

PLASTIC PIPES, PIPE FITTINGS AND
PLASTIC PROFILE SHAPE MANUFACTURING
RESHORE READINESS REPORT
2014



INDUSTRY OVERVIEW

This industry includes companies that manufacture plastic pipes, pipe fittings and plastic profile shapes, such as those used within the automotive industry. Plastic products of varying rigidity are included within this industry.

Outputs from this industry include plastic pipes used in drainage systems, water transportation, waste removal and ventilation. Mining pipes, pipes used within the gas and oil industry and construction trades are also among industry outputs

Tangential industries include the manufacture of coated papers, plastic films and bagging materials, plastic hoses and hose fixtures and miscellaneous plastic products. These industries are influenced by many of the same factors that influence the plastic pipe, pipe fitting and plastic profile shape industry.

Key Industry Data

PROJECTED **2014** DOMESTIC INDUSTRY REVENUE

\$14.7 BILLION

PROJECTED **2019** DOMESTIC INDUSTRY REVENUE

\$16.3 BILLION

TOTAL VALUE OF IMPORTS, **2014**

\$899 MILLION

TOTAL VALUE OF IMPORTS FROM CHINA, **2014**

\$143.9 MILLION

INDUSTRY AVERAGE NET PROFIT MARGIN

6.0%

Economists expect that domestic manufacturers within the sector will reap the benefits of growth within each of the industry's four (4) major demand sectors – construction, automobile manufacturing, water/sewer services and agricultural products – as well as dramatic growth within an emerging demand industry – mining operations. Companies within this sector can expect increased demand from the construction industry as residential and commercial construction rebound from the recession.

The total dollar value of public and private construction is expected to increase by an average annual rate of over 6% through 2020. Companies can also expect increased demand from the industrial manufacturing sector, which is dominated by automotive manufacturers, as the need for more innovative, customized and futuristic product interior trims and accessories continues to grow. The current trend within the automotive industry to migrate away from heavier metal products and towards the use of lightweight plastic products in their place will further bolster demand for plastic profile shape products.

Population growth and continued development of urban and rural communities will likely generate additional demand for water and sewage transport pipes, as well as large-diameter plastic conduit piping for neighborhood electrical, cable and similar services. Increased demand for plastic piping is expected from mining operators as the need to move fresh water, gather and transport used water, and transport natural resources continues to grow.

KEY INDUSTRY PLAYERS

National, International and Pennsylvania-based manufacturers and industry leaders include companies such as:



National and International

Advanced Drainage Systems, Inc.
J-M Eagle
North American Pipe Corp.
Ply Gem Industries, Inc.
Westlake Chemical Corp.

