ISRI

Voice of the Recycling Industry™

2019 Recycling Industry Yearbook

The Institute of Scrap Recycling Industries, Inc., is the "Voice of the Recycling Industry™," with approximately 1,300 member companies operating in thousands of locations in the United States and around the globe. Our members are present throughout the recycling chain and include companies that process, broker, and consume recyclable metals, paper, plastics, glass, tires and rubber, electronics, and textiles, whether sourced from industrial, commercial, or residential activities. Our membership also includes those companies that manufacture and distribute the optical and infrared scanners, balers, shredders, conveyors, and other machinery and transportation equipment that are used in all parts of the chain.

ISRI's mission is to promote safe, economically sustainable, and environmentally responsible recycling through networking, advocacy, and education. From our headquarters in Washington, D.C., and through 20 chapters, ISRI raises public awareness of the vital role recycling plays in the economy, U.S. and global trade, the environment, and sustainable development.

ISRI members benefit from a wide array of services, including

- safety and compliance training
- networking and education
- market research and reporting
- regulatory and legal information
- industry-specific publications
- industry representation
- advocacy on the state, national, and international levels

For more information or to join, visit ISRI.org.

Brian Shine
Chair

Robin Wiener
President

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Introduction to Recycling

WHAT IS RECYCLING?

Recycling is the series of activities in which obsolete, previously used, off-specification, surplus, or incidentally produced materials get processed into specification-grade commodities and consumed as feedstock in the manufacturing of new products. Recycling may include collection, processing, and/or brokering such materials to result in their consumption by a manufacturer. Recycled materials also are called scrap.

One of ISRI's mantras is that "scrap is not waste." In other words, scrap materials have value, both before and after recyclers process them into specification-grade commodities. **Manufacturers value scrap commodities as raw materials because they can provide cost, energy, and environmental savings when they are used instead of virgin materials.** Scrap commodities' value changes every day based on supply, demand, and other market factors, just as it does for other types of commodities, such as corn or soybeans.

The recycling industry is a major contributor to the U.S. economy, generating $109.78 billion in economic activity last year and directly employing 164,154 people with average wages and benefits of $73,000. Recycling companies and workers pay $12.9 billion in federal, state, and local taxes, supporting the communities in which they operate in all 50 states. Recyclers generated those revenues last year by processing 138 million mt of material.

More than two-thirds of material recycled in the United States in 2018 remained in the United States, where manufacturers used it for new products.

WHERE DOES SCRAP COME FROM?

Many people think about recycling in terms of what they put in their recycling bin at home. **Residential recycling provides only about one-third of the entire U.S. supply of recycled materials,** however. Most scrap comes from industrial and commercial sources. **Obsolete** scrap consists of used and end-of-life materials and products. These include vehicles, appliances, electronics, cardboard boxes and other paper goods, bottles and cans, and clothing. Demolition sites are another common source of obsolete scrap. **Prompt, prime**, or **new** scrap comes out of the manufacturing process. These materials include metal clippings, stampings, and turnings as well as paper overruns and cuttings.

Recyclers categorize metal scrap as **ferrous**—made from iron and steel—or **nonferrous**, which includes aluminum, copper, lead, zinc, nickel, and tin. Precious metals such as gold, silver, and platinum also are commonly recycled nonferrous metals. A wide range of paper and fiber, electronic, plastic, rubber and tire, glass, and textile items also are recycled.

2018 VOLUME OF SCRAP PROCESSED IN THE UNITED STATES

(metric tons, unless noted otherwise)

Iron and Steel	72,400,000
Paper	47,800,000
Aluminum	5,462,000
Copper	1,783,000
Lead	1,349,000
Zinc	72,000
Plastics (PET bottles)	782,900 (2017)
Electronics	+5.5 million (est.)
Tire (# of tires)	116,000,000 (2017)

Sources: U.S. Geological Survey, U.S. Census Bureau, American Forest & Paper Association, NAPCOR, Scrap Tire News, and ISRI estimates

THE RECYCLING PROCESS

Recycling is a series of actions that can include collecting material; processing it, which can involve multiple steps; brokering it; and selling it to a consuming facility such as a steel mill, paper mill, foundry, or plastic compounder. The goal is to transform unprocessed, mixed materials into uniform streams of single commodities that can be used as raw materials in manufacturing.

When materials arrive at a scrap recycling facility, an employee weighs them and conducts a visual assessment, sampling, analysis, or other testing to determine their composition. In most cases, recyclers pay for incoming material based on its weight and composition. These employees also inspect incoming scrap for anything they will not accept: hazardous materials, those that contain radiation, or items that appear to have been stolen, for example. The industry has a theft-alert notification system that operates across the United States and Canada to minimize the chance of receiving stolen material in a load of scrap.

Processing is an often capital-intensive series of steps for separating or sorting materials by their physical properties. Size reduction allows recyclers to more easily separate mixed materials. It also creates greater efficiencies for shipping, and it can create the desired material density for the scrap-consuming facility. Shredders, shears, granulators, and wire choppers are some of the equipment recyclers use to size-reduce incoming material.

Sorting can be done by hand in some cases, but most sorting is done through increasingly sophisticated technologies that detect and separate materials based on qualities such as magnetism, density, shape, size, elemental composition, color, and other characteristics. These technologies, when connected to powerful computer processors, conveyors, and other equipment, can rapidly separate many tons of material each hour.

Materials recovery facilities, or MRFs, are facilities that process residential recyclables. They use a series of conveyors, magnets, screens, high-tech scanners, blowers, and other equipment to separate the paper and cardboard, plastic bottles, aluminum and tin cans, glass bottles, and so on. Most MRFs require some hand-sorting to remove contaminants such as plastic bags, dirty diapers, and garden hoses. A few U.S. MRFs now use robots to assist with the process of sorting and removing contaminants.

Hundreds of U.S. metals recycling facilities have massive shredders that operate at high speeds with low torque to process cars, trucks, and large appliances, turning them into pieces a few inches across in less than a minute. Complex arrays of separation technologies then sort those pieces, sending metals into separate streams and removing the nonmetallic components.

Hydraulic shears and cutting torches are used for size reduction on metal objects that are too large or dense to shred.

Plants for recycling tires and rubber and plastics use their own combinations of shredding—often with smaller, low-speed, high-torque shredders—and separation. Electronics recyclers perform a range of services that can include testing, repair, and refurbishment; data destruction or erasure; manual dismantling for parts reuse and recycling; and shredding and separation of end-of-life products.

