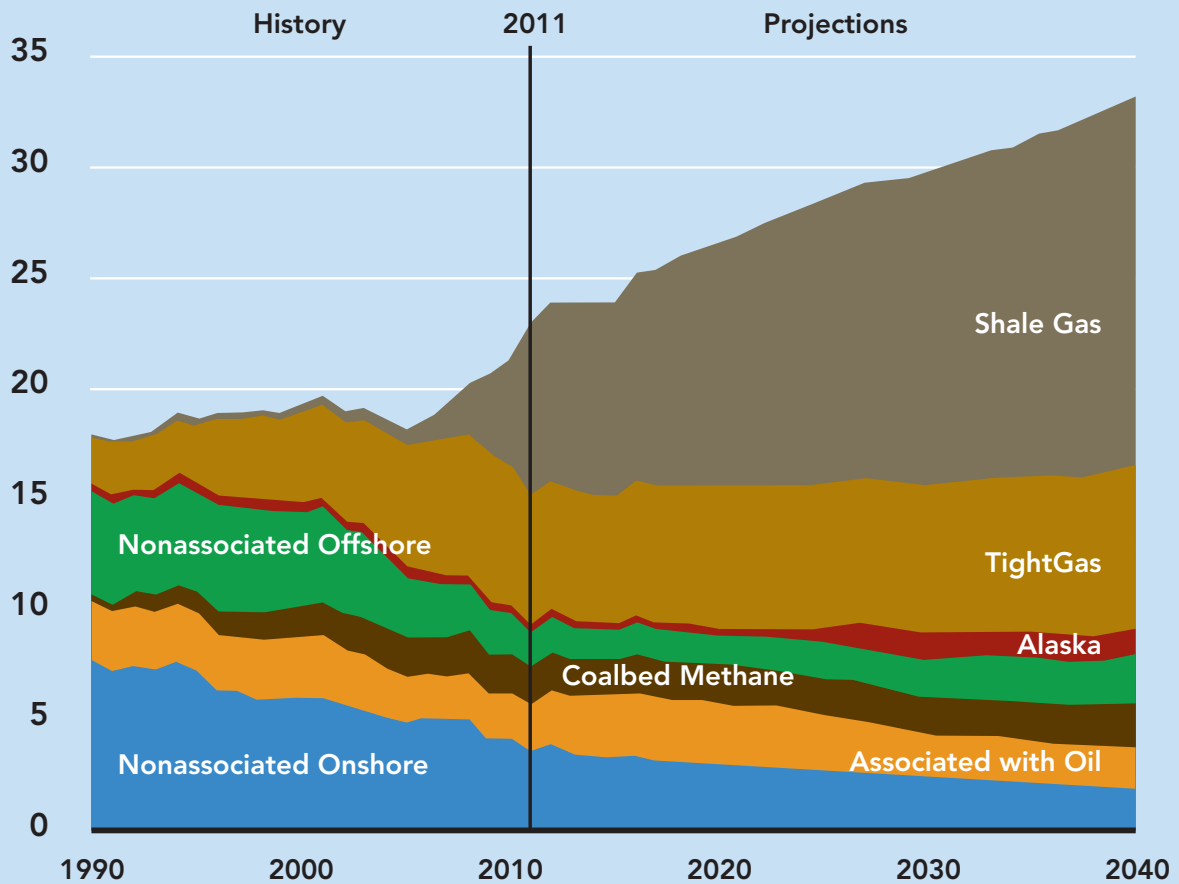
I. United States

After small increases throughout the 1990s, for example, natural gas production in the U.S. hit a high of 19.62 trillion cubic feet in 2001, and then declined for the following four years. In 2005, U.S. natural gas marketed production registered 18.05 trillion cubic feet, which was roughly the same level as in 1993. However, growth resumed, and natural gas production in the U.S. hit 23 trillion cubic feet in 2011, which was a 27 percent increase over 2005. All of the increase in natural gas production basically has come from shale gas, which increased by 947 percent from 2005 to 2011. What's behind this vast expansion in recent production, not to mention an expanded view of resources into the future?

The EIA explained, "Over the past decade, the combination of horizontal drilling and hydraulic fracturing has allowed access to large volumes of shale gas that were previously uneconomical to produce. The production of natural gas from shale formations has rejuvenated the natural gas industry in the United States."³

Looking into the future, the EIA "projects U.S. natural gas production to increase from 23.0 trillion cubic feet in 2011 to 33.1 trillion cubic feet in 2040, a 44% increase. Almost all of this increase in domestic natural gas production is due to projected growth in shale gas production, which grows from 7.8 trillion cubic feet in 2011 to 16.7 trillion cubic feet in 2040. Although the prospects for shale gas production are promising, there remains considerable uncertainty regarding

Figure 3: U.S. Dry Natural Gas Production by Source, 1990-2040



Source: This figure is from the AEO2013 Early Release Overview, U.S. Energy Information Administration, December 5, 2012

Table 1: U.S. Natural Gas Marketed Production

2005:	18,927.1 billion cubic feet
2011:	24,036.4 billion cubic feet

the size and economics of this resource... An analysis in the *Annual Energy Outlook 2012* (released June 2012) indicates that the uncertainty in the size and economics of the domestic shale gas resources could have a considerable impact on future domestic natural gas production and that 2035 shale gas production could be between 9.7 trillion cubic feet and 20.5 trillion cubic feet. U.S. total natural gas production is projected to range between 26.1 trillion cubic feet and 34.1 trillion cubic feet.”⁴

For good measure, proved reserves of U.S. dry natural gas went from 192.5 trillion cubic feet in 2004 to 304.6 trillion cubic feet in 2010 – a 58 percent expansion.

This revolution in natural gas production – coupled with an increase in U.S. oil production (also due to the extraction technologies of hydraulic fracturing and horizontal drilling being applied, especially in Texas and North Dakota) – has provided considerable growth in the energy sector of our economy in recent years, while the overall economy has badly faltered.

It is important to keep in mind when looking ahead that projected resources and production in the areas of oil and natural gas usually turn out to be grossly under-estimated given innovations and improvements that occur in exploration and production technologies – as has been so glaringly the case with increases in both oil and natural gas production in recent years that were not expected a relatively short time ago.

As already noted (and see Table 1), U.S. natural gas marketed production grew by 27 percent between 2005 and 2011.

That expansion in production has led to growth in employment in the energy sector, while the overall economy experienced a decline in jobs.

Impact on Jobs

That expansion in production has led to growth in employment in the energy sector, while the overall economy experienced a decline in jobs.

Table 2 compares employment growth (all employment and business data from Census Bureau “County Business Patterns” unless otherwise noted) among employer firms in the overall economy, and in various energy industry sectors.

The difference in the employment story between the energy sector and the overall economy could not be starker. While overall employment fell between 2005 and 2010, jobs grew markedly in the energy sector given the striking expansion in domestic natural gas and oil production.

While U.S. total employment *declined* by 3.7 percent from 2005 to 2010, jobs *grew* by the following:

- 27.6 percent in the oil and gas extraction sector;⁵
- 15.1 percent in the drilling oil and gas wells sector;⁶
- 38.5 percent in the support sector for oil and gas operations;⁷
- 47 percent in the oil and gas pipeline and related structures construction sector;⁸ and
- 62 percent in the oil and gas field machinery and equipment manufacturing sector.⁹

While U.S. employers overall shed 4.3 million jobs over this period, employers in the five energy industries included here directly added 146,000 jobs.

Table 2: Employment Growth Among Employer Firms, 2005-2010

Sector	2005	2010	Percent Change
Total	116,317,003	111,970,095	-3.7%
Oil/Gas Extraction	85,562	109,199	27.6%
Drilling Oil and Gas Wells	66,084	76,072	15.1%
Support for Oil and Gas Operations	136,038	188,468	38.5%
Oil and Gas Pipeline and Related Structures Construction	86,321	126,856	47.0%
Oil and Gas Field Machinery and Equipment Manufacturing	30,580	49,542	62.0%

Impact on Small Business

At the same time, and not surprisingly, while the number of businesses (in this case, employer firms) in the nation declined, business growth was strong among the energy sector. And it is critical to note the role and growth of smaller businesses.

Table 3 makes clear that expanded production in the energy sector has been a boon for small and midsize enterprises. Or, to look at it from a different angle, expanded energy production has been driven by small and midsize businesses.

For all of the U.S., total employer firms declined by 4.2 percent from 2005 to 2010, including a 3.7 percent decline in firms with less than 20 workers, and a 4.2 percent fall in firms with less than 500 workers. Again, compare those declines to the growth in energy industries over the same period:

- Among oil and gas extraction businesses, the number of employer firms grew by 3.1 percent, including growth of 2.5 percent among firms with less than 20 workers and 3.0 percent among firms with less than 500 workers.
- Among drilling oil and gas wells businesses, the number of employer firms grew by 7.2 percent, including growth of 4.7 percent among firms with less than 20 workers and 7.3 percent among firms with less than 500 workers.
- Among oil and gas operations businesses, the number of employer firms grew by 24.5 percent, including growth

of 24.5 percent among firms with less than 20 workers and 24.6 percent among firms with less than 500 workers.

- Among oil and gas pipeline and related structures construction businesses, the number of employer firms grew by 5.1 percent, including growth of 3.5 percent among firms with less than 500 workers.
- Among oil and gas field machinery and equipment manufacturing businesses, the number of employer firms grew by 61.0 percent, including growth of 59.0 percent among firms with less than 20 workers and 62.7 percent among firms with less than 500 workers.

The growth in both jobs and small-midsize employer firms in the energy sector has been striking in recent years, once again especially given the abysmal performance of the overall economy.

Finally, it must be noted that the energy sector in fact is not all about huge enterprises. As noted in Table 3, each energy sector looked at here is overwhelmingly populated by small and midsize firms.

- Among oil and gas extraction businesses, 91.3 percent of employer firms in 2010 had less than 20 workers, and 98.6 percent had fewer than 500 employees.
- Among drilling oil and gas wells businesses, 80.4 percent of employer firms in 2010 had less than 20 workers, and 97.8 percent had fewer than 500 employees.
- Among oil and gas operations businesses, 84.7 percent

Table 3: Employer Firms – U.S. Total and Energy Industries, 2005-2010

U.S. Total Employer Firms

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	5,983,546	5,357,887	5,966,069	89.5%	99.7%
2010	5,734,538	5,160,404	5,717,302	90.0%	99.7%
Chg 05-10	-4.2%	-3.7%	-4.2%		

Oil/Gas Extraction Employer Firms

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	6,317	5,800	6,230	91.8%	98.6%
2010	6,513	5,947	6,420	91.3%	98.6%
Chg 05-10	3.1%	2.5%	3.0%		

Drilling Oil and Gas Wells Firms

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	1,833	1,509	1,791	82.3%	97.7%
2010	1,965	1,580	1,921	80.4%	97.8%
Chg 05-10	7.2%	4.7%	7.3%		

Support for Oil and Gas Operations

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	6,183	5,238	6,101	84.7%	98.7%
2010	7,696	6,522	7,601	84.7%	98.8%
Chg 05-10	24.5%	24.5%	24.6%		

Oil and Gas Pipeline and Related Structures Construction

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	1,612	1,075	1,561	66.7%	96.8%
2010	1,695	1,068	1,616	63.0%	95.3%
Chg 05-10	5.1%	-0.7%	3.5%		

Oil and Gas Field Machinery and Equipment Manufacturing

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	480	293	442	61.0%	92.1%
2010	773	466	719	60.3%	93.0%
Chg 05-10	61.0%	59.0%	62.7%		

of employer firms in 2010 had less than 20 workers, and 98.8 percent had fewer than 500 employees.

