

20  
16

SIZE &  
IMPACT

\$418 billion in revenue

954,000 jobs sustained

Countless lives changed

**ONE INDUSTRY THAT MAKES A POSITIVE IMPACT**



**PLASTICS**

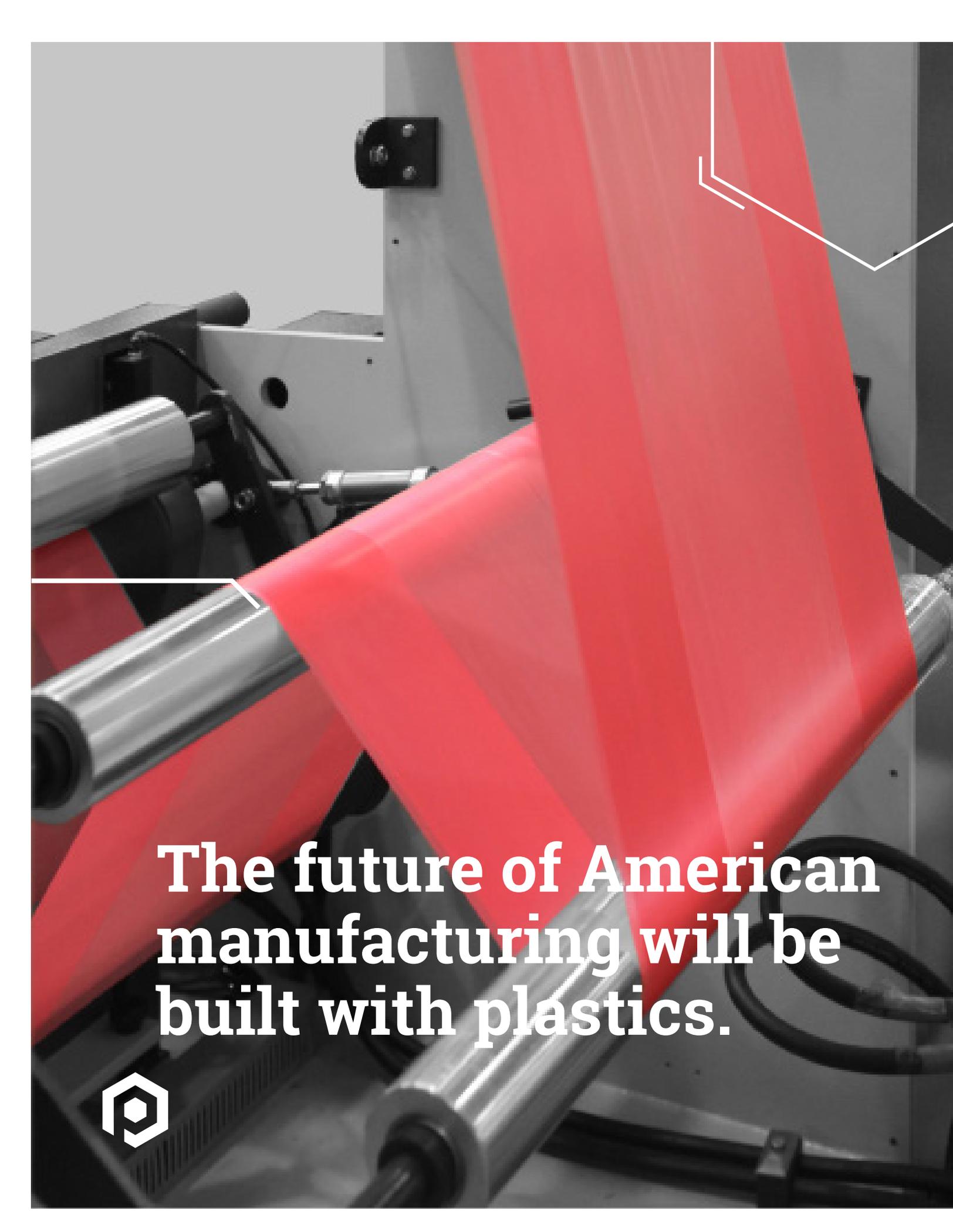
INDUSTRY ASSOCIATION

BETTER INDUSTRY. BETTER WORLD.