QUALITY, ENVIRONMENT, HEALTH, AND SAFETY

While scrap recycling facilities vary considerably in size, layout, and the materials they handle, they share a focus on quality and environmental, health, and safety protection. In recent years, scrap consuming facilities and foreign governments have significantly raised their requirements for scrap quality. Recyclers have used a combination of upgraded technology and slower processing to meet those standards, but this has come at a higher cost. The industry is equally committed to workers' health and safety, environmental protection, and regulatory compliance. To improve performance on QEH&S measures, recyclers are implementing and getting certified to management system standards such as the Recycling Industry Operating Standard™.

TRANSPORTING SCRAP

The final processing step is preparing the scrap to be transported to scrap-consuming facilities. Some materials are compressed into bales; other loose materials fill sturdy sacks, cardboard boxes, shipping containers, truck beds, and rail cars. The recycler ships these specification-grade processed scrap commodities to facilities that have purchased them to make semifinished or finished products.

Truck, rail, and barge are the three most common modes of transporting scrap within the United States. Of the three, trucks have the highest cost per ton. Rail can be less costly because rail cars have a greater tonnage capacity than trucks. **More than 40 million tons of U.S. scrap materials originate on Class I railroads annually,** according to figures from the Association of American Railroads. Rail shipping expenses have risen steeply in the past year, however, and those costs, as well as poor rail car availability and other barriers, have made this method of shipment less attractive. Barges and other waterborne shipments are the third major mode of domestic transportation for scrap. Although adverse weather conditions can significantly affect barge traffic, barges are often the lowest-cost option on a per-unit basis.

Scrap export shipments move within North America via these three shipping modes as well as by oceangoing vessel. Although a large portion of U.S. scrap exports ship as bulk (unpackaged) cargo, container shipping has expanded the ability of recyclers to fill international market demand for recycled materials.

GLOBAL SUPPLY AND DEMAND

Recycling is a business driven by demand. Scrap-consuming facilities determine the quality and volume of scrap commodities they need and the price they are willing to pay. If recyclers can't meet those requirements, the material does not close the loop and re-enter the manufacturing life cycle.

Recycled commodities are a key global manufacturing feedstock that meets about 40% of the world's industrial raw material needs. Worldwide, manufacturers consume about 900 million mt of scrap each year. About 20% of that volume, or nearly 180 million mt, is a result of global trade in scrap.

You can find scrap almost anywhere on the planet you find manufactured goods: buildings, cars, boxes, bottles, cans, cellphones, and more. Global trade in scrap occurs because not every community has the infrastructure and technology to collect and process recyclable material into specification-grade commodities. Further, local demand for a commodity might not match the local supply. For example, Turkey has the technology and capacity to produce many steel products, but it does not have sufficient domestic iron ore or ferrous metal scrap to meet its steelmaking needs. Steel producers in Turkey purchase ferrous scrap from around the globe, much of it from the United States, to make new steel products. This global trade in scrap recyclables makes U.S. recyclers less dependent on local markets to sell their scrap. It also makes U.S. scrap consumers less dependent on domestic recyclers for their supply of scrap.

SCRAP COMMODITY MARKETS

Scrap prices are subject to many of the same market forces as primary (virgin) commodity prices, thus they experience similar price volatility. Domestic and global manufacturing demand, changes in currency markets, transportation supply and prices, energy prices, trade barriers, and the cost and availability of comparable virgin commodities are all factors that can affect the price of scrap commodities. But scrap commodity markets and primary commodity markets have some critical differences.

Primary commodity prices generally follow traditional supply-demand relationships: As supply grows, prices fall. As supply shrinks, prices rise. Primary commodity producers often stockpile their commodities in large warehouses to manage large swings in inventory. Scrap recyclers generally do not stockpile material and hold it until prices increase. Instead, they secure a contract to supply scrap to a consumer and then purchase the material they need—from thousands of sources each day—to fulfill that contract's demands. After acquiring and processing the scrap as the contract specifies, recyclers deliver the material based on current market pricing conditions the consumer has set. Scrap processors are generally considered price-takers, not price-setters, thus the mantra "scrap is bought, not sold."

ISRI INDEX OF SCRAP PRICES, AUGUST 2012-JULY 2019

Source: ISRI

The ISRI Index is a weighted index of ferrous scrap, copper The ISRI Index is a weighted index of ferrous scrap, copper scrap, aluminum scrap, and recovered paper and fiber prices. Scrap prices and supply are closely connected: For most segments of the industry, prices provide the incentive for suppliers to bring recycled materials to the marketplace. In November 2015, when the ISRI Index fell to its lowest level since the Great Recession, supplies were constrained, placing a floor under the market and setting the stage for a price recovery in the first half of 2016 and into 2017. Given the cyclical nature of commodity markets and industrial production, it should come as no surprise that the scrap industry faces similar business cycles.

Residential recycling differs from industrial recycling because the supply does not change based on market conditions. Contracts between materials recovery facilities and municipal governments set the terms for what materials the MRF will collect and at what frequency. Because the supply has less elasticity, a sudden reduction in demand can wreak havoc with prices. This happened in 2018, when China stopped importing postconsumer plastics and mixed paper and set extremely low levels of contaminants it would allow in other scrap materials. With other markets around the world unable to absorb the volumes of these materials that Chinese companies had been purchasing, prices dropped precipitously.

THE ROLE OF SPECIFICATIONS (ISRI SPECS)

Specifications help facilitate trade by improving communication between buyers and sellers worldwide. Each word or phrase has a definition that serves as a global standard for consistency and quality, reflecting manufacturers' tolerances for the product's size, shape, color, composition, manufacturing process, source, or other characteristics.

ISRI's predecessor organizations established the first specifications for scrap commodities more than 100 years ago, selecting words—Zorba, Honey, Berry, Twitch—to describe categories of nonferrous metals. Over the decades, the specifications have expanded to address a wide range of recycled commodities, from ferrous and nonferrous metals to glass, paper, plastics, electronics, and tires. Most recently, ISRI established "inbound MRF" specifications for residential recyclables coming into materials recovery facilities.

The process for requesting new or modified specifications allows them to keep pace with changes in the supply of recyclable manufactured goods and with manufacturers' demand for different, often more uniform, characteristics in the commodities they purchase.

In recent years, the specifications have proven invaluable not just in business-to-business transactions, but also in clarifying to governments and international organizations the difference between scrap and waste when setting trade policy. ISRI has worked with these bodies to craft regulations that continue to give companies around the world access to desirable recycled commodities they can use as manufacturing inputs instead of relying on extraction of natural resources.

Recycling's Benefits, Challenges, & Opportunities

ECONOMIC BENEFITS OF RECYCLING

Recycling is a sophisticated, capital-intensive industry that has been creating "green" jobs in the United States for decades. As the first link in the manufacturing supply chain, recycling is integral to the U.S. economy.

