



MINING, OIL & GAS FIELD  
MACHINERY MANUFACTURING  
**RESHORE READINESS REPORT**  
2014



# INDUSTRY OVERVIEW

This sector includes companies that manufacture oil, gas field and underground mining equipment, including rotary and portable drill rigs; machinery used in crushing, pulverizing and processing minerals; and machinery used in or on derricks and mining platforms.

The manufacture of replacement parts used within the mining, oil and gas field industry is also included within this sector.

Most experts predict that domestic companies within the oil, gas field and underground mining equipment manufacturing sector will experience improved business conditions throughout the period of 2014-2019. Companies within this sector can anticipate rising commodity prices, which increase industry demand for mined products and, ultimately, stimulate demand for mining equipment. Increased efforts to discover new oil and gas reserves, as well as access to the abundant Marcellus Shale reserves throughout the northeastern United States, will also stimulate sales of industry products.

## Key Industry Data

PROJECTED **2014** DOMESTIC INDUSTRY REVENUE

**\$29.2 BILLION**

PROJECTED **2019** DOMESTIC INDUSTRY REVENUE

**\$31.3 BILLION**

INDUSTRY AVERAGE NET PROFIT MARGIN

**9.0%**

IMPORTS AS A PERCENT OF TOTAL 2014 DOMESTIC DEMAND (PROJECTED)

**15.24%**

# KEY INDUSTRY PLAYERS

National, international and Pennsylvania-based OEMs and industry supply-chain participants include companies such as:



## National and International

Baker Hughes, Inc.  
 Caterpillar, Inc.  
 Halliburton Company  
 Joy Global, Inc.  
 National Oilwell Varco, Inc.

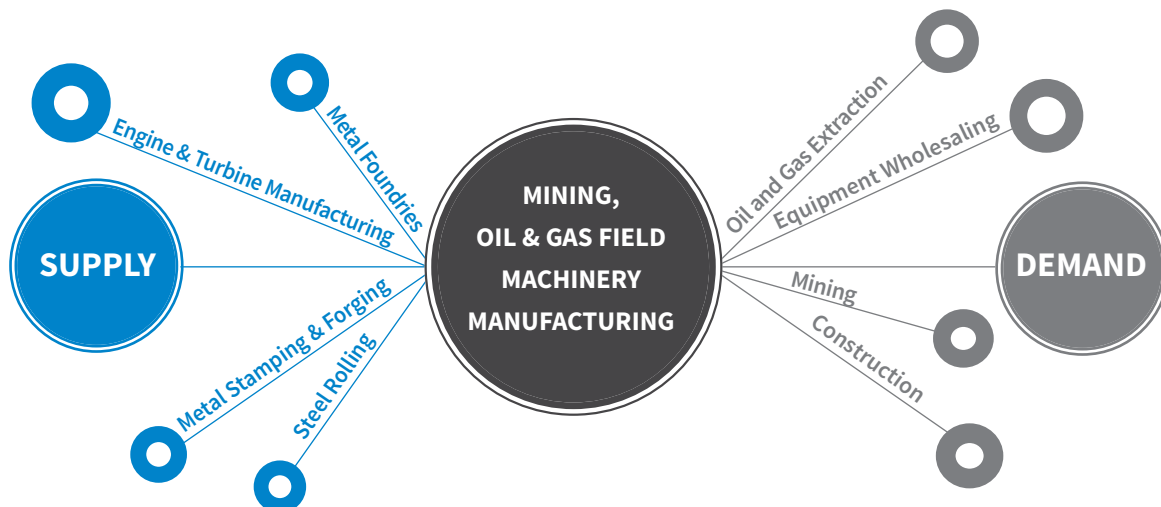


## Pennsylvania-Based

Altas Copco Compressors  
 Bradley Pulverizer Company  
 Caterpillar Global Mining  
 Joy Global, Inc.  
 Metso Minerals Industries, Inc.  
 Pennsylvania Machine Works, Inc.  
 Reichdrill, Inc.  
 Schramm, Inc.  
 Schroeder Industries  
 Shumars Welding and Machine Services

## PRIMARY SUPPLY CHAIN PARTNERS

Mining, oil and gas field machinery manufacturers rely upon robust supply chain partners within the engine and turbine manufacturing, metal foundry, metal stamping and forging and steel rolling sectors as illustrated in the graphic below. Industry demand for equipment is primarily stimulated by growth within the natural resource mining industry, but experiences derivative stimulus from the construction industry.