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**The future of American  
manufacturing will be  
built with plastics.**



**The diversity of plastics applications is a quality that's unique to this industry, and something that continues to increase with every passing**

**year.** It has grown to include new materials and new markets that the industry's earliest practitioners could never have predicted. The trend globally continues to be to replace other materials with polymers, suggesting that when it comes to finding new, previously unheard of uses for plastic materials, the sky is truly the limit. This bodes well for the industry's prospects and its ability to welcome new workers into its ranks.

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Over the last 35 years, plastics industry employment, real shipments and real value added fared better than manufacturing as a whole. Employment in the plastics manufacturing industry grew 0.3 percent per year between 1980 and 2015. This is an accomplishment, because employment in all of U.S. manufacturing fell 1.2 percent per year during that period.

WORKERS NATIONWIDE IN 2015

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**954,000**

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**1.75**  
MILLION

JOBS IN THE U.S.  
IN 2015 WHEN  
SUPPLIERS ARE  
INCLUDED.



# Executive Summary

Plastics is one of the economy's largest industries, and it is still growing. The industry was hit hard by the 2008-2009 recession and has now recovered. Most plastics are used in manufacturing, although the use of plastics in services is becoming increasingly important. As demonstrated in another Plastics Industry Association (PLASTICS) study, Global Business Trends, lower inflation and cheap natural gas have helped U.S. exports. Lower world oil prices and a higher dollar have diminished the export advantage, but the U.S. plastics industry is still globally competitive.

This report is the story of the U.S. plastics industry in numbers. It answers several important questions, including how big is the plastics industry, how does it compare with other industries, how fast is it growing, where is it located and how does it affect the rest of the economy.

## Overview

- ▶ The U.S. plastics industry is large, accounting for 954,000 jobs and \$418.4 billion in shipments during 2015.
- ▶ Texas employs the most people in the plastics industry. As a percentage of total non-farm employment, the plastics industry is most important to Indiana, where it accounts for 16.5 of every 1,000 non-farm jobs. Michigan is a close second.
- ▶ When suppliers to the plastics industry are considered, jobs grow to 1.75 million, and total shipments grow to \$571.5 billion.
- ▶ The plastic products portion of the plastics industry was the eighth largest U.S. industry in 2014.
- ▶ The plastic materials and synthetics portion of the plastics industry (including rubber and fiber) was the sixteenth largest industry in 2014.
- ▶ Plastics manufacturing employment grew 0.3 percent per year from 1980 to 2015. This is compared with manufacturing as a whole, which saw employment shrink 1.2 percent per year during those same years.
- ▶ The growth in plastics manufacturing employment slowed during the 1995-2000 period, reversed from 2000 to 2010, and then began growing again in 2011.
- ▶ Real plastics manufacturing shipments grew at a 2.4 percent annual rate from 1980 to 2015, while real value added grew 2.7 percent annually.
- ▶ The acceleration of the plastics industry reflects recovery from the recession and long-term trend growth.
- ▶ Manufacturing is still the main outlet for plastics, meaning the majority of plastic materials and products are purchased by manufacturing companies. These firms process these materials and products further before they eventually reach their final state and end user.
- ▶ Manufacturing's share of the U.S. economy is shrinking, however. This shift is reflected in the fact that in 2015, 33.7 percent of plastic products went into the services sector, namely wholesale and retail trade, health services, food services and drinking places and other services. The kinds of plastic products that get consumed as part of services could include, for instance, bags, sterile packaging, intravenous tubing, signage, drink containers, other food service items and automotive repair parts.

## Industry Size

Table S-1 summarizes the plastics industry by dividing it into four categories: plastics manufacturing, plastics wholesale trade, captive plastic products manufacturing and upstream impacts. Captives are plastic processing activities located in establishments, such as automobile assembly and milk bottling plants, which are not classified by the government, or most economists, as being part of the plastics industry. The first three categories comprise what the authors call the plastics industry.