Economic Impact of U.S. Scrap Recycling Industry, 2019	
Direct Jobs	164,154
Supplier Jobs	159,681
Induced Jobs	207,675
Total	531,510

Source: John Dunham & Associates

Independent economic consulting firm John Dunham & Associates conducted an economic impact analysis in 2019 to document the size and scope of the industry and its contributions to the U.S. economy in terms of employment, tax generation, and overall economic benefit. It found that **the recycling industry generated $109.78 billion in economic activity in 2018**—that's 0.54% of the nation's total economic activity.

Recycling processors and brokers directly employ 164,154 people at an average wage of $73,000, including benefits. The industry indirectly supports an additional 367,356 jobs: 159,681 people who supply products and services to the industry and 207,675 others who indirectly benefit from the re-spending of wages by recyclers, brokers, and suppliers. The industry and its employees pay $7.96 billion in federal taxes.

Recycling facilities also are significant contributors to the economic health of their state and local governments. They generate about $4.94 billion in state and local tax revenues annually. For the full study, or for information on the recycling industry's economic impact on a specific state, federal congressional district, state congressional district, or city, visit https://www.isri.org/recycling-commodities/economy.

ENERGY SAVED BY USING RECYCLED MATERIALS

Compared with manufacturing using virgin materials

Using Recycled	Saves Up to How Much Energy?
Aluminum	95%
Copper	85%
Plastic	88%
Steel	74%
Paper	68%
Glass	25%

Sources: U.S. Energy Information Administration, International Copper Study Group, Association of Plastic Recyclers, Glass Packaging Institute, U.S. EPA

ENVIRONMENTAL BENEFITS OF RECYCLING

In addition to generating significant economic benefits, the recycling industry is a pivotal player in environmental protection, resource conservation, and sustainability. U.S. recyclers transformed 138 million mt of material from outdated or obsolete products into valuable manufacturing inputs in 2018. Those scrap commodities reduce the need to mine for ore, cut down trees for paper, extract fossil fuels to produce plastic, and otherwise deplete our natural resources. Recycling also reduces the amount of material sent to landfills, preserving that land for better uses.

Manufacturing products with recycled material results in significant energy savings compared with manufacturing with virgin materials, thereby reducing greenhouse gas emissions and making that energy available for other purposes. According to figures from the U.S. Environmental Protection Agency's Greenhouse Gas Equivalencies Calculator, the 138 million mt of commodities recycled in 2018 saved the equivalent of nearly 400 million tons of carbon dioxide, equal to the energy use of 48 million homes for one year.

RECYCLING 1 TON OF MATERIAL AVOIDS THESE GREENHOUSE GAS EMISSIONS EQUIVALENTS:

Carbon Sequestered by

- 3.5 acres of U.S. forests in one year
- 50 tree seedlings grown for 10 years

Greenhouse Gas Emissions From

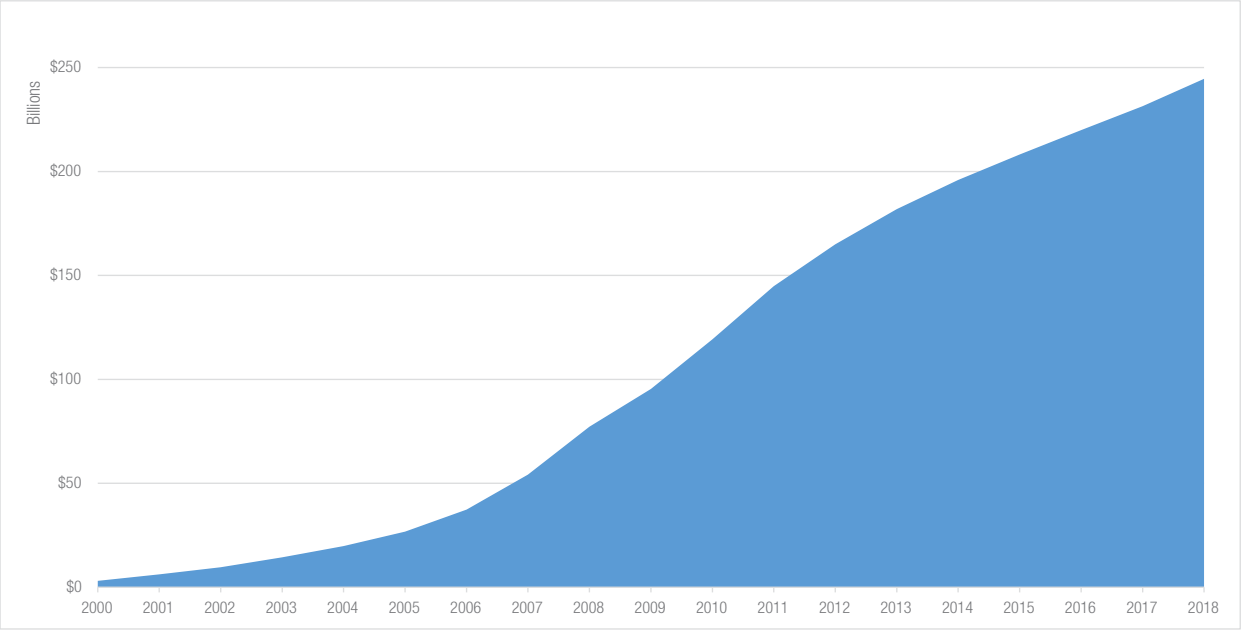
- 7,335 miles driven by an average passenger vehicle

CO_2 Emissions From

- 338 gallons of gasoline consumed
- 3,280 pounds of coal burned
- 382,537 smartphones charged

Source: EPA Greenhouse Gas Equivalencies Calculator

CUMULATIVE IMPACT OF U.S. SCRAP EXPORTS ON THE U.S. TRADE BALANCE SINCE 2000
(billions of dollars)



Source: U.S. Census Bureau/U.S. International Trade Commission

TRADE BENEFITS OF RECYCLING

Recycled commodities are among the nation's largest exports by value. **In 2018, the United States exported 40.4 million mt of commodity-grade scrap valued at $20 billion to buyers in more than 150 countries around the world.** Only 30% of U.S. scrap gets exported, but these exports create approximately 50,543 direct U.S. jobs at scrap processors and brokers and 47,240 U.S. jobs for suppliers of products and services to scrap exporters. Those wage-earners indirectly support another 62,869 jobs, for a total of 160,652 jobs resulting from recyclers' export activities.

Global demand for U.S. scrap is good for the environment for several reasons. Manufacturers substitute it for virgin materials such as ores, fossil fuels, and trees, and doing so saves energy and reduces greenhouse gas emissions. U.S. scrap exports also contribute to the U.S. trade balance, with a net positive impact of $245 billion since 2000. And exports provide a useful outlet for excess domestic scrap supply.