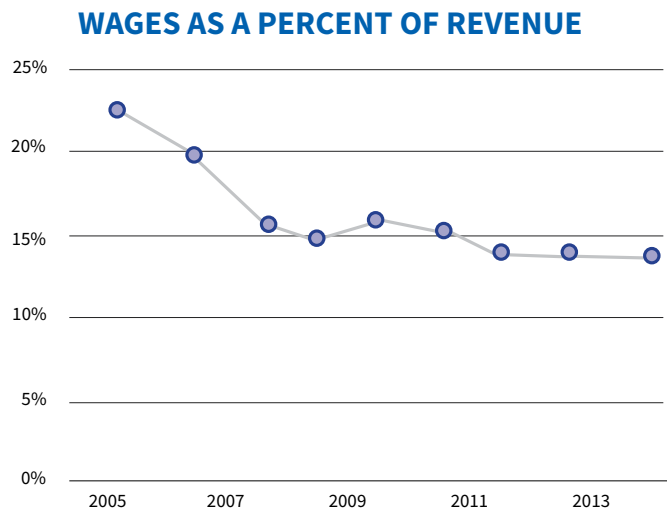


# INDUSTRY RESHORING FACTORS

Several recent industry trends are fueling reshoring decisions among OEMs and industry supply chain companies.

## Erosion of Wages as a Component of Product Cost & Rising Overseas Labor Costs

Automation, robotics, process improvements and technology advances have successfully reduced or eliminated non-value-added processes and repetitive, low-wage tasks in the manufacturing of mining, oil and gas field equipment and related components. This has effectively reduced the labor component of total product cost, as shown in the following graph.

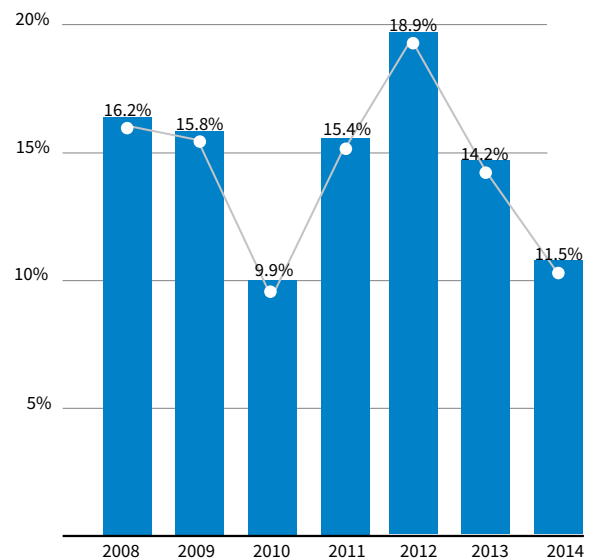


This gradual, yet significant, reduction of labor costs has minimized the cost advantages originally associated with overseas production, particularly with respect to China. With overseas labor rates on the rise, any cost advantage that remains by virtue of lower labor rates will continue to lessen over time and gradually become nonexistent.

Rather than pursuing a low labor rate strategy, leading companies must focus on taking advantage of highly-skilled domestic labor pools and employing workers that can take advantage of new, high-tech manufacturing equipment that further increases worker efficiency and leads to the production of more reliable, dependable products, which the industry demands.

This is particularly relevant to China-based manufacturing, which has experienced significant wage inflation in recent years. Many experts predict that net labor costs of manufacturing in China and the U.S. may converge as early as 2015.

## ANNUAL CHINA MANUFACTURING WAGE INFLATION RATES 2008-2014



## Industry Focus on High-Quality Products

American-made products remain in high-demand within foreign markets and often command a higher price than foreign-produced products, as evidenced by the trade surplus within the industry. Ironically, however, over 15% of domestic demand is currently being filled by imported products.