**TABLE S-1**

PLASTICS INDUSTRY IMPACTS, 2015

	# of Estabs	Employees (thousands)	Value of Industry Shipments (\$Mil)
Plastics Manufacturing:			
NAICS 325211 Plastics Materials and Resins	1,138	67.2	90,169.2
NAICS 325991 & 3261 Plastics Products	11,030	616.4	205,920.7
NAICS 3332201 Plastics Working Machinery	431	11.5	3,885.6
NAICS 33351105 Molds for Plastics	<u>694</u>	<u>16.0</u>	<u>2,752.2</u>
Plastics Manufacturing Totals	13,293	711.1	302,727.6
Plastics Wholesale Trade:			
NAICS 424610 Wholesale Trade for Plastics Materials, Forms and Shapes	3,375	33.9	45,636.1
Government-Documented Plastics Industry	<u>16,668</u>	<u>745.1</u>	<u>348,363.7</u>
Captive Plastic Products:	<u>#N/A</u>	<u>209.0</u>	<u>70,004.5</u>
Plastics Industry:	#N/A	954.0	418,368.2
Upstream Impacts:	<u>#N/A</u>	<u>791.2</u>	<u>153,120.6</u>
Full Impact *	#N/A	1,745.2	571,488.8

\* Excluding downstream impacts

The following conclusions can be drawn from Table S-1:

- ▶ The U.S. plastics industry operated 16,668 manufacturing establishments, employed 745,000 people and made shipments worth \$348 billion in 2015. This excludes establishments producing captive plastic products or supplying goods and services to the plastics industry.
- ▶ When including captives in the definition of the plastics industry, the number of people employed rose to 954,000 in 2015. Another 791,000 people were employed by the upstream industries that supplied the industry, which brought the total year 2015 employment impact to 1.75 million—1.2 percent of the U.S. non-farm workforce.
- ▶ The plastics industry generated \$418 billion in shipments in 2015. Another \$153 billion was generated by upstream, supplying industries, bringing the total shipments impact of the plastics industry to \$571 billion.
- ▶ Table S-1 does not include downstream impacts on the industries that use plastics, or on the consumers who buy the products containing plastics.

## Comparisons with Other Industries

In order to rank plastics along with other industries, this report considered 82 manufacturing industries defined by the 4-digit North American Industry Classification System (NAICS). Data were available through 2014.

- ▶ Plastic products (NAICS 3261), which accounted for most of the plastic processing industry, was the eighth largest U.S. manufacturing industry in terms of shipments in 2014.
- ▶ Resin, synthetic rubber and artificial & synthetic fibers & filament (NAICS 3252), which primarily includes the plastic materials and resins industry, was the sixteenth ranked manufacturing industry in 2014.

## Rate of Growth

Over the last 35 years, plastics industry employment, real shipments and real value added fared better than manufacturing as a whole. Employment in the plastics manufacturing industry grew 0.3 percent per year between 1980 and 2015. This is an accomplishment, because employment in all of U.S. manufacturing fell 1.2 percent per year during that period.

Employment in the larger category, plastics manufacturing plus plastics wholesale trade, grew 0.4 percent per year<sup>1</sup>.

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Real value added in the plastics manufacturing industry grew 2.7 percent per year from 1980 to 2015. The real value of shipments grew 2.4 percent per year.

By one measure—the real shipments growth rate minus the employment growth rate (2.4 – 0.3)—productivity in plastics manufacturing grew 2.1 percent per year from 1980 to 2015, which is slightly better than the 2.0 percent per year productivity growth for manufacturing as a whole.

The number of plastics industry establishments, which had been falling for more than a decade, flattened out starting in 2010. Employment stopped rising in 2000, fell through 2010, and then began rising again. This mirrors what happened to the rest of manufacturing, in response to consolidation, outsourcing, trade imbalances, and the recessions in 2000-2001 and 2008-2009.