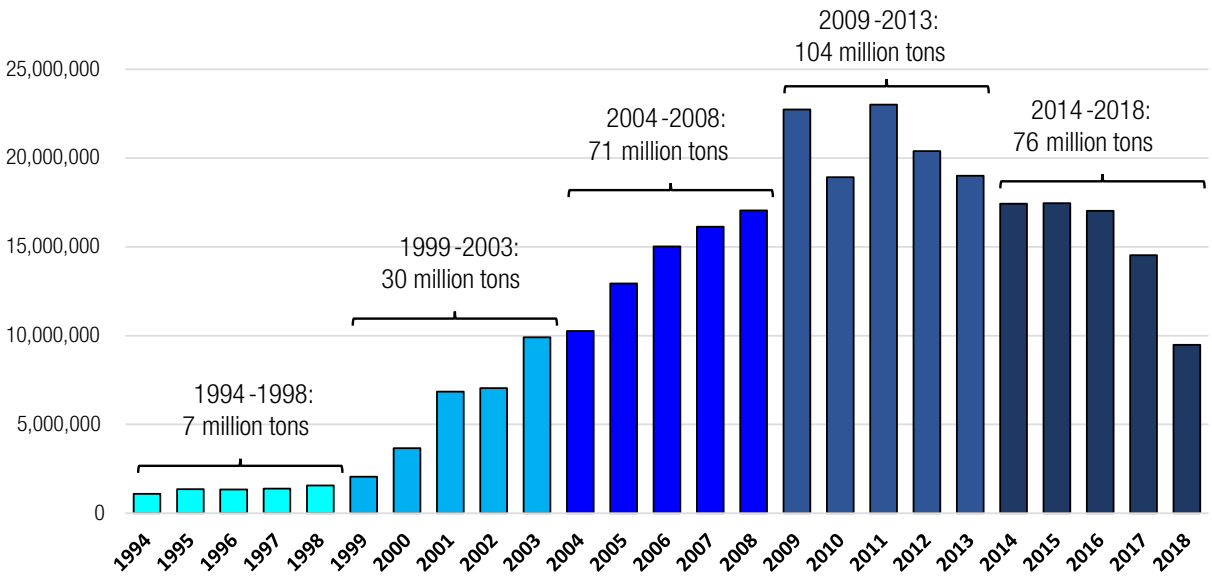
Worldwide, manufacturers consume more than 900 million mt of scrap, which meets 40% of global industrial raw-material needs. Approximately 180 million mt of that total comes from international trade. Thus the United States' 40.4 million mt of exported scrap meets more than 22% of global demand for scrap imports.

CHINA'S IMPACT ON GLOBAL RECYCLING

From 2000 to 2017, China's growth as a center of global manufacturing led it to become the destination for more than half of the world's total scrap imports. **In mid-2017, China declared its intention to stop importing some scrap materials**—most notably, mixed paper and postconsumer plastics—and to strictly limit contamination levels in any remaining scrap imports. In some cases, maximum contamination levels were set at 0.5%.

China implemented these changes for several reasons. Its economic boom had led to a growing pollution problem, with improperly discarded materials including recyclables such as packaging, electronics, and vehicles. One goal of the ban was likely to boost its domestic scrap collection and recycling. The documentary "Plastics China" also had recently drawn attention to the harsh, unsanitary conditions of China's small-scale plastics processing facilities. Chinese leaders blamed "foreign garbage" for such conditions and pledged to ban such materials. Further, smuggling, lax enforcement, and corruption at some Chinese ports had resulted in a small number of shipments entering the country that were classified as scrap but actually contained waste, including medical and hazardous wastes.

U.S. EXPORTS OF ALL SCRAP COMMODITIES TO CHINA (INCLUDING HONG KONG), 1994-2018 (metric tons)



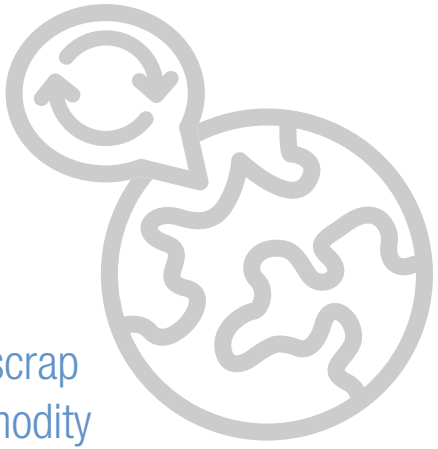
Source: Census Bureau/U.S. International Trade Commission

China's scrap import bans and tighter contamination standards—as well as restrictions on import licenses, quotas, and a crackdown on smuggling—went into effect at the start of 2018. The change has reverberated through the global recycling industry. China (including Hong Kong) imported more than 42 million mt of scrap from all origins in 2017; for 2018, that volume was down 44%, to approximately 24 million mt. Although U.S. scrap exports to China have been declining since 2011, when they peaked at 23 million mt, **U.S. scrap commodity exports to China fell 35% by volume from 2017 to 2018,** from 14.5 million mt to 9.5 million mt—the lowest level since 2002. Even with that decline, China remained the biggest market for U.S. scrap exports by value, with that 9.5 million mt of scrap worth $3.5 billion to U.S. recyclers.

In response to Chinese import restrictions on scrap commodities, some Chinese recyclers and consumers of scrap moved their operations to Southeast Asian countries. The influx of imports quickly overwhelmed those countries' ability to manage trade flows and environmental protections. This led Vietnam and Thailand to ban plastic scrap imports and other countries, including Malaysia and India, to consider such bans.

China's import policy changes and related import bans in Southeast Asia hit the residential recycling sector the hardest. China was the largest buyer of U.S. scrap paper and plastic, both by a wide margin. Its bans on imports of mixed paper and postconsumer plastic scrap left materials recovery facilities and other recyclers of those commodities stockpiling material and searching for new markets. A small amount of recycled material ended up in landfills, and a few dozen residential recycling programs out of the thousands of recycling programs across the country stopped taking some or all recyclables until new markets could be found. Communities in Western states were some of the hardest hit.

Despite the sharp decline in U.S. exports to China, total U.S. scrap exports grew 7% by volume in 2018, to 40.4 million mt. U.S. recyclers implemented greater quality controls to meet China's tighter contamination standards and found new markets for their scrap commodities. The U.S. scrap export markets that grew the most from 2017 to 2018 were India, Malaysia, Taiwan, South Korea, and Germany.



U.S. scrap commodity exports to China **fell 35%** by volume from 2017 to 2018.


U.S. scrap exports
grew 7%
by volume in 2018, to
40.4 million mt.