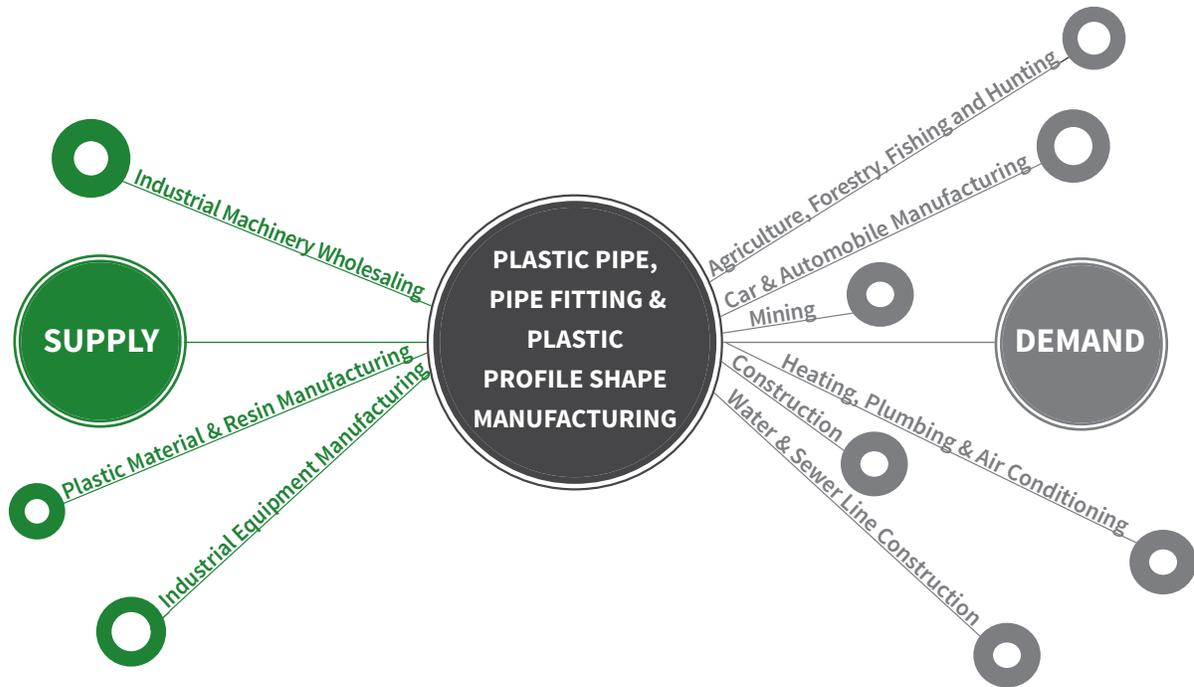


Pennsylvania-Based

Advanced Drainage Systems, Inc.
Bedford Reinforced Plastics
Cardinal Systems, Inc.
Cresline Plastic Pipe Co., Inc.
Markel
Plastic Center, Inc.
Veka
Westlake Plastics Company

PRIMARY SUPPLY CHAIN PARTNERS

Plastic pipe, pipe fitting, and plastic profile shapes manufacturers rely upon robust supply chain partners as illustrated in the graphic below. Industry demand for plastic profile shapes is primarily determined by the level of car and automobile manufacturing, while demand for plastic pipes is determined by the levels of public and private construction and industrial demand.



MAJOR DEMAND MARKETS

Demand within the plastic pipe, pipe fitting and plastic profile shape industry is driven primarily by a few major sectors that provide the industry with the bulk of its business. The largest is the construction market, followed by industrial manufacturing, water and sewer utilities and agriculture.



CONSTRUCTION

\$5.27 BILLION



INDUSTRIAL MANUFACTURING, PRIMARILY AUTOMOBILE

\$2.98 BILLION



WATER & SEWER SERVICES

\$2.72 BILLION



AGRICULTURE, FORESTRY, FISHING & HUNTING

\$2.00 BILLION

INDUSTRY **RESHORING** FACTORS

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

Proximity to Fast-Growing Markets

Domestic production and sourcing of supply chain inputs within the plastic pipe, pipe fitting and plastic profile shape market puts manufacturers in proximity to the fast-growing domestic construction, water supply/irrigation and automotive markets. With the total value of public and private construction expected to grow at an average rate of over 6.0% during the period of 2014 thru 2020, and similar growth anticipated within the water movement and water utility markets, domestic manufacturers will be located closer to their customers, resulting in reduced lead times, improved production flexibility to meet customer demand, reduced product transportation costs and superior customer satisfaction.

Preferred Status for “Buy American” Contracts

Large-scale construction, civil infrastructure, water and sewage treatment plants and irrigation projects are commonly funded by municipalities, state governments, federal agencies, or a combination thereof. A growing trend among such projects is the inclusion of “Buy American” or similar clauses that require the procurement of domestically-manufactured products whenever possible. Domestic producers of plastic pipes and pipe fittings can “get the inside track” on awards and contracts for projects that contain such clauses. Conversely, overseas producers would be precluded from participating in those awards unless a waiver is filed and accepted by the funding agencies.

“Buy American” requirements will drive more large scale construction projects to domestic manufacturers.



Access to Innovation

Downstream plastic pipe, pipe fitting and plastic profile shape markets are actively searching for new products that can replace more expensive metal, clay or concrete products currently in use. The high price of metals, as compared to that of plastics, presents a great opportunity for plastics manufacturers to derive higher revenue from metal-dominated markets, particularly within the automotive industry. Within the pipe and pipe fitting markets, customers are searching for existing product enhancements and new products that can withstand higher pressure, have greater strength-to-weight ratios and are designed to reduce installation costs. The desire for innovative and technologically advanced products represents a great opportunity within the industry.