- Among oil and gas pipeline and related structures construction businesses, 63.0 percent of employer firms in 2010 had less than 20 workers, and 95.3 percent had fewer than 500 employees.
- Among oil and gas field machinery and equipment manufacturing businesses, 60.3 percent of employer firms in 2010 had less than 20 workers, and 93.0 percent had fewer than 500 employees.

Finally, in looking at the full picture of the impact unconventional oil and natural gas production – that is, “unconventional natural gas extracted from shale formations and from tight sands and unconventional oil extracted from shale and other dense rocks” – on the U.S. economy, IHS found:¹⁰

- “In 2012, capital expenditures will surpass \$87 billion. These expenditures supporting the growth of unconventional oil and gas activity will reach \$172.5 billion in 2020 and more than \$353 billion in 2035.”
- “Over 1.7 million jobs are attributable to unconventional oil and gas development today. These employment contributions are expected to rise to 3 million by the end of the decade and to 3.5 million jobs by 2035.”
- “In 2012, unconventional oil and gas will contribute almost \$238 billion in value added to the US economy. This contribution to gross domestic product (GDP) will increase more than 75% by 2020 to over \$416 billion. By the final year of the forecast period, 2035, this will increase to nearly \$475 billion.”

Now let’s consider the developments in key states experiencing expanded opportunities on the natural gas production front.

II. Arkansas

The increase in natural gas production has been dramatic in Arkansas via the Fayetteville Shale area. The state’s natural gas production, as highlighted in Table 4, expanded by 462.7 percent from 2005 to 2011.

Table 4: Arkansas Natural Gas Marketed Production

2005:	190.5 billion cubic feet
2011:	1,072.2 billion cubic feet

Table 5: Arkansas Employment Growth Among Employer Establishments, 2005-2010

Sector	2005	2010	Percent Change
Total	1,017,424	965,474	-5.1%
Oil/Gas Extraction	637	1,666	161.5%
Drilling Oil and Gas Wells	692	2,456	254.9%
Support for Oil and Gas Operations	817	2,936	259.4%
Oil and Gas Pipeline and Related Structures Construction	588	1,334	126.9%
Oil and Gas Field Machinery and Equipment Manufacturing	NA	NA	NA

Impact on Jobs

Table 5 compares employment growth (again, all employment and business data from Census Bureau “County Business Patterns” unless otherwise noted) among employer establishments in the overall state, and in various energy industry sectors. The difference in the employment story between the energy sector and the overall economy is striking.

While overall employment fell between 2005 and 2010, jobs grew markedly in the energy sector given the expansion in energy production.

Arkansas total employment *declined* by 5.1 percent from 2005 to 2010, but jobs grew by the following:

- 161.5 percent in the oil and gas extraction sector;
- 254.9 percent in the drilling oil and gas wells sector;
- 259.4 percent in the support sector for oil and gas operations; and
- 126.9 percent in the oil and gas pipeline and related structures construction sector.

While Arkansas employers overall shed 51,950 jobs over this period, employers in the four energy industries (where data was available) included here added more than 5,600 jobs.

Impact on Small Business

At the same time, while the number of businesses (in this case, establishments) declined in the nation and in Arkansas (though at a slower pace of decline in Arkansas compared to the U.S.), the number of establishments grew strongly among Arkansas' energy sector. And it is critical to note the role and growth of smaller businesses.

Table 6 makes clear that expanded production in the energy sector has been a boon for small and midsize enterprises in the state. Or, to look at it from a different angle, expanded energy production has been driven by small and midsize businesses.

For all of the U.S., total employer establishments declined by 1.4 percent from 2005 to 2010, including a 3.5 percent decline in establishments with less than 20 workers, and a 3.1 percent fall in establishments with less than 500 workers.

In Arkansas, total establishments declined by 1.3 percent, including a 1.5 percent fall among establishments with less than 20 workers, and a 1.3 percent decline among those with less than 500 workers.

But compare those declines to the growth in these energy industries in Arkansas:

- Among oil and gas extraction businesses, the number of employer establishments grew by 14.6 percent, including growth of 13.1 percent among those with less than 20 workers and 14.6 percent among establishments with less than 500 workers.
- Among drilling oil and gas wells businesses, the number of employer establishments grew by 56.3 percent, including growth of 40.0 percent among establishments with less than 20 workers and 56.3 percent among establishments with less than 500 workers.
- Among oil and gas operations businesses, the number of employer establishments grew by 77 percent, including growth of 51.8 percent among establishments with less than 20 workers and 77 percent among establishments with less than 500 workers.

The growth in both jobs and small-midsize employer establishments in the energy sector has been striking in recent years, especially given the abysmal performance of the overall economy.

Finally, it must be noted that the Arkansas energy sector is not all about big energy businesses. As noted in Table 6, each energy sector looked at is overwhelmingly populated by small and midsize establishments.

- Among oil and gas extraction businesses, 93.1 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among drilling oil and gas wells businesses, 70 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas operations businesses, 81.8 percent of employer establishments in 2010 had less than 20 workers, and 98.8 percent had fewer than 500 employees.
- Among oil and gas pipeline and related structures construction businesses, 48.3 percent of employer establishments in 2010 had less than 20 workers, and 95.3 percent had fewer than 500 employees.

Table 6: Establishments – Arkansas Total and Energy Industries, 2005-2010

Arkansas Total Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	66,039	57,236	65,844	86.7%	99.7%
2010	65,158	56,394	65,018	86.5%	99.8%
AR 05-10	-1.3%	-1.5%	-1.3%		
US 05-10	-1.4%	-3.5%	-3.1%		

Arkansas Oil/Gas Extraction Employer Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	89	84	89	94.4%	100%
2010	102	95	102	93.1%	100%
Chg 05-10	14.6%	13.1%	14.6%		

Arkansas Drilling Oil and Gas Wells Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	32	25	32	78.1%	100%
2010	50	35	50	70.0%	100%
Chg 05-10	56.3%	40.0%	56.3%		

Arkansas Support for Oil and Gas Operations Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	87	83	87	95.4%	100%
2010	154	126	154	81.8%	100%
Chg 05-10	77.0%	51.8%	77.0%		

Arkansas Oil and Gas Pipeline and Related Structures Construction Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	30	20	30	66.7%	100%
2010	29	14	29	48.3%	100%
Chg 05-10	-3.3%	-30.0%	-3.3%		

Arkansas Oil and Gas Field Machinery and Equipment Manufacturing Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	1	0	1	0%	100%
2010	2	1	2	50%	100%
Chg 05-10	100%	-	100%		

III. Colorado

The increase in natural gas production has been notable in Colorado. The state's natural gas production, as highlighted in Table 7, expanded by 44.5 percent from 2005 to 2011.

Table 7: Colorado Natural Gas Marketed Production

2005:	1,133.1 billion cubic feet
2011:	1,637.6 billion cubic feet

Table 8: Colorado Employment Growth Among Employer Establishments, 2005-2010

Sector	2005	2010	Percent Change
Total	1,936,264	1,955,336	1.0%
Oil/Gas Extraction	4,060	6,447	58.8%
Drilling Oil and Gas Wells	2,678	3,612	34.9%
Support for Oil and Gas Operations	4,381	7,648	74.6%
Oil and Gas Pipeline and Related Structures Construction	1,473	1,248	-15.3%
Oil and Gas Field Machinery and Equipment Manufacturing	NA	NA	NA

Impact on Jobs

Table 8 compares employment growth (again, all employment and business data from Census Bureau "County Business Patterns" unless otherwise noted) among employer establishments in the overall state, and in various energy industry sectors. The difference in the employment story between the energy sector and the overall economy is impressive.

While overall employment grew between 2005 and 2010 in Colorado – compared to a decline in the U.S. overall – jobs grew markedly in the energy sector given the expansion in energy production.

While U.S. total employment *declined*, Colorado total

employment grew by 1.0 percent from 2005 to 2010. On the energy front, jobs grew by the following:

- 58.5 percent in the oil and gas extraction sector;
- 34.9 percent in the drilling oil and gas wells sector; and
- 74.6 percent in the support sector for oil and gas operations.

While Colorado employers overall added 19,072 jobs over this period, employers in the four energy industries (where data was available) included here added more than 6,363 jobs. That's one in three jobs added coming from these energy industries.

Impact on Small Business

At the same time, while the number of businesses (in this case, establishments) in the nation declined, in Colorado, the number of establishments grew, and they expanded robustly in the state's energy sector. And it is critical to note the role and growth of smaller businesses.

Table 9 makes clear that expanded production in the energy sector has been a boon for small and midsize enterprises in the state. Or, to look at it from a different angle, expanded energy production has been driven by small and midsize businesses.

For all of the U.S., total employer establishments declined by 1.4 percent from 2005 to 2010, including a 3.5 percent decline in establishments with less than 20 workers, and a 3.1 percent fall in establishments with less than 500 workers.

In Colorado, total establishments increased by 0.6 percent, including a 1.2 percent increase among establishments with less than 20 workers, and a 0.6 percent rise among those with less than 500 workers.

Again, compare the U.S. decline to the growth in these energy industries in Colorado:

- Among oil and gas extraction businesses, the number of employer establishments grew by 7.6 percent, including growth of 6.8 percent among establishments with less than 20 workers and 7.0 percent among establishments with less than 500 workers.
- Among drilling oil and gas wells businesses, the number of employer establishments grew by 12.8 percent, including growth of 12.7 percent among establishments with less than 20 workers and 14.1 percent among establishments with less than 500 workers.
- Among oil and gas operations businesses, the number of employer establishments grew by 61.4 percent, including growth of 58 percent among establishments with less than 20 workers and 61 percent among establishments with less than 500 workers.
- Among oil and gas pipeline and related structures construction businesses, the number of employer establishments grew by 2 percent, including growth of 14.3 percent among establishments with less than 20 workers and 2 percent among those with less than 500 workers.

The growth in both jobs and small-midsize employer establishments in the energy sector has been noteworthy, again especially given the abysmal performance of the overall economy.

Finally, it must be noted that the Colorado energy sector in fact is not all about huge enterprises. As noted in Table 9, each energy sector looked at is overwhelmingly populated by small and midsize establishments.