Major Scrap Commodities

Iron and Steel

Ferrous scrap is the most recycled material in the United States and **worldwide.**

On average, the United States processes enough ferrous scrap every day to build **25 Eiffel Towers.**

Producing steel from ferrous scrap requires

60% less energy and reduces CO_2 emissions

58% compared with producing steel from virgin materials.

Recycling one car saves more than

2,500 lbs. of iron ore,

1,400 lbs. of coal, and

120 lbs. of limestone.

THE FERROUS METAL RECYCLING PROCESS

Here's how the steel in cars can be recycled and used to build other things, like bridges.

Sources: U.S. Department of Energy, EPA, and ISRI estimates

IRON AND STEEL

Ferrous scrap, made from iron and steel, comes from consumer products such as automobiles and household appliances as well as industrial products that include buildings, railroad tracks, ships, and farm equipment. **The largest single source of obsolete ferrous scrap in the United States is end-of-life vehicles**, the volume of which tracks closely to new vehicle sales. Light vehicle sales totaled 17.2 million units in 2018, according to the Bureau of Economic Analysis. The manufacturing process produces prompt, or new, ferrous scrap: leftover iron and steel that results from stamping, cutting, trimming, or punching. Approximately half of the ferrous scrap supply is prompt scrap.

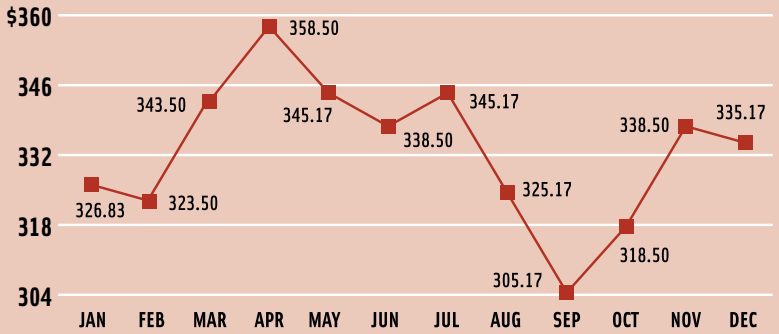
U.S. MARKET

U.S. steel mills consumed approximately 103 million mt of iron and steel scrap in 2018 to produce nearly 87 million mt of steel, according to the U.S. Geological Survey. **The 6.2% growth in U.S. steel production in 2018 increased demand and prices for ferrous scrap**, leading it to outperform most other scrap commodities. U.S. tariffs

IRON AND STEEL PRICE AND FERROUS SCRAP VOLUMES

IRON & STEEL

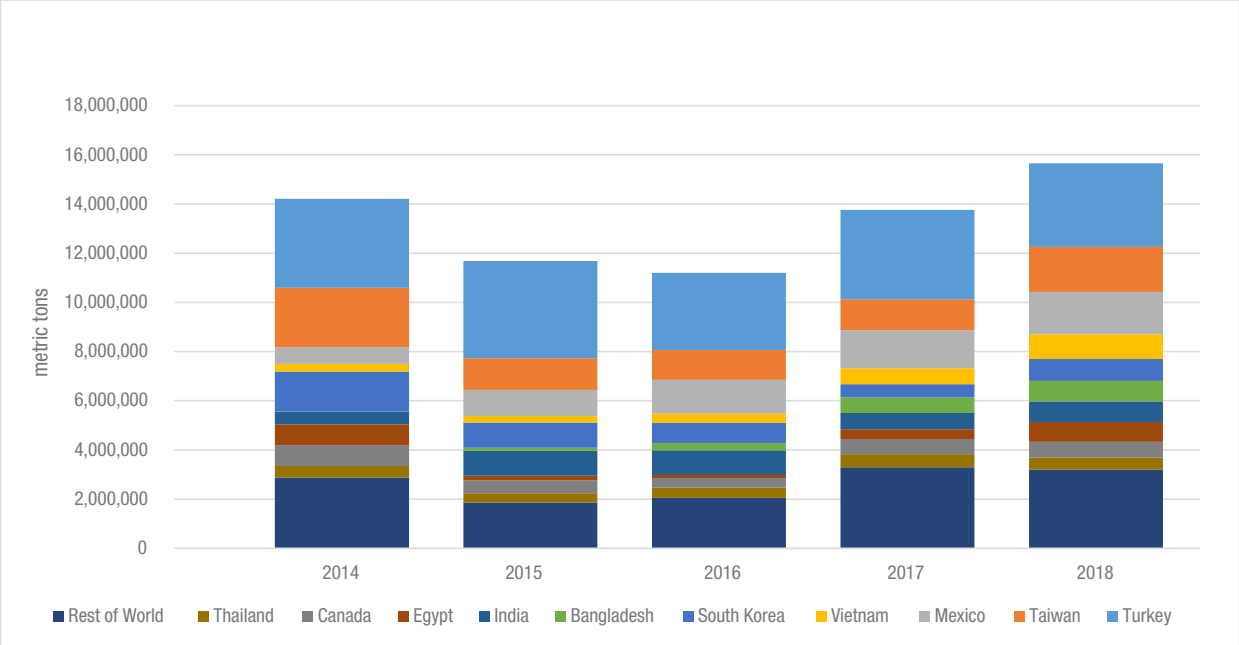
2018 NO. 1 HMS MONTHLY COMPOSITES (per gross ton)
2018 AVERAGE: $334.64, 20% ABOVE 2017



	TOTAL FERROUS SCRAP CONSUMED[1] (metric tons)	TOTAL APPARENT CONSUMPTION[2] (metric tons)	SCRAP MARKET SHARE	U.S. SCRAP EXPORTS[3] (metric tons)
14	62,000,000	100,000,000	62%	14,227,000
15	56,500,000	100,000,000	57%	11,696,000
16	56,700,000	95,000,000	60%	11,233,000
17	58,800,000	99,000,000	59%	13,805,000
18	60,100,000	103,000,000	58%	15,650,000

Sources: USGS, USITC, ISRI estimates
[1] USGS reported consumption
[2] Steel shipments + net imports
[3] Excludes stainless and alloy steel scrap

TOP U.S. FERROUS SCRAP EXPORT MARKETS



Source: U.S. Census Bureau/U.S. International Trade Commission

on steel imports from Turkey and other countries were widely viewed as supporting domestic steel producers, and, by extension, domestic ferrous scrap demand.