Recent data gathered from purchasing agents indicates that the industry is willing to pay more for high-quality products up-front because they recognize that doing so saves them time, money and productivity in the long run. OEMs and supply chain partners within this industry, particularly those that operate under recognized ISO, API or similar certifications, could maintain a higher price in the marketplace for their domestically-produced products. Thus, they can recapture any additional costs associated with the domestic production of industry goods when compared to the cost of sourcing that same item to a potential or incumbent overseas supplier.

## Need for Collaborative Innovation and R&D

As the industry heightens its focus on finding new ways to extract resources from older, existing fields, access Marcellus Shale gas more effectively, tap into deeper natural gas reserves and implement better recovery techniques, buyers will rely on their machinery manufacturing partners to collaborate with them on innovations and invest in R&D.

Domestic OEMs and U.S.-based supply chain partners will have the upper-hand in securing valuable joint R&D ventures with their existing customers and potential new customers, and will also be better positioned to leverage federal labs, research universities, technical schools, additive manufacturing techniques and other innovations to foster their own advances in machinery design, functionality and manufacturing. Conversely, overseas suppliers are commonly viewed as being capable replicators of existing technologies, but not valued as innovators or R&D partners.

## Requirement of Intellectual Property Protection

As mining, oil and gas field machinery becomes more technologically advanced, OEMs and their supply chain partners need to ensure that their patents, licensing agreements and confidential processes are properly safeguarded and protected.

Patent infringement and confidentiality breaches on the part of overseas companies and, in some cases, foreign governments, have raised awareness of the intellectual property risk commonly associated with outsourced production. OEMs and their supply chain can achieve maximum protection for their product

and process differentiators by operating exclusively within countries that have a solid patent enforcement history. Historically, industry leaders have been firms that can generate and protect their patented technologies. One of the most successful mining, oil and gas field OEMs, for example, filed 240 patents in the areas of hydraulic fracturing and sand control in the 10-year period of 1992 through 2002. No country offers more robust protection of such patents than the United States.



Downstream markets are willing to pay for quality up-front if it will save them money in the long run.

# PENNSYLVANIA SPECIFIC RESHORING BENEFITS

In addition to the industry-wide reshoring factors previously mentioned, Pennsylvania offers several reshoring benefits to mining, oil and gas field machinery OEMs and supply chain partners.

## Booming Energy Industry = Proximity to Major Markets

Pennsylvania is situated atop the 2nd largest energy field in the world, with Marcellus Shale gas existing beneath approximately two-thirds of the Commonwealth’s land mass. Marcellus Shale is just one of eight gas formations in Pennsylvania. As a result, industry operators are placing more focus on hydraulic fracturing (or “fracking”) as the primary means to extract natural gas from Marcellus Shale and similar formations throughout the northeastern U.S. Pennsylvania is the hub of this growing industry sector.

Pennsylvania has the greatest number of active and permitted Marcellus Shale wells in the nation, with Marcellus Shale drilling activities expected to continue within the Commonwealth for years into the future.

Having a presence in Pennsylvania gives machinery OEMs and their suppliers the competitive advantages of quick customer response, in-field installation and 24-hour part replacement assistance and other customer-focused advantages that overseas or out-of-state suppliers cannot easily duplicate. A presence in Pennsylvania also strategically locates OEMs and their suppliers near the lucrative Canadian market, with 60% of Canada’s population within a reasonable commute from Pennsylvania.

## Robust Network of Potential Suppliers

Among the 50 states, Pennsylvania currently ranks 6th in terms of the number of mining, oil and gas field machinery manufacturers.

Pennsylvania also has a robust network of potential suppliers in the engine and turbine manufacturing, ferrous metal foundry, metal stamping and forging, metal valve manufacturing and steel rolling sectors, as shown below.