Low inflation, cheap natural gas/gas liquids and a growing economy have turned things around. Lower world oil prices recently improved the competitive positions of overseas plastics producers, but the U.S. continues to be competitively advantaged.

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<sup>1</sup>The growth rate was not available for captive and upstream industries.

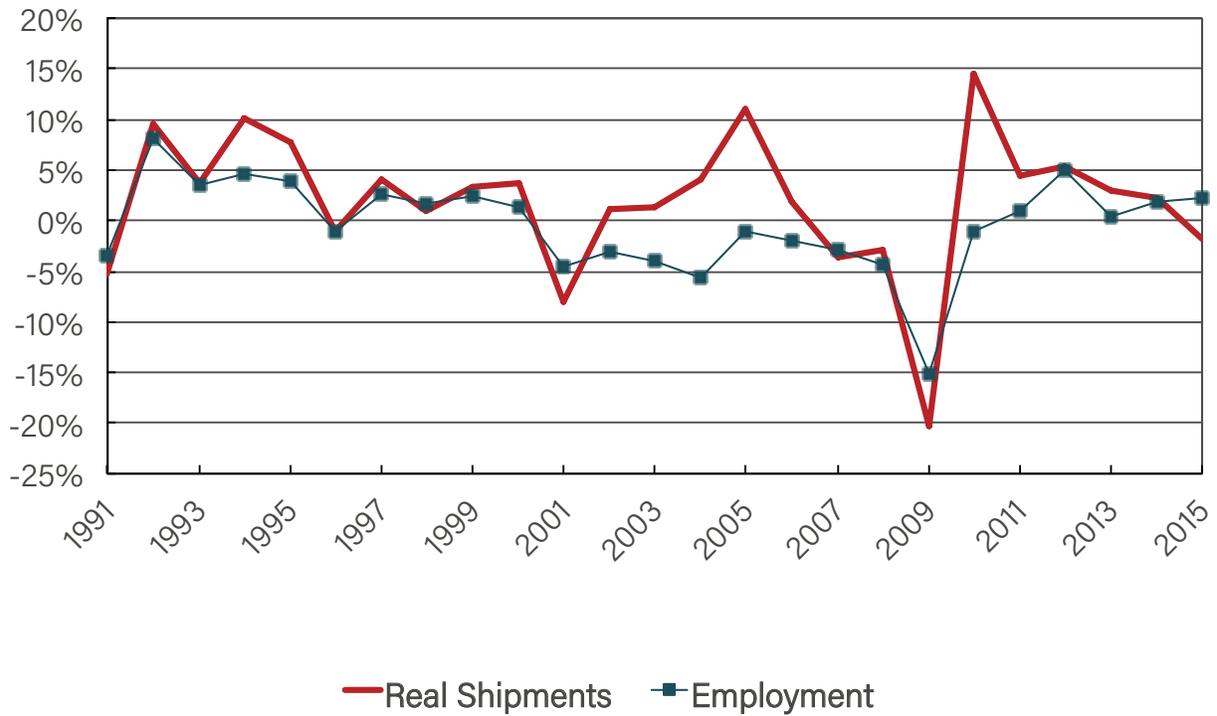
TABLE S-2

COMPARATIVE GROWTH RATES, 1980-2015

	Plastics Manufacturing	All Manufacturing
Employment	0.3%	-1.2%
Real Shipments	2.4%	0.8%
Real Value Added	2.7%	0.7%
Productivity Growth	2.1%	2.0%

FIGURE S-1

PLASTICS MANUFACTURING GROWTH RATES  
(SHIPMENTS ARE CORRECTED FOR INFLATION)