- Among oil and gas extraction businesses, 87.4 percent of employer establishments in 2010 had less than 20 workers, and 99.5 percent had fewer than 500 employees.
- Among drilling oil and gas wells businesses, 73.2 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas operations businesses, 87.4 percent of employer establishments in 2010 had less than 20 workers, and 99.5 percent had fewer than 500 employees.
- Among oil and gas pipeline and related structures construction businesses, 78.4 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas field machinery and equipment manufacturing businesses, 75 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.

Table 9: Establishments – Colorado Total and Energy Industries, 2005-2010

Colorado Total Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	151,070	133,125	150,799	88.1%	99.8%
2010	151,973	134,726	151,695	88.7%	99.8%
CO 05-10	0.6%	1.2%	0.6%		
US 05-10	-1.4%	-3.5%	-3.1%		

Oil/Gas Extraction Employer Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	369	325	369	88.1%	100%
2010	397	347	395	87.4%	99.5%
Chg 05-10	7.6%	6.8%	7.0%		

Drilling Oil and Gas Wells Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	86	63	85	73.3%	98.8%
2010	97	71	97	73.2%	100%
Chg 05-10	12.8%	12.7%	14.1%		

Support for Oil and Gas Operations Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	355	317	354	89.3%	99.7%
2010	573	501	570	87.4%	99.5%
Chg 05-10	61.4%	58.0%	61.0%		

Oil and Gas Pipeline and Related Structures Construction Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	50	35	50	70.0%	100%
2010	51	40	51	78.4%	100%
Chg 05-10	2.0%	14.3%	2.0%		

Oil and Gas Field Machinery and Equipment Manufacturing Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	5	3	5	60%	100%
2010	4	3	4	75%	100%
Chg 05-10	-20%	0%	-20%		

IV. Louisiana

The increase in natural gas production has been sizeable in Louisiana, to say the least. The state's natural gas production, as highlighted in Table 10, expanded by 133.7 percent from 2005 to 2011.

Table 10: Louisiana Natural Gas Marketed Production

2005:	1,296.0 billion cubic feet
2011:	3,029.2 billion cubic feet

Table 11: Louisiana Employment Growth Among Employer Establishments, 2005-2010

Sector	2005	2010	Percent Change
Total	1,617,507	1,599,551	-1.1%
Oil/Gas Extraction	10,280	8,565	-16.7%
Drilling Oil and Gas Wells	6,524	6,765	3.7%
Support for Oil and Gas Operations	26,069	32,247	23.7%
Oil and Gas Pipeline and Related Structures Construction	14,452	28,897	100%
Oil and Gas Field Machinery and Equipment Manufacturing	NA	3,575	NA

Impact on Jobs

Table 11 compares employment growth (again, all employment and business data from Census Bureau "County Business Patterns" unless otherwise noted) among employer establishments in the overall state, and in various energy industry sectors. The difference in the employment story between the energy sector and the overall economy is notable, even with the decline in the oil and gas extraction sector.

While overall employment declined between 2005 and 2010 in Louisiana – though at a much slower rate than the decline in the U.S. overall – jobs grew markedly in the energy sector given the expansion in energy production.

While Louisiana and U.S. total employment *declined*, Louisiana employment *grew* in three of the four energy sectors for which data was available, expanding by the following:

- 3.7 percent in the drilling oil and gas wells sector;
- 23.7 percent in the support sector for oil and gas operations; and
- 100 percent in the oil and gas pipeline and related structures construction industry.

While Louisiana employers overall shed 17,956 jobs over this period, employers in the four energy industries (where data was available) included here added 19,149 jobs. That's an incredible contrast.

Impact on Small Businesses

At the same time, while the number of businesses (in this case, establishments) in the nation declined, in Louisiana, the number of establishments grew, and they expanded strongly in the state's energy sector. It is critical to note the role and growth of smaller businesses as well.

Table 12 makes clear that expanded production in the energy sector has been a boon for small and midsize enterprises in the state. Or, to look at it from a different angle, expanded energy production has been driven by small and midsize businesses.

For all of the U.S., total employer establishments declined by 1.4 percent from 2005 to 2010, including a 3.5 percent decline in firms with less than 20 workers, and a 3.1 percent fall in firms with less than 500 workers.

In Louisiana, total establishments increased by 0.6 percent, including a 0.5 percent increase among establishments with less than 20 workers, and a 0.6 percent rise among those with less than 500 workers.

Again, compare the U.S. decline to the growth in these energy industries in Louisiana:

- Among oil and gas extraction businesses, the number of employer establishments grew by 6.0 percent, including growth of 8.8 percent among establishments with less than 20 workers and 6.6 percent among establishments with less than 500 workers.
 - Among oil and gas operations businesses, the number of employer establishments grew by 24.1 percent, including growth of 27.7 percent among establishments with less than 20 workers and 24.6 percent among establishments with less than 500 workers.
 - Among oil and gas pipeline and related structures construction businesses, the number of employer establishments grew by 25.7 percent, including growth of 24.3 percent among establishments with less than 500 workers.
 - Among field machinery and equipment manufacturing businesses, the number of employer establishments grew by 35.6 percent, including growth of 63 percent among establishments with less than 20 workers and 35.6 percent among establishments with less than 500 workers.
- Among oil and gas extraction businesses, 79.6 percent of employer establishments in 2010 had less than 20 workers, and 99.5 percent had fewer than 500 employees.
 - Among drilling oil and gas wells businesses, 69.5 percent of employer establishments in 2010 had less than 20 workers, and 99.4 percent had fewer than 500 employees.
 - Among oil and gas operations businesses, 74 percent of employer establishments in 2010 had less than 20 workers, and 98.9 percent had fewer than 500 employees.
 - Among oil and gas pipeline and related structures construction businesses, 43.9 percent of employer establishments in 2010 had less than 20 workers, and 97 percent had fewer than 500 employees.
 - Among oil and gas field machinery and equipment manufacturing businesses, 55 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.

The growth in both jobs and small-midsize employer establishments in the energy sector has been noteworthy in recent years, again especially given the abysmal performance of the overall economy.

Finally, it must be noted that the Louisiana energy sector in fact is not all about huge enterprises. As noted in Table 12, each energy sector looked at is overwhelmingly populated by small and midsize establishments.

Table 12: Establishments – Louisiana Total and Energy Industries, 2005-2010

Louisiana Total Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	102,790	87,638	102,526	85.3%	99.7%
2010	103,365	88,081	103,130	85.2%	99.8%
LA 05-10	0.6%	0.5%	0.6%		
US 05-10	-1.4%	-3.5%	-3.1%		

Oil/Gas Extraction Employer Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	397	308	393	77.6%	99.0%
2010	421	335	419	79.6%	99.5%
Chg 05-10	6.0%	8.8%	6.6%		

Drilling Oil and Gas Wells Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	179	127	177	70.9%	98.9%
2010	177	123	176	69.5%	99.4%
Chg 05-10	-1.1%	-3.1%	-0.6%		

Support for Oil and Gas Operations Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	738	531	727	72.0%	98.5%
2010	916	678	906	74.0%	98.9%
Chg 05-10	24.1%	27.7%	24.6%		

Oil and Gas Pipeline and Related Structures Construction Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	105	58	103	55.2%	98.1%
2010	132	58	128	43.9%	97.0%
Chg 05-10	25.7%	0%	24.3%		

Oil and Gas Field Machinery and Equipment Manufacturing Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	59	27	59	45.8%	100%
2010	80	44	80	55.0%	100%
Chg 05-10	35.6%	63.0%	35.6%		

V. North Dakota

The big energy story in North Dakota in recent years has been the increase in oil production, pushing the state to ranking second among the states in oil output. At the same time, though, the increase in natural gas production has been sizeable as well. The state's natural gas production, as highlighted in Table 13, expanded by 84.8 percent from 2005 to 2011.

Table 13: North Dakota Natural Gas Marketed Production

2005:	52.557 billion cubic feet
2011:	97.102 billion cubic feet

Table 14: North Dakota Employment Growth Among Employer Establishments, 2005-2010

Sector	2005	2010	Percent Change
Total	270,479	294,907	9.0%
Oil/Gas Extraction	1,130	1,607	42.2%
Drilling Oil and Gas Wells	554	1,442	160.3%
Support for Oil and Gas Operations	1,036	3,604	247.9%
Oil and Gas Pipeline and Related Structures Construction	NA	75	NA
Oil and Gas Field Machinery and Equipment Manufacturing	NA	NA	NA

Impact on Jobs

Table 14 compares employment growth (again, all employment and business data from Census Bureau "County Business Patterns" unless otherwise noted) among employer establishments in the overall state, and in various energy industry sectors. The difference in the employment story between North Dakota, including its energy sector, and the overall U.S. economy is striking.

While overall employment increased between 2005 and 2010 in North Dakota, jobs grew even faster in the energy sector given the expansion in energy production.

While U.S. total employment *declined*, North Dakota employment *grew* overall, including in each energy sector for which data was available, expanding by the following:

- 42.2 percent in the oil and gas extraction sector;
- 160.3 percent in the drilling oil and gas wells sector; and
- 247.9 percent in the support sector for oil and gas operations.

North Dakota employers overall added 24,428 jobs over this period, with employers in the three energy industries (where data was available) included here adding 3,933.

Impact on Small Businesses

At the same time, while the number of businesses (in this case, establishments) in the nation declined, in North Dakota, the number of establishments grew, and they expanded strongly in the state's energy sector. It is critical to note the role and growth of smaller businesses as well.

Table 15 makes clear that expanded production in the energy sector has been a boon for small and midsize enterprises in the state. Or, to look at it from a different angle, expanded energy production has been driven by small and midsize businesses.

For all of the U.S., total employer establishments declined by 1.4 percent from 2005 to 2010, including a 3.5 percent decline in establishments with less than 20 workers, and a 3.1 percent fall in establishments with less than 500 workers.

In North Dakota, total establishments increased by 3.7 percent, including a 1.0 percent increase among establishments with less than 20 workers, and a 2.5 percent rise among those with less than 500 workers.

Again, compare the U.S. decline to the growth in these energy industries in North Dakota:

- Among oil and gas extraction businesses, the number of employer establishments grew by 28.1 percent, including growth of 44 percent among establishments with less than 20 workers and 32.3 percent among establishments with less than 500 workers.
- Among drilling oil and gas wells businesses, the number of employer establishments grew by 20 percent, including growth of 18.2 percent among establishments with less than 20 workers and 20 percent among establishments with less than 500 workers.
- Among oil and gas operations businesses, the number of employer establishments grew by 74.5 percent, including growth of 46.1 percent among establishments with less than 20 workers and 74.5 percent among establishments with less than 500 workers.

The growth in both jobs and small-midsize employer establishments in the energy sector has been noteworthy in recent years, especially given the abysmal performance of the overall economy.