### PA MACHINE MANUFACTURING SUPPLY CHAIN

Supply Chain Sector	# of Establishments in PA	Location Quotient*
Engine & Turbine Manufacturing (NAICS 33361)	42	1.06
Ferrous Metal Foundries (NAICS 33151)	55	2.39
Metal Stamping & Forging (NAICS 33211)	168	1.36
Metal Valve Manufacturing (NAICS 33291)	79	1.36
Steel Rolling & Drawing (NAICS 33122)	39	2.39

\*1.0 = U.S. Average. Location Quotient is calculated to measure the concentration of employment within an industry in one geographic region to another; in this case comparing Pennsylvania counties to the US average.



Among the U.S., Pennsylvania ranks 6th in terms of the number of mining, oil and gas field machinery manufacturers.

## World-Class R&D and Innovation Capabilities

Pennsylvania is home to more than 270 colleges and universities, including four of the nation's top 50 universities, eight of the top 50 liberal arts colleges and three top business schools. Together, these colleges and universities provide not only a world-class workforce, but unparalleled collaborative R&D, innovation, materials testing and technology acceleration capabilities.

Pennsylvania also supports Centers of Excellence in plastics technology, metal stamping and perforation, welding, additive manufacturing, materials testing and other manufacturing specialties. These Centers assure Pennsylvania's manufacturers that they will have access to the cutting-edge technologies, workforce training opportunities and innovations they need to remain competitive and thrive.

## Diverse Energy Sources & Low Energy Costs

Pennsylvania is among national leaders in terms of low-cost energy for manufacturers. In addition to leveraging the world's 2nd largest Marcellus Shale reserves to reduce the cost of natural gas, the Commonwealth's energy portfolio consists of coal, clean-coal technology, nuclear power, hydropower and other renewable energy sources to fuel manufacturing growth. In the last six years, Pennsylvania's abundant resources have reduced natural gas prices by 50% and electricity costs by 40% for industrial users.

## Access to World Markets

In addition to providing immediate access to the booming energy (Marcellus Shale) market, Pennsylvania offers an outstanding network of interstate highways, modern freight railroads, six international airports and three major ports with access to the Atlantic Ocean, Great Lakes and the Gulf of Mexico. Pennsylvania also provides resident manufacturers with a state-supported network of 27 overseas offices that cover more than 62 world markets.





## Make It In America: The PA Made Again Initiative

PA Made Again is a statewide initiative, funded in part with federal Make It In America Challenge Grant support, that is focused on creating jobs through the growth and retention of Pennsylvania's manufacturing economy. The initiative includes key economic development organizations from across the Commonwealth that work collaboratively to build a strong pipeline of middle and highly-skilled manufacturing workers for companies reshoring to Pennsylvania. The initiative avails companies considering reshoring their production facility or supply chain inputs to a variety of assistance.

**Manufacturing Extension Partnership (MEP)** Centers host industry professionals who can introduce manufacturers to Total Cost of Ownership, Assess Costs Everywhere and similar reshoring tools. These tools help companies make informed reshoring decisions based upon accurate, real-time offshore and domestic production costs and other important factors. MEP centers also offer no-cost supplier identification assistance and technical assistance to companies considering reshoring.

**Economic Development Administration (EDA)** Partners assist manufacturers in site selection for their businesses, along with touring, deal negotiation and financing assistance. EDA partners can provide prospective Pennsylvania manufacturers with demographic information, permit and regulatory assistance, infrastructure/utility data, quality of life statistics and similar information.

**Employment & Training Administration (ETA)** Partners are building a strong pipeline of skilled workers through a collaborative training environment that serves the needs of existing manufacturers and new foreign-owned businesses wishing to locate in Pennsylvania. Through regional workforce organizations, ETA partners can identify the workforce that manufacturers need today, as well as train their workforce of tomorrow.

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# RESHORING SUCCESSES



## Pequea Machine

Pequea Machine manufactures equipment in Earl Township, Pennsylvania. To save on production costs, in 2008 it contracted to have gear boxes made in China. According to Owner and President, Dennis Skibo, twenty-five percent of the made in China gear boxes failed due to substandard metals. "That's not good when you're making a huge pile of gear boxes under warranty," he said. "After years of getting unacceptable quality, we decided to bring the gear box manufacturing back to the U.S." In 2011, Pequea began bringing the jobs back to the U.S.