EXPORT MARKET

The United States is the world's leading ferrous scrap exporting country, selling to buyers in 75 countries around the world. **Ferrous scrap exports increased nearly 14% by volume from 2017 to 2018, to 15.7 million mt,** even though shipments to the No.1 ferrous export destination, Turkey, declined 5.6%. Turkish steel production fell in 2018 after the United States imposed higher tariffs on imported Turkish steel, which likely contributed to its drop in demand for U.S. ferrous scrap. By value, ferrous scrap exports in 2018 totaled $5.3 billion, up 29% from 2017. The biggest export markets for U.S. scrap in 2018 were Turkey, Taiwan, Mexico, Vietnam, and South Korea, according to the U.S. International Trade Commission.

Nonferrous Metals

ISRI estimates that
50% to 60%
of the aluminum consumed
by U.S. mills comes from scrap.

U.S. recyclers recover
85% to 95%
of all aluminum in U.S.
automobiles.

Nonferrous metals do not degrade or lose their chemical properties in the recycling process, which allows them to be recycled an infinite number of times. Nonferrous scrap comes from a wide array of consumer, commercial, and industrial sources that include electronic devices and wiring, beverage containers, automobile batteries and radiators, aluminum siding, airplane parts, and more.

According to data from the U.S. Geological Survey and the U.S. Commerce Department, in 2018 the United States recovered more than 9.2 million mt of nonferrous scrap that ISRI estimates was worth more than $34 billion. Nonferrous metal scrap is less than 10% of all scrap recycled in the United States by volume, but by value, nonferrous metals—which include precious metals—provided nearly half of the total value of U.S. scrap recycling industry earnings in 2018.

The United States exported $10.4 billion worth of nonferrous scrap to more than 95 countries in 2018, including China, Canada, Mexico, South Korea, Japan, Taiwan, Belgium, India, and Germany. The following pages give further detail on some of the most prevalent recycled nonferrous metals: aluminum, copper, lead and zinc, and nickel.

About **75%** of all aluminum produced since commercial manufacturing began in the 1880s is still in productive use as secondary raw material.

Sources: USGS, USITC, JASON Learning, ISRI

Manufacturing products from recycled aluminum saves up to **95 percent** of the energy needed to manufacture them from virgin materials.

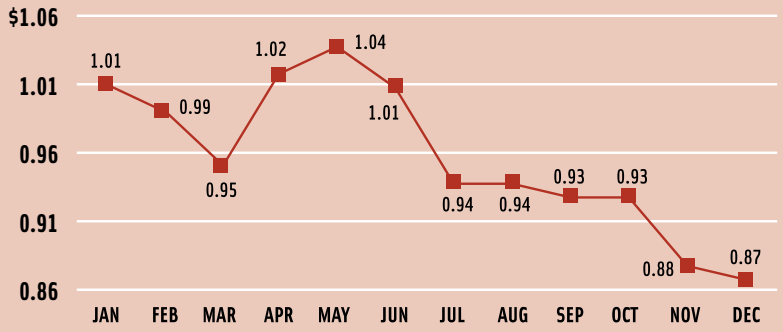
THE ALUMINUM RECYCLING PROCESS

Here's how aluminum beverage containers are recycled into new cans.

ALUMINUM PRICE AND SCRAP VOLUMES

ALUMINUM

2018 LME THREE-MONTH AVERAGES (per pound)
2018 AVERAGE: $0.96, 7% ABOVE 2017



	OLD & NEW SCRAP COMBINED[1] (metric tons)	TOTAL APPARENT CONSUMPTION[2] (metric tons)	SCRAP MARKET SHARE	U.S. SCRAP EXPORTS (metric tons)
14	3,640,000	6,230,000	58%	1,716,000
15	3,460,000	6,719,000	51%	1,549,000
16	3,540,000	6,893,000	51%	1,353,000
17	3,700,000	7,080,000	52%	1,567,000
18	3,700,000	7,000,000	53%	1,762,000

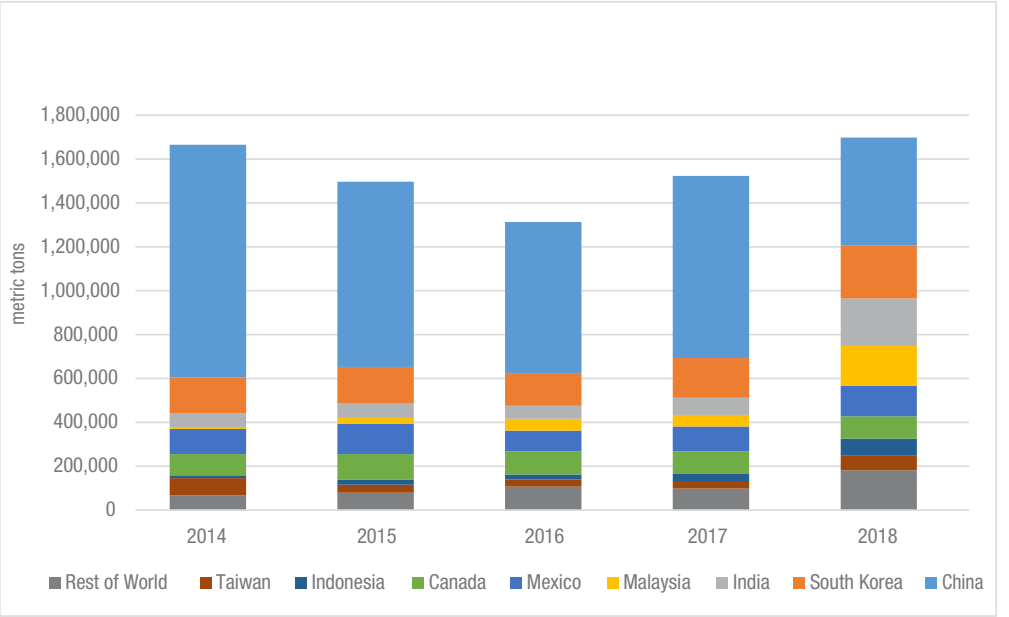
Sources: USGS, USITC, ISRI estimates
[1] Metal recovered
[2] Domestic primary production + recovered from old and new scrap + net imports

ALUMINUM

Aluminum holds the distinction of being both the youngest and the most widely used base nonferrous metal in the United States. Its lightweight, ductile, malleable, and corrosion-resistant characteristics make it a popular choice with engineers and manufacturers. Common sources of aluminum scrap include used beverage containers, house siding, radiators, wire and cable, automobiles, and airplanes.

Aluminum prices at the London Metal Exchange fluctuated significantly in 2018 due to factors including the U.S. imposition of Section 232 import tariffs on aluminum products, Chinese retaliatory tariffs on its imports of U.S. aluminum scrap, and U.S. sanctions against Russian aluminum producer UCRusal. Aluminum metal recovered from purchased new and old scrap in the United States totaled about 3.7 million mt, according to USGS figures, essentially unchanged from 2017. About 58% of that supply came from prompt scrap and 42% from old scrap, it notes.