Finally, it must be noted that the North Dakota energy sector in fact is not all about huge enterprises. As noted in Table 15, each energy sector looked at is overwhelmingly populated by small and midsize establishments.

- Among oil and gas extraction businesses, 87.8 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among drilling oil and gas wells businesses, 54.2 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas operations businesses, 73 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas pipeline and related structures construction businesses, 85.7 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas field machinery and equipment manufacturing businesses, 33 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.

Table 15: Establishments – North Dakota Total and Energy Industries, 2005-2010

North Dakota Total Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	21,061	15,268	18,768	72.5%	89.1%
2010	21,832	15,427	19,236	70.7%	88.1%
ND 05-10	3.7%	1.0%	2.5%		
US 05-10	-1.4%	-3.5%	-3.1%		

Oil/Gas Extraction Employer Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	32	25	31	78.1%	96.9%
2010	41	36	41	87.8%	100%
Chg 05-10	28.1%	44.0%	32.3%		

Drilling Oil and Gas Wells Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	20	11	20	55.0%	100%
2010	24	13	24	54.2%	100%
Chg 05-10	20.0%	18.2%	20.0%		

Support for Oil and Gas Operations Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	102	89	102	87.3%	100%
2010	178	130	178	73.0%	100%
Chg 05-10	74.5%	46.1%	74.5%		

Oil and Gas Pipeline and Related Structures Construction Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	7	6	7	85.7%	100%
2010	7	6	7	85.7%	100%
Chg 05-10	0%	0%	0%		

Oil and Gas Field Machinery and Equipment Manufacturing Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	2	2	2	100%	100%
2010	3	1	3	33.0%	100%
Chg 05-10	50.0%	-50.0%	50.0%		

VI. Ohio

The opportunity for increased shale natural gas production exists in Ohio, but is only beginning to move forward. The state's natural gas production, as noted in Table 16, actually contracted between 2005 and 2011, falling by 7.8 percent.

Again, though, the opportunities for expanded production certainly exist with both the Utica and Marcellus Shale plays reaching into the state. In fact, it is worth noting that a December 2012 IHS study projected that jobs tied to unconventional oil and gas production in Ohio could rise from 38,830 in 2012 to 143,595 in 2020 and 266,624 in 2035.¹¹

Table 16: Ohio Natural Gas Marketed Production

2005:	85.523 billion cubic feet
2011:	78.858 billion cubic feet

Table 17: Ohio Employment Growth Among Employer Establishments, 2005-2010

Sector	2005	2010	Percent Change
Total	4,762,618	4,352,481	-8.6%
Oil/Gas Extraction	1,355	1,340	-1.1%
Drilling Oil and Gas Wells	515	542	5.7%
Support for Oil and Gas Operations	1,206	1,023	-15.2%
Oil and Gas Pipeline and Related Structures Construction	2,281	2,411	5.7%
Oil and Gas Field Machinery and Equipment Manufacturing	NA	NA	NA

For good measure, a recent *New York Times* story noted how investment in the state is stepping up.¹² It was noted in the report that "natural gas buried in shale thousands of feet below the surface is attracting more than \$1 billion in private investment and rapidly reviving the area as an energy producer. To prepare, market and transport the natural gas, companies are building an expansive network of regional field offices, processing plants and other infrastructure... In public statements, though, energy industry executives have said drilling and production are being impeded by a shortage of processing plants and pipelines. Chesapeake and

other leading production and processing companies are attacking that problem with an infrastructure development program never seen here, said Thomas E. Stewart, executive vice president of the Ohio Oil and Gas Association... With all this energy-related construction, industry executives believe that Ohio will produce two billion to three billion cubic feet of processed gas daily within the decade."

Impact on Jobs

Table 17 compares employment growth (again, all employ-

ment and business data from Census Bureau “County Business Patterns” unless otherwise noted) among employer establishments in the overall state, and in various energy industry sectors. Unfortunately, given the limited activity on the energy front, Ohio has suffered along with the rest of the nation during these tough economic times.

While U.S. total employment *declined* from 2005 to 2010, it fell even more in Ohio. And the jobs story in the energy sector was mixed, with employment:

- declining by 1.1 percent in the oil and gas extraction sector;
- increasing by 5.7 percent in the drilling oil and gas wells sector;
- declining by 15.2 percent in the support sector for oil and gas operations; and
- increasing by 5.7 percent in the oil and gas pipeline and related structures construction.

Impact on Small Businesses

And while the number of businesses (in this case, establishments) in the nation declined, in Ohio, the decline was even larger.

As noted in Table 18, for all of the U.S., total employer establishments declined by 1.4 percent from 2005 to 2010, including a 3.5 percent decline in firms with less than 20 workers, and a 3.1 percent fall in firms with less than 500 workers.

In Ohio, total establishments decreased by 6.4 percent, including a 9.5 percent drop among establishments with less than 20 workers, and a 8.6 percent fall off among those with less than 500 workers.

Again, compared with the U.S. in general and other states that have moved ahead aggressively on energy production, Ohio’s numbers in the energy sector regarding establishment growth have been very mixed:

- Among oil and gas extraction businesses, the number of employer establishments fell by 5.7 percent, including a fall of 6.2 percent among establishments with less than 20 workers and 5.7 percent among establishments with less than 500 workers.
- Among drilling oil and gas wells businesses, the number of employer establishments declined by 1.4 percent, including growth of 5 percent among establishments with

less than 20 workers and a decline of 1.4 percent among establishments with less than 500 workers.

- Among oil and gas operations businesses, the number of employer establishments actually grew by 9.4 percent, including growth of 9.4 percent among establishments with less than 20 workers and 9.4 percent among establishments with less than 500 workers.
- Among oil and gas pipeline and related structures construction businesses, the number of employer establishments grew by 16.9 percent, including growth of 13.2 percent among establishments with less than 20 workers and 19 percent among those with less than 500.
- Among oil and gas field machinery and equipment manufacturing businesses, the number of employer establishments fell by 33.3 percent, including a decline of 50 percent among establishments with less than 20 workers and 33.3 percent among establishments with less than 500 workers.

Nonetheless, it must be noted that the Ohio energy sector still in fact is not about huge enterprises. As noted in Table 18, each energy sector looked at is overwhelmingly populated by small and midsize establishments.

- Among oil and gas extraction businesses, 92.9 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among drilling oil and gas wells businesses, 91.3 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas operations businesses, 92.1 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas pipeline and related structures construction businesses, 62.3 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas field machinery and equipment manufacturing businesses, 66.7 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.

In the end, the change in Ohio employment and small business growth will increase like other states with significant shale-based energy resources once the state starts moving ahead aggressively with production. And that will only be fed further via LNG exports.

Table 18: Establishments – Ohio Total and Energy Industries, 2005-2010

Ohio Total Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	270,968	181,984	223,825	67.2%	82.6%
2010	253,491	164,646	204,503	65.0%	80.7%
OH 05-10	-6.4%	-9.5%	-8.6%		
US 05-10	-1.4%	-3.5%	-3.1%		

Oil/Gas Extraction Employer Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	209	195	209	93.3%	100%
2010	197	183	197	92.9%	100%
Chg 05-10	-5.7%	-6.2%	-5.7%		

Drilling Oil and Gas Wells Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	70	60	70	85.7%	100%
2010	69	63	69	91.3%	100%
Chg 05-10	-1.4%	5.0%	-1.4%		

Support for Oil and Gas Operations Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	138	127	138	92.0%	100%
2010	151	139	151	92.1%	100%
Chg 05-10	9.4%	9.4%	9.4%		

Oil and Gas Pipeline and Related Structures Construction Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	59	38	58	64.4%	98.3%
2010	69	43	69	62.3%	100%
Chg 05-10	16.9%	13.2%	19.0%		

Oil and Gas Field Machinery and Equipment Manufacturing Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	9	8	9	88.9%	100%
2010	6	4	6	66.7%	100%
Chg 05-10	-33.3%	-50.0%	-33.3%		

VII. Oklahoma

Natural gas production in Oklahoma, as highlighted in Table 19, expanded by 15.2 percent from 2005 to 2011.

Table 19: Oklahoma Natural Gas Marketed Production

2005:	1,639.3 billion cubic feet
2011:	1,888.9 billion cubic feet

Table 20: Oklahoma Employment Growth Among Employer Establishments, 2005-2010

Sector	2005	2010	Percent Change
Total	1,220,285	1,241,168	1.7%
Oil/Gas Extraction	9,878	14,685	48.7%
Drilling Oil and Gas Wells	6,460	7,317	13.3%
Support for Oil and Gas Operations	12,705	16,520	30.0%
Oil and Gas Pipeline and Related Structures Construction	2,956	3,825	29.4%
Oil and Gas Field Machinery and Equipment Manufacturing	3,746	3,744	-0.05%

Impact on Jobs

Table 20 compares employment growth (again, all employment and business data from Census Bureau "County Business Patterns" unless otherwise noted) among employer establishments in the overall state, and in various energy industry sectors. The difference in the employment story between Oklahoma, including its energy sector, and the overall U.S. economy is striking.

While overall employment increased between 2005 and 2010 in Oklahoma, jobs grew robustly in the energy sector given the expansion in energy production.

While U.S. total employment *declined*, Oklahoma employment *grew* overall, including in the energy sector, expanding by the following:

- 48.7 percent in the oil and gas extraction sector;
- 13.3 percent in the drilling oil and gas wells sector;
- 30 percent in the support sector for oil and gas operations; and
- 29.4 percent in the oil and gas pipeline and related structures construction sector.

Oklahoma employers overall added 20,833 jobs over this period, with employers in the energy industries included here adding 10,346, or half the jobs added.

Impact on Small Businesses

At the same time, while the number of businesses (in this case, establishments) in the nation declined, in Oklahoma, the number of establishments grew, and they expanded strongly in the state's energy sector. It is critical to note the role and growth of smaller businesses as well.

Table 21 makes clear that expanded production in the energy sector has been a boon for small and midsize enterprises in the state. Or, to look at it from a different angle, expanded energy production has been driven by small and midsize businesses.

For all of the U.S., total employer establishments declined by 1.4 percent from 2005 to 2010, including a 3.5 percent decline in firms with less than 20 workers, and a 3.1 percent fall in firms with less than 500 workers.

In Oklahoma, total establishments increased by 1.7 percent, including a 1.4 percent increase among establishments with less than 20 workers, and a 1.7 percent rise among those with less than 500 workers.

Again, compare the U.S. decline to the growth in these energy industries in Oklahoma:

- Among oil and gas extraction businesses, the number of employer establishments grew by 11.8 percent, including growth of 10.2 percent among establishments with less than 20 workers and 11.8 percent among establishments with less than 500 workers.
- Among oil and gas operations businesses, the number of employer establishments grew by 37.3 percent, including growth of 35.7 percent among establishments with less than 20 workers and 37.3 percent among establishments with less than 500 workers.
- Among oil and gas pipeline and related structures construction businesses, the number of employer establishments grew by 14.3 percent, including growth of 9.0 percent among those with less than 20 workers and 13.3 percent among establishments with less than 500 workers.
- Among oil and gas field machinery and equipment manufacturing businesses, the number of employer establishments grew by 28.4 percent, including growth of 36.1 percent among those with less than 20 workers and 28.8 percent among those with less than 500 workers.