## LOCATION

- ▶ The plastics industry is found in all 50 states, wherever people and manufacturing activities are found. As shown in Table S-3, Texas has the most plastics industry employees, followed by California, Ohio, Michigan, Illinois, Indiana, Pennsylvania, Wisconsin, North Carolina and New York.
- ▶ Texas is very populous—second only to California—so it isn’t surprising that Texas is first in terms of total plastics employment, especially since it is so well endowed with feedstocks and the numerous petrochemical facilities needed to supply the plastics industry. An alternative measure, plastics industry employees per thousand non-farm employees, indicates how concentrated the plastics industry is in a given state—or how much that state specializes in plastics. Using this alternative measurement, Table S-4 shows that Indiana has the largest number of plastics industry employees per thousand non-farm employees, followed closely by Michigan, and then Kentucky, Wisconsin, Ohio, South Carolina, Alabama, Tennessee, North Carolina and Iowa.
- ▶ The states with the highest concentrations of plastics industry employees tend to have the highest concentrations of manufacturing activity, which is consistent with the fact that most plastic products go into manufactured goods.

**TABLE S-3**

TOP STATES FOR PLASTICS EMPLOYMENT  
(PLASTICS INDUSTRY, 2015)

Rank	State	Plastic Employment (thousands)
1	Texas	76.7
2	California	75.5
3	Ohio	74.6
4	Michigan	68.2
5	Illinois	50.9
6	Indiana	50.1
7	Pennsylvania	48.3
8	Wisconsin	39.8
9	North Carolina	37.4
10	New York	30.5
	U.S. Total	954.0

**TABLE S-4**

TOP STATES FOR PLASTICS CONCENTRATION  
(PLASTICS INDUSTRY, 2015)

Rank	State	Plastic Employment (thousands)
1	Indiana	16.5
2	Michigan	16.1
3	Ohio	13.9
4	Wisconsin	13.8
5	Kentucky	13.8
6	South Carolina	12.4
7	Alabama	10.7
8	Tennessee	9.2
9	North Carolina	8.8
10	Iowa	8.6
	U.S. Average	6.7

## Upstream (Supplier) Impacts

Jobs are created in the plastics industry, but they are also created in the industries that, directly or indirectly, supply goods and services to the plastics industry. These industries supply fuel, spare parts, office supplies, transportation services, etc. As discussed in connection with Table S-1, the employment and shipments of these upstream industries contribute significantly to plastics' impact on the economy.

- ▶ During 2015, upstream industries accounted for 791,000 jobs in order to supply goods and services to the plastics industry—about 0.83 upstream jobs for every job in the industry itself.
- ▶ During 2015, upstream industries generated \$153 billion in shipments in order to supply goods and services to the plastics industry.

## Downstream (User) Impacts

Some plastic products, such as toys, are final goods, ready for use. Most are intermediate goods, which are sent on to other manufacturing steps for processing or assembly. Ultimately, all plastic products wind up as part of some kind of final good or service.

- ▶ In 2014 (the latest year for which we have data), an impressive 33.7 percent of the final consumption of plastic products, on a value basis, wound up in some form of service, like wholesale and retail trade, healthcare, food services and other services.
- ▶ Construction accounted for 9.0 percent of final plastic products, a percentage that was decreased due to low housing starts.
- ▶ A large share (30.6 percent) went into non-durable goods: food, tobacco & spirits (9.1 percent); plastic products (15.1 percent); and other non-durables (6.4 percent).
- ▶ Durable goods accounted for the remaining 26.8 percent share: transportation equipment (12.5 percent); furniture and related (2.4 percent); and other durables (11.9 percent).
- ▶ In terms of who is ultimately buying these plastics-containing goods and services in 2014, households consumed 74.0 percent, private fixed investment (by households and businesses) accounted for 28.3 percent, and state, local and federal government agencies used 12.5 percent.<sup>2</sup>
- ▶ The most intense final user of plastic products in 2014, in terms of the value of plastic products per dollar of final product or service, was the plastic products industry itself, followed by soft drinks and ice; mattresses, blinds and shades; snack foods; and seasonings and dressings.

The following sections provide data, discuss definitions and methodology, and develop the conclusions just discussed.

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<sup>2</sup> These percentages add up to more than 100 percent, because we have not deducted the 14.9 percent that, on a net basis, was provided by imports – not supplied by domestic producers. The deduction would be required if the authors were using National Income and Product Account (NIPA) accounting.