U.S. ALUMINUM SCRAP EXPORTS



Source: U.S. Census Bureau/U.S. International Trade Commission

The United States exported 1.8 million mt of aluminum scrap in 2018. Even though U.S. aluminum scrap exports to China declined 39% by volume, developing markets including Malaysia, India, and Indonesia ramped up their purchases. The result was that **U.S. aluminum scrap exports increased 12% from 2017 to 2018.** China and Hong Kong remained a destination for 32.5% of U.S. scrap aluminum exports in 2018, down from 56% in 2017.

It takes a little as **60 days** for an aluminum can to go from the recycling bin back to a grocery shelf.

Sources: Aluminum Association, USGS, Census Bureau, ISRI estimates

COPPER

Archaeological evidence shows that people have been using copper for more than 10,000 years. Today copper remains a vital commodity used in construction, electrical equipment, transportation, consumer goods, and other products. Copper combines well with other metals, such as tin, lead, and zinc, to form metal alloys. Bronze and brass are two of the most common copper alloys, but hundreds of others have been created for the specific properties they can provide.

U.S. AND EXPORT MARKETS

In 2018, U.S. recyclers recovered 870,000 mt of old and new copper scrap, up 1% from 2017. 83% of that total is new scrap from fabricating operations and 17% is old scrap, according to the U.S. Geological Survey. That supply met 34% of the U.S. market's need for refined copper. **Global and U.S. prices for copper fell in 2018,** largely due to Chinese scrap import restrictions and slower Chinese economic growth. For the year, the London Metal Exchange three-month-average price for copper remained 6% above its price in 2017, but prices fell 14% from January to December. U.S. prices for No. 2 refiners' copper scrap also fell 14% in that period.

U.S. copper and copper alloy scrap exports to China and Hong Kong fell 56% in 2018, according to trade data from the U.S. Census Bureau, from 724,221 mt to 315,525 mt. Other export market gains could not offset this decline in Chinese demand, resulting in a 9% decrease in total U.S. copper scrap exports compared with 2017, to 913,000 mt. China and Hong Kong purchased 35% of U.S. copper scrap in 2018, compared with 72% in 2017. Other important overseas markets for U.S. copper scrap exports in 2018 included Malaysia (up 2,053% from 2017, to 119,573 mt), Canada (down 1.5%), South Korea (up 129%), Japan (up 165%), and India (up 94%).

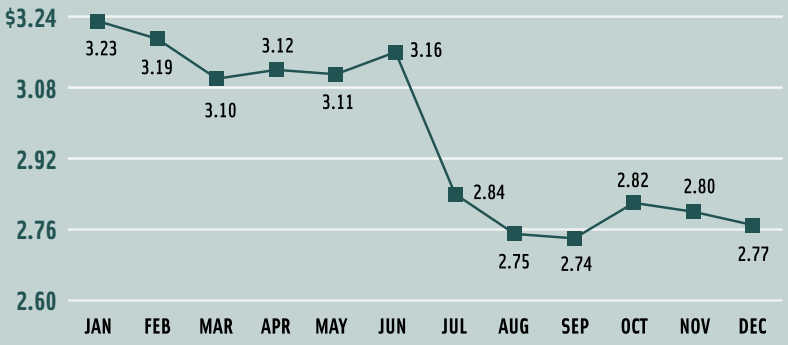
About 1/3 of the
U.S. copper supply
comes from scrap.

The United States recycles enough copper each year to equal the copper content of more than 30,000 Statues of Liberty.

COPPER PRICE AND SCRAP VOLUMES

COPPER

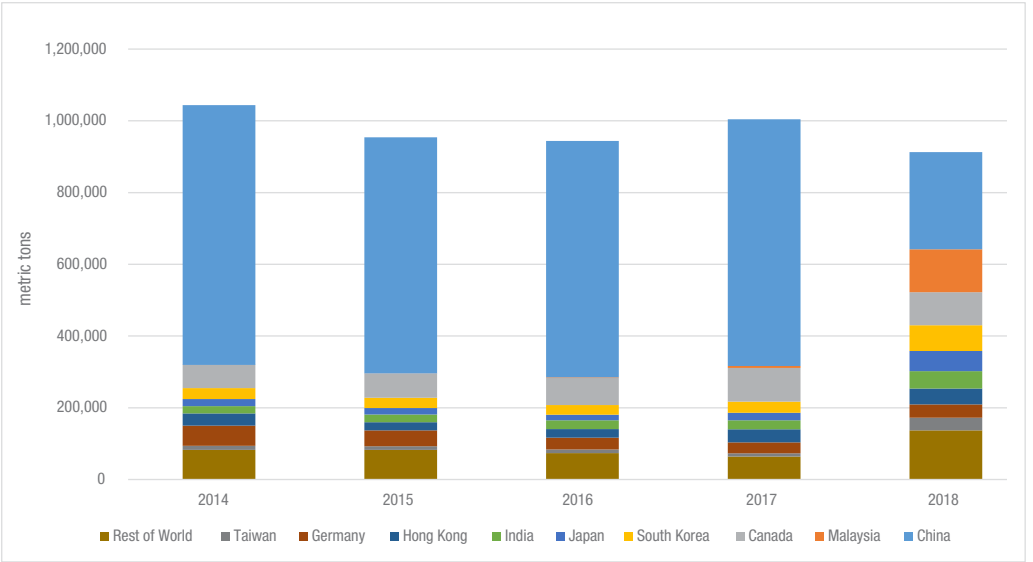
2018 LME THREE-MONTH AVERAGES (per pound)
2018 AVERAGE: $2.97, 6% ABOVE 2017



	OLD & NEW SCRAP COMBINED[1] (metric tons)	TOTAL APPARENT CONSUMPTION[2] (metric tons)	SCRAP MARKET SHARE	U.S. SCRAP EXPORTS (metric tons)
14	820,000	2,380,000	34%	1,044,000
15	830,000	2,450,000	34%	954,000
16	810,000	2,440,000	33%	944,000
17	860,000	2,565,000	34%	1,004,000
18	870,000	2,570,000	34%	913,000

Sources: USGS, USITC, ISRI estimates
[1] Includes copper recovered from all sources
[2] Domestic primary production + recovered from old and new scrap + net imports + stock changes

U.S. COPPER SCRAP EXPORT MARKETS



Source: U.S. Census Bureau/U.S. International Trade Commission

LEAD AND ZINC

Although lead has been used for centuries as a building material and to produce ceramic glazes, leaded glass and crystal, paint, and other protective coatings, lead's use in battery technology is what solidified its importance in the modern age. U.S. secondary lead smelting grew out of the recycling of automotive and similar lead-acid batteries. More than 85% of the U.S. lead supply is used in lead-acid batteries, but other uses include rolled and extruded products, ammunition, alloys, pigments, and cable sheathing.