To capitalize on this opportunity, plastic shape manufacturers in particular need to engage in robust and ongoing process and product innovation and work collaboratively with customers to meet their needs. Domestic manufacturers and U.S.-based supply chain partners will have the upper-hand in securing valuable joint R&D ventures with their existing and potentially new customers and will also be better positioned to leverage federal labs, additive manufacturing labs, research universities, technical schools and other innovation systems to foster their own advances in plastics materials, product design and new product development. Conversely, overseas suppliers are commonly viewed as being capable replicators of existing technologies, but not valued as innovators or viable R&D partners.

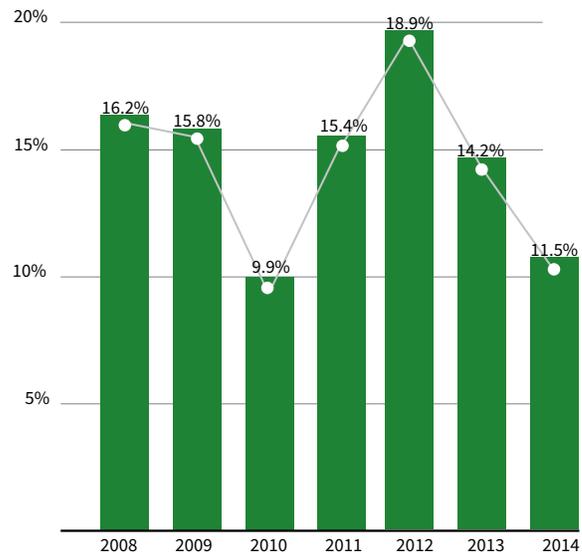
Favorable Domestic Prices for Natural Resources

Domestic manufacturers have been able to compete globally and offset many of the costs traditionally associated with overseas production due to recent reductions in both gas and electric utility rates across the United States and, perhaps more importantly, decreases in the cost of ethane and hydrocarbon ethylene, which is the primary feedstock for polyvinyl chloride (or PVC) – the primary plastic used within the pipe and pipe fitting industry. While ethylene has traditionally come from naphtha, a hydrocarbon derived from crude oil, increasing supplies are now being converted from shale gas. This is driving down the price of plastic and giving domestic manufacturers a true and long-lasting raw material cost advantage.

Rising Chinese Labor Rates

The supply of China’s low-cost labor is expected to dwindle over the next few years, as the competition for labor and minimum pay rate increases in China considerably narrow China’s direct cost advantage. According to the Boston Consulting Group, pay and benefits for the average Chinese factory worker rose by 10 percent per year from 2000 through 2005 and by 19 percent per year from 2005 through 2010. Additionally, the Chinese government has set a target for annual increases in the minimum wage of 13 percent from 2010 through 2015. Rising wages, higher U.S. productivity and other factors have significantly eroded the competitive advantage of many low-cost manufacturing counties. According to the Boston Consulting Group, China’s manufacturing-cost advantage over the U.S. has shrunk to less than 5 percent.

ANNUAL CHINA MANUFACTURING WAGE INFLATION RATES 2008-2014



PENNSYLVANIA SPECIFIC RESHORING BENEFITS

In addition to the industry-wide reshoring factors mentioned, Pennsylvania offers several reshoring benefits to plastic pipes, pipe fittings and plastic profile shape manufacturers and their supply chain partners.

Unique Material & Operating Cost Advantages Through Marcellus Shale

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. Pennsylvania's safe, efficient and environmentally-sound natural gas production has already had significant beneficial impacts to the plastics industry within the Commonwealth.

Remcon Plastics, for example, recognized a 30% reduction in purchasing costs by migrating to Marcellus Shale-derived plastics and the utilization of lower-cost Marcellus Shale gas within its operations. Pennsylvania's Marcellus Shale play provides plastic manufacturers – from resins to finished products – with assurance that they will enjoy unique, location-based cost advantages for ethane, hydrocarbon ethylene, compressed and liquefied natural gas and clean gas for use as a utility fuel for decades into the future.



Pennsylvania's Marcellus Shale play provides plastic manufacturers with assurance that they will enjoy unique cost advantages for decades.

Diverse Energy Sources & Low Energy Costs

Pennsylvania is among national leaders in 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.

Vibrant Network of Plastic Technology Centers & Centers of Excellence

Pennsylvania is host to several world-class research centers, technical colleges, testing facilities and R&D resources with a focus on plastics.