The growth in both jobs and small-midsize employer establishments in Oklahoma's energy sector has been strong in recent years, again especially given the abysmal performance of the overall U.S. economy.

Finally, it must be noted that the Oklahoma energy sector in fact is not the domain of huge enterprises. As noted in Table 21, each energy sector looked at is overwhelmingly populated by small and midsize establishments.

- Among oil and gas extraction businesses, 90.6 percent of employer establishments in 2010 had less than 20 workers, and 99.9 percent had fewer than 500 employees.
- Among drilling oil and gas wells businesses, 79.7 percent of employer establishments in 2010 had less than 20 workers, and 98.3 percent had fewer than 500 employees.
- Among oil and gas operations businesses, 86.9 percent of employer establishments in 2010 had less than 20 workers, and 99.8 percent had fewer than 500 employees.
- Among oil and gas pipeline and related structures construction businesses, 64.3 percent of employer establishments in 2010 had less than 20 workers, and 99.1 percent had fewer than 500 employees.
- Among oil and gas field machinery and equipment manufacturing businesses, 57 percent of employer establishments in 2010 had less than 20 workers, and 98.8 percent had fewer than 500 employees.

Table 21: Establishments – Oklahoma Total and Energy Industries, 2005-2010

Oklahoma Total Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	88,548	76,986	88,369	86.9%	99.8%
2010	90,050	78,044	89,885	86.7%	99.8%
OK 05-10	1.7%	1.4%	1.7%		
US 05-10	-1.4%	-3.5%	-3.1%		

Oil/Gas Extraction Employer Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	1,076	989	1,075	91.9%	99.9%
2010	1,203	1,090	1,202	90.6%	99.9%
Chg 05-10	11.8%	10.2%	11.8%		

Drilling Oil and Gas Wells Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	235	195	233	83.0%	99.1%
2010	237	189	233	79.7%	98.3%
Chg 05-10	0.9%	-3.0%	0%		

Support for Oil and Gas Operations Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	914	804	912	88.0%	99.8%
2010	1,255	1,091	1,252	86.9%	99.8%
Chg 05-10	37.3%	35.7%	37.3%		

Oil and Gas Pipeline and Related Structures Construction Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	98	66	98	67.3%	100%
2010	112	72	111	64.3%	99.1%
Chg 05-10	14.3%	9.0%	13.3%		

Oil and Gas Field Machinery and Equipment Manufacturing Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	67	36	66	53.7%	98.5%
2010	86	49	85	57.0%	98.8%
Chg 05-10	28.4%	36.1%	28.8%		

VIII. Pennsylvania

The increase in natural gas production has been dramatic in Pennsylvania via the Marcellus Shale area. The state's natural gas production, as highlighted in Table 22, expanded by 677.8 percent from 2005 to 2011.

Table 22: Pennsylvania Natural Gas Marketed Production

2005:	168.5 billion cubic feet
2011:	1,310.6 billion cubic feet

Table 23: Pennsylvania Employment Growth Among Employer Establishments, 2005-2010

Sector	2005	2010	Percent Change
Total	5,082,630	4,976,193	-2.1%
Oil/Gas Extraction	1,809	3,270	80.8%
Drilling Oil and Gas Wells	846	2,696	218.7%
Support for Oil and Gas Operations	1,640	3,620	120.7%
Oil and Gas Pipeline and Related Structures Construction	1,025	2,566	150.3%
Oil and Gas Field Machinery and Equipment Manufacturing	347	301	-13.3%

Impact on Jobs

Table 23 compares employment growth (again, all employment and business data from Census Bureau "County Business Patterns" unless otherwise noted) among employer establishments in the overall state, and in various energy industry sectors. The difference in the employment story between the energy sector and the overall economy is striking.

While overall employment fell between 2005 and 2010, jobs grew markedly in the energy sector given the expansion in energy production.

While both U.S. and Pennsylvania total employment *declined* from 2005 to 2010, Pennsylvania jobs *grew* by the following:

- 80.8 percent in the oil and gas extraction sector;
- 218.7 percent in the drilling oil and gas wells sector;
- 120.7 percent in the support sector for oil and gas operations; and
- 150.3 percent in the oil and gas pipeline and related structures construction sector.

While Pennsylvania employers overall shed 106,437 jobs over this period, employers in the four energy industries (where data was available) included here added more than 5,823 jobs.

Impact on Small Businesses

At the same time, while the number of businesses (in this case, establishments) declined in the nation and in Pennsylvania, the number of establishments grew strongly among Pennsylvania's energy sector. And it is critical to note the role and growth of smaller businesses.

Table 24 makes clear that expanded production in the energy sector has been a boon for small and midsize enterprises in the state. Or, to look at it from a different angle, expanded energy production has been driven by small and midsize businesses.

For all of the U.S., total employer establishments declined by 1.4 percent from 2005 to 2010, including a 3.5 percent decline in firms with less than 20 workers, and a 3.1 percent fall in firms with less than 500 workers.

In Pennsylvania, total establishments declined by 2.1 percent, including a 2.2 percent fall among establishments with less than 20 workers, and a 2.1 percent decline among those with less than 500 workers.

Compare those declines to the growth in these energy industries in Pennsylvania:

- Among oil and gas extraction businesses, the number of employer establishments grew by 40.7 percent, including growth of 36.3 percent among establishments with less than 20 workers and 40.7 percent among establishments with less than 500 workers.
- Among drilling oil and gas wells businesses, the number of employer establishments grew by 104.2 percent, including growth of 121.6 percent among establishments with less than 20 workers and 102.1 percent among establishments with less than 500 workers.
- Among supporting oil and gas operations businesses, the number of employer establishments grew by 119.5 percent, including growth of 111.7 percent among those with less than 20 workers and 119.5 percent among establishments with less than 500 workers.
- Among oil and gas pipeline and related structures construction businesses, the number of employer establishments grew by 14.8 percent, including growth of 13 percent among establishments with less than 500 workers.

The growth in both jobs and small-midsize employer establishments in the energy sector has been striking in recent years, especially given the abysmal performance of the overall economy.

Finally, it must be noted that the Pennsylvania energy sector is not all about huge enterprises. As noted in Table 24, each energy sector looked at is overwhelmingly populated by small and midsize establishments.

- Among oil and gas extraction businesses, 80.1 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among drilling oil and gas wells businesses, 83.7 percent of employer establishments in 2010 had less than 20 workers, and 99 percent had fewer than 500 employees.
- Among oil and gas operations businesses, 75.1 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas pipeline and related structures construction businesses, 74.2 percent of employer establishments in 2010 had less than 20 workers, and 98.4 percent had fewer than 500 employees.
- Among oil and gas field machinery and equipment manufacturing establishments, 50 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.

Table 24: Establishments – Pennsylvania Total and Energy Industries, 2005-2010

Pennsylvania Total Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	303,333	258,823	302,449	85.3%	99.7%
2010	297,023	253,251	296,208	85.3%	99.7%
PA 05-10	-2.1%	-2.2%	-2.1%		
US 05-10	-1.4%	-3.5%	-3.1%		

Oil/Gas Extraction Employer Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	150	124	150	82.7%	100%
2010	211	169	211	80.1%	100%
Chg 05-10	40.7%	36.3%	40.7%		

Drilling Oil and Gas Wells Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	48	37	48	77.1%	100%
2010	98	82	97	83.7%	99.0%
Chg 05-10	104.2%	121.6%	102.1%		

Support for Oil and Gas Operations Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	77	60	77	77.9%	100%
2010	169	127	169	75.1%	100%
Chg 05-10	119.5%	111.7%	119.5%		

Oil and Gas Pipeline and Related Structures Construction Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	54	46	54	85.2%	100%
2010	62	46	61	74.2%	98.4%
Chg 05-10	14.8%	0%	13.0%		

Oil and Gas Field Machinery and Equipment Manufacturing Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	11	5	11	45.5%	100%
2010	10	5	10	50.0%	100%
Chg 05-10	-9.1%	0%	-9.1%		

IX. Texas

The increase in natural gas production has been considerable in Texas. The state's natural gas production, as highlighted in Table 25, expanded by 34.8 percent from 2005 to 2011.

Table 25: Texas Natural Gas Marketed Production

2005:	5,276.4 billion cubic feet
2011:	7,112.9 billion cubic feet

Table 26: Texas Employment Growth Among Employer Establishments, 2005-2010

Sector	2005	2010	Percent Change
Total	8,305,102	8,785,238	5.8%
Oil/Gas Extraction	34,124	42,889	25.7%
Drilling Oil and Gas Wells	31,310	32,485	3.8%
Support for Oil and Gas Operations	53,064	78,505	47.9%
Oil and Gas Pipeline and Related Structures Construction	29,299	41,699	42.3%
Oil and Gas Field Machinery and Equipment Manufacturing	20,544	26,455	28.8%

Impact on Jobs

Table 26 compares employment growth (all employment and business data from Census Bureau "County Business Patterns" unless otherwise noted) among employer establishments in the overall state, and in various energy industry sectors.

The difference in the employment story in Texas versus the U.S. at large is breathtaking, including the growth in the Texas energy sector.

While Texas total employment increased by 5.8% percent from 2005 to 2010, jobs grew by the following:

- 25.7 percent in the oil and gas extraction sector;
- 3.8 percent in the drilling oil and gas wells sector;
- 47.9 percent in the support sector for oil and gas operations;
- 42.3 percent in the oil and gas pipeline and related structures construction sector; and
- 28.8 percent in the oil and gas field machinery and equipment manufacturing sector.

Texas employers overall added 480,136 jobs over this period, including employers in the energy industries included here adding 53,692 jobs.

Impact on Small Businesses

At the same time, while the number of businesses (in this case, establishments) declined in the nation, the number of establishments grew strongly in Texas, including in the energy sector. And it is critical to note the role and growth of smaller businesses.

Table 27 makes clear that expanded production in the energy sector has been a boon for small and midsize enterprises in the state. Or, to look at it from a different angle, expanded energy production has been driven by small and midsize businesses.

For all of the U.S., total employer establishments declined by 1.4 percent from 2005 to 2010, including a 3.5 percent decline in firms with less than 20 workers, and a 3.1 percent fall in firms with less than 500 workers.