The company now produces a more reliable product for about the same price as the made in China product. "It costs about \$900 to produce the gear boxes here in the U.S. and between \$800 and \$900 to produce them in China," Skibo said.



## Caterpillar, Inc.

Caterpillar reshored the production of hydraulic excavators, which weigh from 12 to 49 tons and are costly to ship, from Japan to the U.S. The company opened a state-of-the-art hydraulic excavator facility in Victoria, Texas. The new, 1.1 million-square-foot operation represents a \$200 million investment by Caterpillar to increase excavator capacity and production in the U.S. They hired about 225 new employees in Victoria, and plan to continue hiring based on demand for products made in Victoria and as it ramps up production with additional models to be produced at the new facility.

The excavators had been produced in Akashi, Japan, and Aurora, Illinois. The company now utilizes those plants for other projects.

# WHY RESHORE?

## Top 10 most commonly cited reasons for reshoring

Taken from over 200 reshoring case studies, related to the mining, oil and gas field machinery manufacturing sector.

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### 1 Wages & Currency Changes

Technology, robotics and process improvements have reduced labor costs significantly since 2005, which in turn has significantly eroded foreign supplier low-labor-rate advantages.

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### 2 Product Quality & Rework

Quality commands a premium in this market, which buyers are willing to pay. Buyers focus on quality in the long term, not low-price at the time of purchase. Poor quality, conversely, can sever customer relationships.

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### 3 Freight Costs

Most machinery and component parts are bulky, heavy and difficult to transport. As freight costs increase, overseas purchases become less attractive. Proximity to market can be an advantage for PA-based companies.

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### 4 Delivery Times

Downtime costs the mining, oil and gas field industry millions. Buyers demand quick response for replacement parts. Overseas suppliers, and the related logistics, can hamper the ability to meet delivery expectations.

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### 5 Travel Costs & On-Site Time

The costs incurred in traveling to an out-of-country location are much greater than visiting a U.S.-based supplier.

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### 6 Inventory Carrying Costs

In order to meet customer delivery time expectations for replacement parts (see #4), many companies maintain high parts inventory levels, which tie up cash and require warehousing, security and various other related costs.

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### 7 Intellectual Property Risks

As innovation and R&D lead to new capabilities, OEMs and their suppliers must operate in a region that enforces patent & licensing laws, protecting company I.P. Overseas suppliers may not honor U.S. patents.

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### 8 Total Product (Landed) Cost

Fluctuating currency rates, steel pricing and over 30 other factors all contribute to the total landed cost of outsourced machinery, components and replacement parts. Many of these costs escape manufacturer analyses.

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### 9 Communication Issues

Language barriers can often be an issue between international locations.

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### 10 Brand Issues (Made in USA)

The industry commonly associates “Made in USA” with “Quality”, which leads to increased brand loyalty and the ability to command premium prices.

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# TOTAL COST OF OWNERSHIP (TCO)

## MAKING AN INFORMED RESHORING DECISION

Manufacturers considering reshoring their production capabilities and/or their supply chain inputs (components, sub-assemblies, packaging, consumables, etc...) to Pennsylvania can receive NO COST reshoring assistance through the PA Made Again initiative.


NEPIRC and its partners provide no-cost Total Cost of Ownership analyses for manufacturers. Total Cost of Ownership (or TCO) is a comprehensive analysis that considers all outsourced product costs – including factors that are often overlooked by most internal pricing, costing and sourcing models – so that manufacturers can make informed outsourcing, domestic purchasing or internal production decisions.

More than 60% of companies use cost modeling and purchase analysis systems that do not accurately capture the true cost of offshore production or imported supply chain inputs. In many cases, these systems understate the true costs by as much as 20%. The TCO model walks manufacturers through 29 factors that contribute to total product cost. Using real-time, user-inputted data, the TCO model allows companies to make accurate sourcing decisions.

**Make the TCO analysis a key element of your company's sourcing decision-making process today.**

To learn more about the Total Cost of Ownership analysis, and how your company can receive **NO COST** assistance with the tool, contact:

**Maureen Mulcahy, NEPIRC Supply Chain Specialist**  
**maureen@nepirc.com**  
**(570) 819-8966**



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