The Plastics Innovation & Resource Center (PIRC) at the Pennsylvania College of Technology, for example, is one of the top plastics technology centers in the nation for R&D, testing, prototyping and education relating to injection molding, extrusion, blow molding, rotational molding and thermoforming. The Plastics Technology Center (Erie, PA), Penn State Material Research Institute (State College, PA) and the University of Pittsburgh Applied Research Facility (Pittsburgh, PA) represent a small sampling of the vast resources that Pennsylvania-based plastics manufacturers can draw upon to accelerate and improve their new product development, material selection, material testing, custom

compounding and process technology systems. These resources, and many others across Pennsylvania, stand at the ready to provide quality workforce education and training programs to Pennsylvania’s growing plastics manufacturing industry.

Access to Innovative Additive Manufacturing Labs

Additive manufacturing has the potential to revolutionize the plastics industry – particularly within the automotive and plastic profile shape segments. Pennsylvania manufacturers have access to world-class additive manufacturing labs, research facilities, prototyping services and training programs enabling them to stay ahead of the additive manufacturing curve and lead the way, profiting from this new technology. The University of Pennsylvania’s PennDesign Fabrication Lab, Penn State University’s CIMP-3D Applied Research Lab and the University of Pittsburgh’s research being performed under a National Additive Manufacturing Innovation Institute (America Makes) Award are examples of just some of the additive manufacturing resources that plastics manufacturers can rely upon to help them evaluate and adopt additive manufacturing techniques and technology. Across the Commonwealth, additive manufacturing training curriculum, simulation labs, research capabilities and industry-to-university collaborations are growing in support of one of the Commonwealth’s largest manufacturing industry – plastics.

Robust Existing Plastics Industry

Among the 50 states, Pennsylvania ranks 5th in terms of the number of plastic pipe, pipe fitting and plastic profile shape manufacturers. In total, the Commonwealth’s plastic and related products industry provides employment for more than 35,000 full-time workers – or over 6.5% of all manufacturing industry employees. Due to Pennsylvania’s focus on the plastics industry and unparalleled network of trade schools, technical colleges and universities, over 44% of Pennsylvania’s current plastics industry workers possess an Associate’s Degree or greater. Over 15% hold a Bachelor’s Degree, Master’s Degree or higher level of designation.

Extensive Network of Supply Chain Partners & Prospective Customers

Pennsylvania supports its plastics industry with an extensive network of potential suppliers and prospective buyers. The Commonwealth is home to over 52 plastics material and resin manufacturers and 183 industrial machinery manufacturers.

PA PLASTIC PIPE MANUFACTURING SUPPLY CHAIN

Supply Chain Sector	# of Establishments in PA
Industrial Machinery Merchant Wholesaling (NAICS 423830)	931
Industrial Machinery Manufacturing (NAICS 33324)	183
Plastics Material & Resin Manufacturing (NAICS 325211)	52



Access to Nationwide & World Markets

Having a presence in Pennsylvania gives plastic pipe, pipe fitting and plastic profile shape manufacturers the competitive advantages of quick customer response, in-field installation and assistance, 24-hour part replacement capability and other customer-focused advantages that overseas or out-of-state suppliers cannot easily duplicate. A presence in Pennsylvania also places manufacturers within a reasonable commute to 40% of the U.S. population, 6 of the 10 largest domestic markets and 60% of Canada's population. Despite its proximity to such markets, Pennsylvanians enjoy a lower cost of living than all 7 other northeastern states.

In addition, Pennsylvania offers access to the world market through six international airports and three major ports to the Atlantic Ocean, Great Lakes and Gulf of Mexico. Pennsylvania also provides resident manufacturers with a state-supported network of 27 overseas offices that cover more than 62 world markets.

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.

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.

Together PA Made Again partners are collaborating to strengthen regional assets, advance regional workforce skills and create localized supplier networks – all with the goals of attracting, supporting and growing Pennsylvania's Reshore-Ready industries.

RESHORING **SUCCESSSES**



TASUS Corporation

TASUS Corporation is a supplier of plastic molded components, decals and nameplates to the automotive and transportation markets. The company began reshoring their jobs back to the U.S. when they realized their costs were greater while operating outside of the country.