In Texas, total establishments increased by 4.9 percent, including a 4.7 percent increase among establishments with less than 20 workers, and a 4.9 percent increase among those with less than 500 workers. The growth in energy industries in Texas were:

- Among oil and gas extraction businesses, the number of employer establishments grew by 9 percent, including growth of 6.7 percent among establishments with less than 20 workers and 9.1 percent among establishments with less than 500 workers.
- Among drilling oil and gas wells businesses, the number of employer establishments grew by 19.1 percent, including growth of 12 percent among establishments with less than 20 workers and 20.7 percent among establishments with less than 500 workers.
- Among supporting oil and gas operations businesses, the number of employer establishments grew by 34.2 percent, including growth of 29.4 percent among establishments with less than 20 workers and 34.4 percent among establishments with less than 500 workers.
- Among oil and gas pipeline and related structures construction businesses, the number of employer establishments grew by 37.8 percent, including growth of 36 percent among establishments with less than 20 workers and 38.2 percent among establishments with less than 500 workers.
- Among oil and gas field machinery and equipment manufacturing businesses, the number of employer estab-

lishments grew by 11.4 percent, including growth of 14.8 percent among establishments with less than 20 workers and 11.4 percent among those with less than 500.

The growth in both jobs and small-midsize employer establishments in the energy sector has been striking in recent years, especially given the abysmal performance of the overall economy.

Finally, it must be noted that the Texas energy sector in fact is not all about so-called “Big Oil.” As noted in Table 27, each energy sector looked at is overwhelmingly populated by small and midsize establishments.

- Among oil and gas extraction businesses, 88.7 percent of employer establishments in 2010 had less than 20 workers, and 99.9 percent had fewer than 500 employees.
- Among drilling oil and gas wells businesses, 72 percent of employer establishments in 2010 had less than 20 workers, and 98.6 percent had fewer than 500 employees.
- Among oil and gas operations businesses, 78.3 percent of employer establishments in 2010 had less than 20 workers, and 99.6 percent had fewer than 500 employees.
- Among oil and gas pipeline and related structures construction businesses, 53.3 percent of employer establishments in 2010 had less than 20 workers, and 97 percent had fewer than 500 employees.
- Among oil and gas field machinery and equipment manufacturing establishments, 54.4 percent of employer establishments in 2010 had less than 20 workers, and 96.8 percent had fewer than 500 employees.

Table 27: Establishments – Texas Total and Energy Industries, 2005-2010

Texas Total Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	497,758	423,838	496,364	85.1%	99.7%
2010	522,146	443,599	520,718	85.0%	99.7%
TX 05-10	4.9%	4.7%	4.9%		
US 05-10	-1.4%	-3.5%	-3.1%		

Oil/Gas Extraction Employer Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	2,958	2,681	2,952	90.6%	99.8%
2010	3,225	2,860	3,222	88.7%	99.9%
Chg 05-10	9.0%	6.7%	9.1%		

Drilling Oil and Gas Wells Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	587	449	571	76.5%	97.3%
2010	699	503	689	72.0%	98.6%
Chg 05-10	19.1%	12.0%	20.7%		

Support for Oil and Gas Operations Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	2,377	1,930	2,365	81.2%	99.5%
2010	3,191	2,497	3,179	78.3%	99.6%
Chg 05-10	34.2%	29.4%	34.4%		

Oil and Gas Pipeline and Related Structures Construction Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	365	197	353	54.0%	96.7%
2010	503	268	488	53.3%	97.0%
Chg 05-10	37.8%	36.0%	38.2%		

Oil and Gas Field Machinery and Equipment Manufacturing Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	307	162	297	52.8%	96.7%
2010	342	186	331	54.4%	96.8%
Chg 05-10	11.4%	14.8%	11.4%		

X. Utah

The increase in natural gas production has been sizeable in Utah. The state's natural gas production, as highlighted in Table 28, expanded by 51.9 percent from 2005 to 2011.

Table 28: Utah Natural Gas Marketed Production

2005:	301.2 billion cubic feet
2011:	457.5 billion cubic feet

Table 29: Utah Employment Growth Among Employer Establishments, 2005-2010

Sector	2005	2010	Percent Change
Total	974,686	1,021,143	4.8%
Oil/Gas Extraction	1,027	1,262	22.9%
Drilling Oil and Gas Wells	610	716	17.4%
Support for Oil and Gas Operations	1,582	2,374	50.1%
Oil and Gas Pipeline and Related Structures Construction	547	452	-17.4%
Oil and Gas Field Machinery and Equipment Manufacturing	NA	NA	NA

Impact on Jobs

Table 29 compares employment growth (again, all employment and business data from Census Bureau "County Business Patterns" unless otherwise noted) among employer establishments in the overall state, and in various energy industry sectors.

The difference in the employment story in Utah versus the U.S. at large is striking, including the growth in the Utah energy sector.

While Utah total employment increased by 4.8% percent from 2005 to 2010, jobs *grew* by the following:

- 22.9 percent in the oil and gas extraction sector;

- 17.4 percent in the drilling oil and gas wells sector; and
- 50.1 percent in the support sector for oil and gas operations.

Utah employers overall added 46,457 jobs over this period, including employers in the energy industries included here adding 1,038 jobs.

Impact on Small Businesses

At the same time, while the number of businesses (in this case, establishments) declined in the nation, the number of establishments grew strongly in Utah, including in the energy sector. And it is critical to note the role and growth of smaller businesses.

Table 30 makes clear that expanded production in the energy sector has been a boon for small and midsize enterprises in the state. Or, to look at it from a different angle, expanded energy production has been driven by small and midsize businesses.

For all of the U.S., total employer establishments declined by 1.4 percent from 2005 to 2010, including a 3.5 percent decline in firms with less than 20 workers, and a 3.1 percent fall in firms with less than 500 workers.

In Utah, though, total establishments increased by 5.0 percent, including a 5.3 percent rise among establishments with less than 20 workers, and a 5.0 percent increase among those with less than 500 workers. The growth in energy industries in Utah were:

- Among oil and gas extraction businesses, the number of employer establishments grew by 3.6 percent, including growth of 10 percent among establishments with less than 20 workers and 3.6 percent among establishments with less than 500 workers.
- Among drilling oil and gas wells businesses, the number of employer establishments grew by 56.8 percent, including growth of 33.3 percent among establishments with less than 20 workers and 56.8 percent among establishments with less than 500 workers.
- Among supporting oil and gas operations businesses, the number of employer establishments grew by 41.2 percent, including growth of 39.9 percent among establishments with less than 20 workers and 41.2 percent among establishments with less than 500 workers.
- Among oil and gas pipeline and related structures construction businesses, the number of employer establishments grew by 4.2 percent, including growth of 4.2 percent among establishments with less than 500 workers.
- Among oil and gas field machinery and equipment manufacturing businesses, the number of employer establishments grew by 33.3 percent, including growth of 33.3 percent among establishments with less than 500 workers.

The growth in both jobs and small-midsize employer establishments in the energy sector has been striking in recent years, especially given the abysmal performance of the overall economy.

Finally, it must be noted that the Utah energy sector in fact is not all about large companies. As noted in Table 30, each energy sector looked at is overwhelmingly populated by small and midsize establishments.

- Among oil and gas extraction businesses, 75.9 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among drilling oil and gas wells businesses, 75.9 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas operations businesses, 89.2 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas pipeline and related structures construction businesses, 64 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas field machinery and equipment manufacturing establishments, 75 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.

Table 30: Establishments – Utah Total and Energy Industries, 2005-2010

Utah Total Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	65,549	57,040	65,399	87.0%	99.8%
2010	68,820	60,074	68,656	87.3%	99.8%
UT 05-10	5.0%	5.3%	5.0%		
US 05-10	-1.4%	-3.5%	-3.1%		

Oil/Gas Extraction Employer Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	56	40	56	71.4%	100%
2010	58	44	58	75.9%	100%
Chg 05-10	3.6%	10.0%	3.6%		

Drilling Oil and Gas Wells Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	37	33	37	89.2%	100%
2010	58	44	58	75.9%	100%
Chg 05-10	56.8%	33.3%	56.8%		

Support for Oil and Gas Operations Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	170	153	170	90.0%	100%
2010	240	214	240	89.2%	100%
Chg 05-10	41.2%	39.9%	41.2%		

Oil and Gas Pipeline and Related Structures Construction Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	24	18	24	75.0%	100%
2010	25	16	25	64.0%	100%
Chg 05-10	4.2%	-11.1%	4.2%		

Oil and Gas Field Machinery and Equipment Manufacturing Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	3	3	3	100%	100%
2010	4	3	4	75%	100%
Chg 05-10	33.3%	0%	33.3%		

XI. West Virginia

The increase in natural gas production has been sizeable in West Virginia. The state's natural gas production, as highlighted in Table 31, expanded by 78.2 percent from 2005 to 2011.

Table 31: West Virginia Natural Gas Marketed Production

2005:	221.1 billion cubic feet
2011:	394.1 billion cubic feet

Table 32: West Virginia Employment Growth Among Employer Establishments, 2005-2010

Sector	2005	2010	Percent Change
Total	565,499	560,450	-0.9%
Oil/Gas Extraction	1,806	2,605	44.2%
Drilling Oil and Gas Wells	929	1,016	9.4%
Support for Oil and Gas Operations	1,154	2,296	99.0%
Oil and Gas Pipeline and Related Structures Construction	868	1,000-2,499	NA
Oil and Gas Field Machinery and Equipment Manufacturing	NA	NA	NA

Impact on Jobs

Table 32 compares employment growth (all employment and business data from Census Bureau "County Business Patterns" unless otherwise noted) among employer establishments in the overall state, and in various energy industry sectors. The key point in the employment story in West Virginia has to do with the energy sector.

While West Virginia total employment decreased by 0.9 percent from 2005 to 2010, jobs grew by the following:

- 44.2 percent in the oil and gas extraction sector;
- 9.4 percent in the drilling oil and gas wells sector; and

- 99 percent in the support sector for oil and gas operations.

West Virginia employers overall shed 5,049 jobs over this period, yet employers in the energy industries included here (three for which there are data) added 2,028 jobs.

Impact on Small Businesses

At the same time, while the number of businesses (in this case, establishments) declined in the nation and in West Virginia overall, the number of establishments grew strongly in West Virginia's energy sector. And it is critical to note the role and growth of smaller businesses.

Table 33 makes clear that expanded production in the energy sector has been a boon for small and midsize enterprises in the state. Or, to look at it from a different angle, expanded energy production has been driven by small and midsize businesses.

For all of the U.S., total employer establishments declined by 1.4 percent from 2005 to 2010, including a 3.5 percent decline in firms with less than 20 workers, and a 3.1 percent fall in firms with less than 500 workers.

In West Virginia, total establishments declined by 5.0 percent, including a 5.5 percent fall among establishments with less than 20 workers, and a 5.0 percent decline among those with less than 500 workers. However, the growth in energy industries in West Virginia were:

- Among oil and gas extraction businesses, the number of employer establishments grew by 9.6 percent, including growth of 5.3 percent among establishments with less than 20 workers and 9.6 percent among establishments with less than 500 workers.
- Among drilling oil and gas wells businesses, the number of employer establishments grew by 12.5 percent, including growth of 36.6 percent among establishments with less than 20 workers and 12.5 percent among establishments with less than 500 workers.
- Among supporting oil and gas operations businesses, the number of employer establishments grew by 48.3 percent, including growth of 45.2 percent among establishments with less than 20 workers and 48.3 percent among establishments with less than 500 workers.
- Among oil and gas pipeline and related structures construction businesses, the number of employer establishments grew by 14.3 percent, including growth of 30.2 percent among establishments with less than 20 workers, and 14.3 percent among establishments with less than 500 workers.

The growth in both jobs and small-midsize employer establishments in the energy sector has been striking in recent years, especially given the abysmal performance of the overall economy.

Finally, it must be noted that the West Virginia energy sector in fact is not all about huge enterprises. As noted in Table 33, each energy sector looked at is overwhelmingly populated by small and midsize establishments.

- Among oil and gas extraction businesses, 86.9 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among drilling oil and gas wells businesses, 77.8 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas operations businesses, 82.2 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas pipeline and related structures construction businesses, 75 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas field machinery and equipment manufacturing establishments, 50 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.

Table 33: Establishments – West Virginia Total and Energy Industries, 2005-2010

West Virginia Total Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	40,735	35,419	40,656	86.9%	99.8%
2010	38,676	33,463	38,604	86.5%	99.8%
WV 05-10	-5.0%	-5.5%	-5.0%		
US 05-10	-1.4%	-3.5%	-3.1%		

Oil/Gas Extraction Employer Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	188	170	188	90.4%	100%
2010	206	179	206	86.9%	100%
Chg 05-10	9.6%	5.3%	9.6%		

Drilling Oil and Gas Wells Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	40	26	40	65.0%	100%
2010	45	35	45	77.8%	100%
Chg 05-10	12.5%	36.6%	12.5%		

Support for Oil and Gas Operations Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	87	73	87	83.9%	100%
2010	129	106	129	82.2%	100%
Chg 05-10	48.3%	45.2%	48.3%		

Oil and Gas Pipeline and Related Structures Construction Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	35	23	35	65.7%	100%
2010	40	30	40	75.0%	100%
Chg 05-10	14.3%	30.4%	14.3%		

Oil and Gas Field Machinery and Equipment Manufacturing Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	4	2	4	50.0%	100%
2010	2	1	2	50.0%	100%
Chg 05-10	-50.0%	-50.0%	-50.0%		

XII. Wyoming

The increase in natural gas production has been notable in Wyoming. The state's natural gas production, as highlighted in Table 34, expanded by 31.7 percent from 2005 to 2011.

Table 34: Wyoming Natural Gas Marketed Production

2005:	1,639.3 billion cubic feet
2011:	2,159.4 billion cubic feet

Table 35: Wyoming Employment Growth Among Employer Establishments, 2005-2010

Sector	2005	2010	Percent Change
Total	191,934	205,046	6.8%
Oil/Gas Extraction	2,663	3,592	34.9%
Drilling Oil and Gas Wells	3,041	3,604	35.3%
Support for Oil and Gas Operations	7,342	7,506	2.2%
Oil and Gas Pipeline and Related Structures Construction	892	2,987	234.9%
Oil and Gas Field Machinery and Equipment Manufacturing	NA	364	NA

Impact on Jobs

Table 35 compares employment growth (again, all employment and business data from Census Bureau "County Business Patterns" unless otherwise noted) among employer establishments in the overall state, and in various energy industry sectors.

Employment growth in Wyoming was positive over the period of 2005 to 2010, compared to a decline nationally, with Wyoming's energy sector showing particularly solid expansion.

While Wyoming total employment increased by 6.8 percent from 2005 to 2010, jobs grew by the following:

- 34.9 percent in the oil and gas extraction sector;
- 35.3 percent in the drilling oil and gas wells sector;
- 2.2 percent in the support sector for oil and gas operations; and
- 234.9 percent in the oil and gas pipeline and related structures construction sector.

Wyoming employers overall added 13,112 jobs over this period, yet employers in the energy industries included here (four for which there are data) added 3,751 jobs.

Impact on Small Businesses

At the same time, while the number of businesses (in this case, establishments) declined in the nation, the number of establishments grew in Wyoming, including in the energy sector. And it is critical to note the role and growth of smaller businesses.

Table 36 makes clear that expanded production in the energy sector has been a boon for small and midsize enterprises in the state. Or, to look at it from a different angle, expanded energy production has been driven by small and midsize businesses.

For all of the U.S., total employer establishments declined by 1.4 percent from 2005 to 2010, including a 3.5 percent decline in firms with less than 20 workers, and a 3.1 percent fall in firms with less than 500 workers.

In Wyoming, total establishments increased by 2.5 percent, including a 2.6 percent rise among establishments with less than 20 workers, and a 2.5 percent increase among those with less than 500 workers.

The growth in energy industries in Wyoming was:

- Among drilling oil and gas wells businesses, the number of employer establishments grew by 20.6 percent, including growth of 19.6 percent among establishments with less than 20 workers and 20.6 percent among establishments with less than 500 workers.
- Among supporting oil and gas operations businesses, the number of employer establishments grew by 13.6 percent, including growth of 13.3 percent among establishments with less than 20 workers and 13.9 percent among establishments with less than 500 workers.
- Among oil and gas pipeline and related structures construction businesses, the number of employer establishments grew by 40.7 percent, including growth of 51.3 percent among establishments with less than 20 workers, and 38.9 percent among establishments with less than 500 workers.

The growth in both jobs and small-midsize employer establishments in the energy sector has been striking in recent years, especially given the abysmal performance of the overall economy.

Finally, it must be noted that the Wyoming energy sector in fact is not all about big businesses. As noted in Table 36, each energy sector looked at is overwhelmingly populated by small and midsize firms.

- Among oil and gas extraction businesses, 75.6 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among drilling oil and gas wells businesses, 75.8 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.
- Among oil and gas operations businesses, 83.5 percent of employer establishments in 2010 had less than 20 workers, and 99.6 percent had fewer than 500 employees.
- Among oil and gas pipeline and related structures construction businesses, 73.7 percent of employer establishments in 2010 had less than 20 workers, and 98.7 percent had fewer than 500 employees.
- Among oil and gas field machinery and equipment manufacturing establishments, 45.5 percent of employer establishments in 2010 had less than 20 workers, and 100 percent had fewer than 500 employees.

Table 36: Establishments – Wyoming Total and Energy Industries, 2005-2010

Wyoming Virginia Total Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	19,736	17,804	19,715	90.2%	99.9%
2010	20,231	18,270	20,213	90.3%	99.9%
WY 05-10	2.5%	2.6%	2.5%		
US 05-10	-1.4%	-3.5%	-3.1%		

Oil/Gas Extraction Employer Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	205	159	205	77.6%	100%
2010	180	136	180	75.6%	100%
Chg 05-10	-12.2%	-14.5%	-12.2%		

Drilling Oil and Gas Wells Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	98	81	98	82.7%	100%
2010	128	97	128	75.8%	100%
Chg 05-10	20.6%	19.6%	20.6%		

Support for Oil and Gas Operations Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	412	345	409	83.7%	99.3%
2010	468	391	466	83.5%	99.6%
Chg 05-10	13.6%	13.3%	13.9%		

Oil and Gas Pipeline and Related Structures Construction Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	54	37	54	68.5%	100%
2010	76	56	75	73.7%	98.7%
Chg 05-10	40.7%	51.3%	38.9%		

Oil and Gas Field Machinery and Equipment Manufacturing Establishments

	Total	Number of Employees		As Percent of Total Firms	
		Less 20	Less 500	Less 20	Less 500
2005	11	8	11	72.7	100%
2010	11	5	11	45.5%	100%
Chg 05-10	0%	-37.5%	0%		

XIII. LNG Exports: Expand or Limit Opportunities?

As is clear from the trends noted throughout this analysis, advancements in technology have opened up vast resources of natural gas (as well as oil) in shale rock that were previously not accessible. As a result, natural gas prices have plummeted in the U.S. However, prices remain high in other parts of the world, and therefore, the potential exists for economic benefits to be derived from exporting LNG.

That is, the trends in terms of expanded investment, entrepreneurship, economic growth and employment that have been highlighted given the expansion of domestic energy production – with our emphasis primarily on natural gas via hydraulic fracturing and horizontal drilling – can be expanded further through global markets for LNG.

Of course, this is how markets work. Prices send signals to producers to expand investment and production. Expanded foreign demand can boost the incomes of U.S. energy entrepreneurs, businesses and workers, with added benefits rippling out through the larger economy. Naturally, businesses must consider costs relative to the potential revenues, and assess the state of current and future competitors to get a full picture of the opportunity. The opportunity and evaluation process that businesses undertake was noted in a recent analysis of the LNG export issue published by the Peterson Institute for International Economics:

“US natural gas producers are eager to take advantage of tremendous price differentials between the United States and foreign markets. US prices are around \$3 per million metric British thermal units (mmBtu), while prices in Europe are \$11 to \$13 per mmBtu and as high as \$18 per mmBtu in Southeast Asia. Even considering the cost of liquefaction and ocean transportation at \$3.50 to \$9.00 per mmBtu, producers can export LNG and earn a significant profit over domestic sales.”¹³

Unfortunately, though, there is a movement afoot to actually have government limit LNG exports. Various chemical firms are seeking such limits. As the *Houston Chronicle* reported on January 10, 2013: “Some of the nation’s largest chemical makers and manufacturers on Thursday united as a new coalition to lobby against a wholesale rush to export America’s new natural gas bounty, which they say threatens some \$80 billion in planned investments in new U.S. plants and assembly lines.” They are concerned about higher natural gas prices due to increased exports.

Given the benefits that the chemicals industry has reaped

in the international marketplace, these firms effectively are arguing that exports are fine for us, but not for others, in particular, the firms that produce our inputs. Consider the increases in U.S. chemical exports (in millions of dollars) from 2000 to 2011 in Table 37.

Based on their own arguments, might it follow then that these chemical firms should have their own exports limited, so as to keep their own products’ prices in check for U.S. consumers of such chemicals? Of course not.

As noted in the Peterson Institute for International Economics analysis: “Fears of a significant increase in average domestic natural gas prices over a 20-year horizon are no more justified as a reason for limiting US exports of LNG than they would be as a reason for limiting exports of soybeans, corn, coal, or other natural resources. Historically, domestic price stabilization has not been an objective of US export policy. Rather, the overarching philosophy of a market economy is that prices for individual commodities should be allowed to fluctuate and thereby guide rational production and consumption decisions, both at home and abroad.”¹⁴

Therefore, expanded demand for U.S. natural gas in international markets will result in greater U.S. natural gas production, increased investment, enhanced GDP growth, rising incomes, and more jobs – just as is the case with increasing exports in chemical industries.