According to Melanie Hart, president and CEO of Bloomington, Ind.-based Tsuchiya North America, TASUS Corporation's parent company, "What we're seeing is manufacturing moving to where it should be. It's going to where it can be successful and profitable. A lot of times, the move [back to North America] is a correction of a bad decision," added Hart, "We located in what we thought were great low-cost countries, but costs rose."

In 2013, Tasus posted sales of \$64 million and the company expects to register sales of \$75 million in 2014. The firm employs 500 at plants in Indiana, Texas, Alabama and Ontario. Tasus is considering further expansion in the U.S. mainly due to the country's growing population and increasing number of car buyers.

PRECISION EXTRUSION, INC.

Precision Extrusion, Inc.

Precision Extrusion, a designer and manufacturer of custom plastic tubing for the medical device industry, reshored work back to the U.S. when higher labor costs and a large commitment of time and resources at their Hangzhou, China facility led them to close the plant. Startup costs and expenses at the 58,000-square-foot Chinese plant also were three to four times higher than originally anticipated.

According to Company President Michael Badera, "Five years ago, a pretty picture was painted in China. But our labor costs have doubled and the government incentives that we expected changed over time. There are a lot of smart, hard-working people there, but our knowledge is very specific, so we had to spend a lot of time at the plant," added Badera, who founded the firm in 1993. "It's not something you can learn in school."

WHY RESHORE?

Top 10 most commonly cited reasons for reshoring

Taken from over 40 reshoring case studies related to the plastic pipe, pipe fitting, and plastic profile shape manufacturing and the plastics and rubber manufacturing sector.

1 Freight Costs

Costs to ship goods and finished products is an important concern for companies. Rising oil prices, a fall off in new shipbuilding and a projected shortage in container port capacity in 2015 are expected to boost ocean freight rates, according to the Boston Consulting Group.

2 Research and Development

R&D capabilities are key success factors for product innovation. Having access to research centers like the Plastics Innovation & Resource Center at PA College of Technology and Manufacturing Extension Partnership offices provides a competitive edge for industry players.

3 Lead Time to Markets

Long lead times cause manufacturers to carry excess inventory and can cause on-time delivery issues. For this industry, it makes economic sense to produce products close to the market.

4 Skilled Workforce

Pennsylvania has over 31,000 workers in the plastic products industry. Over 44% of them possess an Associate's Degree and over 15% hold a Bachelor Degree or higher, giving plastics manufacturers the skilled workforce they need to operate highly automated machinery and equipment.

5 U. S. Price of Natural Gas

Pennsylvania has the greatest numbers of active and permitted Marcellus Shale wells in the nation. Marcellus Shale drilling activities are expected to continue within Pennsylvania for years into the future. This will make energy and raw materials less expensive, giving Pennsylvania manufacturers a competitive advantage.

6 Automation and Technology

This industry continuously innovates to improve its machine technology and product performance while expanding the use of recycled materials and product applications. Having access to Pennsylvania's vibrant network of Plastic Technology Centers & Centers of Excellence gives plastics manufacturers a competitive advantage.

7 Brand Issues (Made in USA)

Customers of plastics manufacturers commonly associate "Made in the USA" with "Quality", which leads to increased brand loyalty and the ability to command premium prices.

8 Productivity

U.S. plastics workers are increasingly more productive. The Bureau of Labor Statistics reported that output per hour for this industry increased by 2.8% between 2011 and 2012 while unit labor costs increased by only .2%.

9 Product Quality & Rework

Leaky, faulty plastic pipes and fittings can damage property and lead to substantial financial liability for plastic pipe and fitting manufacturers.

10 Wages & Currency Changes

Escalating pay and benefit increases for the average Chinese factory worker and the appreciation of China's currency, coupled with increased U.S. productivity, make domestic manufacturing more attractive.

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:

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Printed in August, 2014

Sources: America Makes, Bloomberg Businessweek, Boston Consulting Group, Consumer Product Safety Commission, Datamyne.com, Hoovers, Ibisworld.com, The Manufacturing Institute, McGladrey Report, PA Department of Labor and Industry, Plastics News, PRNewswire, Reinforcedplastics.com, The Reshoring Initiative, ReshoringMFG, SPI: The Plastics Industry Trade Association, U.S. Bureau of Labor Statistics and the U.S. Department of Commerce: U.S. Census Bureau.

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