Table 37: Chemical Industry: Export Growth, 2000-2011

Category	2000 Exports	2011 Exports	Percent Change
Chemicals – Cosmetics	5,292	13,244	150%
Chemicals – Dyeing	4,089	8,542	109%
Chemicals – Fertilizers	2,249	5,133	128%
Chemicals – Inorganic	5,359	13,345	149%
Chemicals – Medicinal	12,893	40,011	210%
Chemicals – n.e.s	12,264	27,127	121%
Chemicals – Organic	17,990	43,571	142%
Chemicals – Plastics	19,519	46,195	137%

Economics 101 reminds us that the economy is not a zero-sum game. Therefore, expanded demand for U.S. natural gas in international markets will result in greater U.S. natural gas production, increased investment, enhanced GDP growth, rising incomes, and more jobs – just as is the case with increasing exports in chemical industries.

If one understands that international trade is mutually beneficial (otherwise, why would the parties participate in the transaction?), and that trade expands opportunity, enhances incentives for investment and expanded production, boosts competition, and increases income and employment, then the idea that government should place barriers on either exports or imports is glaringly absurd. Again, Economics 101 offers the lesson of comparative advantage, taught by the 19th-century economist David Ricardo, showing how trade is an economic positive as businesses, entrepreneurs and workers focus on the endeavors at which they rank as most efficient, and then trade with others for other goods and services. That’s how the domestic and global economies work.

Unsurprisingly, study after study shows how these basic economic principles apply to energy markets. Consider the following examples.

- In “Macroeconomic Impacts of LNG Exports from the United States,” researched and written by NERA Economic Consulting for the Energy Information Administration (December 2012), it was found: “Across all these scenarios, the U.S. was projected to gain net economic benefits from allowing LNG exports. Moreover, for every one of the market scenarios examined, net economic benefits increased as the level of LNG exports increased. In particular, scenarios with unlimited exports always had higher net economic benefits than corresponding cases

with limited exports. In all of these cases, benefits that come from export expansion more than outweigh the losses from reduced capital and wage income to U.S. consumers, and hence LNG exports have net economic benefits in spite of higher domestic natural gas prices. This is exactly the outcome that economic theory describes when barriers to trade are removed. Net benefits to the U.S. would be highest if the U.S. becomes able to produce large quantities of gas from shale at low cost, if world demand for natural gas increases rapidly, and if LNG supplies from other regions are limited.”

- In “Made in America: The economic impact of LNG exports from the United States,” from Deloitte Center for Energy Solutions and Deloitte MarketPoint LLC (2011), it was reported: “Given the model’s assumptions, the WGM projects a weighted-average price impact of \$0.12 per million British thermal units (MMBtu) on U.S. prices from 2016 to 2035 as a result of the 6 Bcfd of LNG exports. The \$0.12/MMBtu increase represents a 1.7% increase in the projected average U.S. citygate gas price of \$7.09/MMBtu over this time period.”

Given this small projected price rise, a follow-up captured the nature of how the market works: “The results show that the North American gas market is dynamic. If exports can be anticipated, and clearly they can with the public application process and long lead time required to construct a LNG liquefaction plant, then producers, midstream players, and consumers can act to mitigate the price impact. Producers will bring more supplies online, flows will be adjusted, and consumers will react to price change resulting from LNG exports.”

- That point about the dynamism of the market was emphasized in a study titled “Liquid Markets: Assessing

the Case for U.S. Exports of Liquefied Natural Gas,” written by Charles Ebinger, Kevin Massy, and Govinda Avasarala, for the Brookings Institution in May 2012. The authors observed: “Shale gas technologies and production processes have been developing rapidly in recent years, improving the economics of extraction. Companies now are drilling longer laterals and are increasing the number of frack stages—the number of different fracking sections in each lateral section—per well, leading to an increase in available reserves and well productivity. An analysis of well-specific-data illustrates that both initial production rates and ultimate well recovery have been growing across all production regions (or ‘plays’), thereby driving down per unit costs of production.”

Ebinger, Massy and Avasarala summed up a critical point when it comes to how increased demand via new exports markets would be met: “In their analyses, both Deloitte and EIA found that the majority—63 percent, according to both studies—of the exported natural gas will come from new production as opposed to displaced consumption from other sectors.”

For good measure, the study from the Peterson Institute made an important counterpoint to one pessimistic point put forth by the NERA study.

Any politically driven efforts to limit exports, therefore, would limit the creation, growth and job-creating abilities of those small and midsize businesses that populate the energy industry.

It was stated in the NERA study, “LNG exports are not likely to affect the overall level of employment in the U.S. There will be some shifts in the number of workers across industries, with those industries associated with natural gas production and exports attracting workers away from other industries. In no scenario is the shift in employment out of any industry projected to be larger than normal rates of turnover of employees in those industries.” However, it is countered in the Peterson Institute study: “The NERA model assumes that the economy operates at full employ-

ment. In reality, the American economy has not been operating at full employment for four years and this condition is expected to last at least through 2015. For this reason, the potential employment benefits from larger natural gas production may be understated in the NERA report. By the same token, if lower gas prices spurred new investment in chemical or power plants, that too would reduce the unemployment rolls.”

In the end, the expectation that nearly two-thirds of LNG exports would be met via new production – and within the context of recent and expected growth in natural gas production – speaks to further strong growth for small and midsize businesses, and for employment. At the same time, the minimal price impact that expanded exports might have on domestic prices would have small effects on domestic consumers of natural gas – especially given the enormous declines we’ve already experienced in natural gas prices. And even those small, potential price increases must be further offset against the effect of the overall positive for economic growth coming via generally lower natural gas prices and expanded natural gas production.

Recall the tremendous growth in energy sector employment due to expanded domestic natural gas and oil production, as cited earlier in this report, versus the decline in overall U.S. jobs. Also, consider that growth state by state in energy sectors, again versus the dismal overall job market.

Recall the growth in the number of small and midsize businesses experienced nationally and in key states due to expanded energy production, and compare those to the overall decline in the U.S. economy. And again, keep in mind that these energy sectors are overwhelmingly populated by those small and midsize firms.

Given these economic realities, allowing for LNG exports to be guided by market forces – as opposed to political preferences and lobbying – means expanding the potential opportunity for small and midsize businesses to be created, to grow, and to create jobs. Any politically driven efforts to limit exports, therefore, would limit the creation, growth and job-creating abilities of those small and midsize businesses that populate the energy industry.

About the Author

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Keating has testified before congressional and state legislative bodies, and has spoken to groups across the nation on a wide range of economic, policy and small business topics. The media taps him regularly for his views, including print, radio and television (for example, NBC, CNBC, Fox News, Fox Business Network, CNN, PBS, etc.) interviews.

Endnotes

- 1 Liquefied natural gas, as explained here for example from Shell Global's website (<http://www.shell.com/global/future-energy/meeting-demand/natural-gas/liquefied-natural-gas/what-is-lng.html>), is: "Transporting gas by pipeline can be costly and impractical. We create LNG by cooling the gas to a liquid to -160°C, which we can then ship out, safely and efficiently.

LNG is a clear, colourless, non-toxic liquid that can be transported and stored more easily than natural gas because it occupies up to 600 times less space. When LNG reaches its destination, it is returned to a gas at regasification facilities. It is then piped to homes, businesses and industries."
- 2 International Energy Administration, "North America leads shift in global energy balance, IEA says in latest World Energy Outlook," November 12, 2012, accessed at http://www.iea.org/newsroomandevents/pressreleases/2012/november/name_33015_en.html.
- 3 Energy Information Administration, "What is shale gas and why is it important?" *Energy in Brief*, December 5, 2012, accessed at http://www.eia.gov/energy_in_brief/article/about_shale_gas.cfm.
- 4 Energy Information Administration, "What is shale gas and why is it important?" *Energy in Brief*, December 5, 2012, accessed at http://www.eia.gov/energy_in_brief/article/about_shale_gas.cfm.
- 5 Census Bureau industry definition: "This industry comprises establishments primarily engaged in operating and/or developing oil and gas field properties and establishments primarily engaged in recovering liquid hydrocarbons from oil and gas field gases. Such activities may include exploration for crude petroleum and natural gas; drilling, completing, and equipping wells; operation of separators, emulsion breakers, desilting equipment, and field gathering lines for crude petroleum; and all other activities in the preparation of oil and gas up to the point of shipment from the producing property. This industry includes the production of crude petroleum, the mining and extraction of oil from oil shale and oil sands, the production of natural gas and the recovery of hydrocarbon liquids from oil and gas field gases. Establishments in this industry operate oil and gas wells on their own account or for others on a contract or fee basis."
- 6 Census Bureau industry definition: "This U.S. industry comprises establishments primarily engaged in drilling oil and gas wells for others on a contract or fee basis. This industry includes contractors that specialize in spudding in, drilling in, redrilling, and directional drilling."
- 7 Census Bureau industry definition: "This U.S. industry comprises establishments primarily engaged in performing support activities on a contract or fee basis for oil and gas operations (except site preparation and related construction activities). Services included are exploration (except geophysical surveying and mapping); excavating slush pits and cellars, well surveying; running, cutting, and pulling casings, tubes, and rods; cementing wells, shooting wells; perforating well casings; acidizing and chemically treating wells; and cleaning out, bailing, and swabbing wells."
- 8 Census Bureau industry definition: "This U.S. industry comprises establishments primarily engaged in the construction of oil and gas lines, mains, refineries, and storage tanks. The work performed may include new work, reconstruction, rehabilitation, and repairs. Specialty trade contractors are included in this group if they are engaged in activities primarily related to oil and gas pipeline and related structures construction. All structures (including buildings) that are integral parts of oil and gas networks (e.g., storage tanks, pumping stations, and refineries) are included in this industry."
- 9 Census Bureau industry definition: "This U.S. industry comprises establishments primarily engaged in (1) manufacturing oil and gas field machinery and equipment, such as oil and gas field drilling machinery and equipment; oil and gas field production machinery and equipment; and oil and gas field derricks and (2) manufacturing water well drilling machinery."
- 10 IHS, *America's New Energy Future: The Unconventional Oil and Gas Revolution and the US Economy: Volume 2: State Economic Contributions*, December 2012.
- 11 IHS, *America's New Energy Future: The Unconventional Oil and Gas Revolution and the US Economy: Volume 2: State Economic Contributions*, December 2012.
- 12 Keith Schneider, "Ohio's Resurgent Natural Gas Industry Spends Millions to Set Up Shop," *The New York Times*, March 12, 2013, accessed at <http://www.nytimes.com/2013/03/13/realestate/commercial/natural-gas-industry-drives-construction-surge-in-ohio.html?pagewanted=all&r=0>.
- 13 Gary Clyde Hufbauer, Allie E. Bagnall, and Julia Muir, "Liquefied Natural Gas Exports: An Opportunity for America," Peterson Institute for International Economics, February 2013.
- 14 Gary Clyde Hufbauer, Allie E. Bagnall, and Julia Muir, "Liquefied Natural Gas Exports: An Opportunity for America," Peterson Institute for International Economics, February 2013.



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