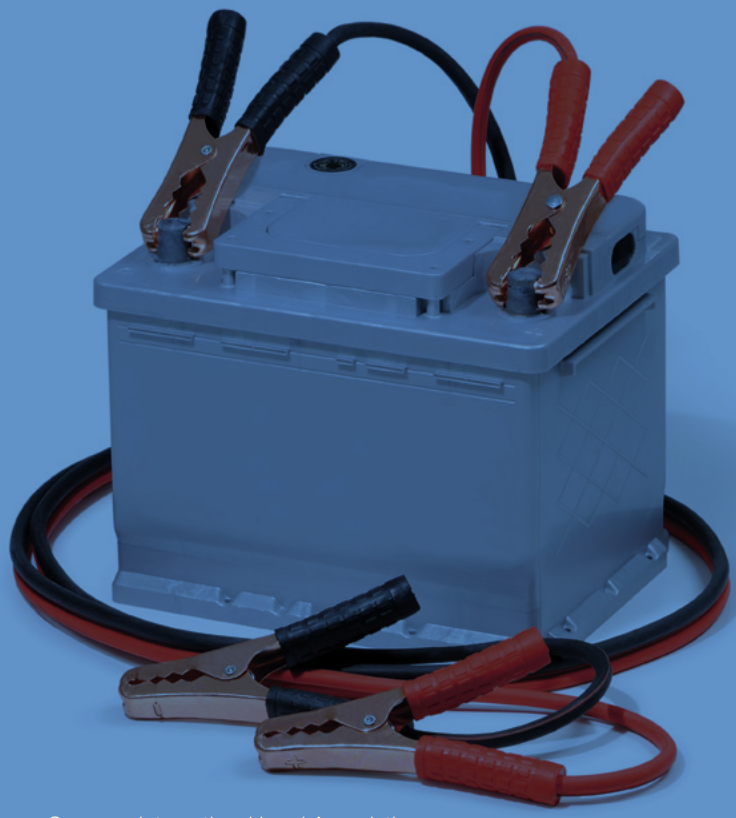
Zinc is mostly used for galvanizing—protecting other metals from corrosion—and creating alloys such as brass and bronze. Its low melting point makes it useful for die-casting and for rolling applications where more durable dies would be too expensive. Zinc also gets compounded with rubber, chemical salts, paint, and agricultural products.

U.S. AND EXPORT MARKETS

The United States recycled 1.3 million mt of secondary lead scrap in 2018, a 30% increase over 2017. Of the 1.8 million mt of apparent lead used in U.S. manufacturing last year, 71% came from scrap, nearly all of which was postconsumer scrap. Global lead prices fell in 2018, with the London Metal Exchange three-month average for the year 4% below 2017. From January to December, that price fell 23%. Zinc scrap recycled in the United States increased 7.4% from 2017 to 2018, to 72,000 mt. About 25% of the refined zinc produced in the United States in 2018 was from recycled material. LME three-month average zinc prices fell 6% from 2017 to 2018. The two metals' export performance differed. Lead scrap exports decreased 12 percent from 2017 to 2018, to 49,000 mt, while zinc scrap exports grew 18%, to 40,000.

100% of U.S. lead production and **74%** of European lead production come from recycled material.

Lead-acid batteries have a nearly **100% recycling rate** in North America and Europe.

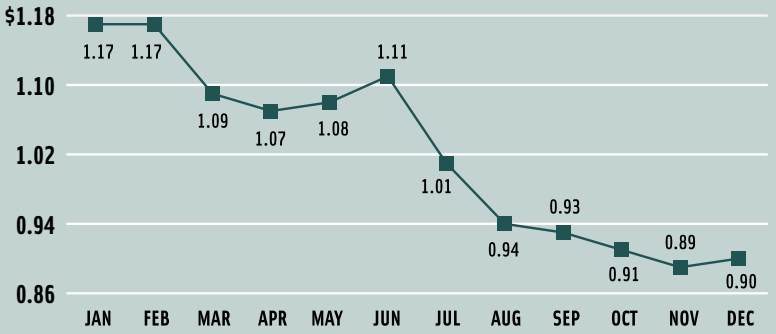


Sources: International Lead Association, Association of Battery Recyclers

LEAD PRICE AND SCRAP VOLUMES

LEAD

2018 LME THREE-MONTH AVERAGES (per pound)
2018 AVERAGE: $1.02, 4% BELOW 2017



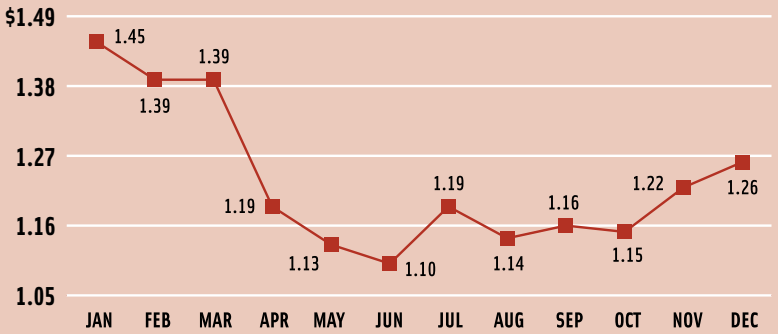
	OLD AND NEW SCRAP RECYCLED (metric tons)	TOTAL APPARENT CONSUMPTION (metric tons)	SCRAP MARKET SHARE	U.S. SCRAP EXPORTS (metric tons)
14	1,130,000	1,560,000	72%	36,000
15	1,120,000	1,540,000	73%	47,000
16	1,070,000	1,540,000	69%	45,000
17	1,000,000	1,680,000	60%	56,000
18	1,300,000	1,800,000	71%	49,000

Sources: USGS, USITC

ZINC PRICE AND SCRAP VOLUMES

ZINC

2018 LME THREE-MONTH AVERAGES (per pound)
2018 AVERAGE: $1.23, 6% BELOW 2017



	PROCESSED ZINC SCRAP[1] (metric tons)	TOTAL APPARENT CONSUMPTION (metric tons)	SECONDARY SLAB SHARE	U.S. SCRAP EXPORTS (metric tons)
14	166,000	965,000	52%	71,000
15	120,000	960,000	37%	55,000
16	65,000	780,000	25%	30,000
17	67,000	870,000	25%	34,000
18	72,000	880,000	25%	40,000

Sources: USGS, USITC
[1] Secondary slab zinc production + zinc scrap exports

NICKEL AND STAINLESS STEEL

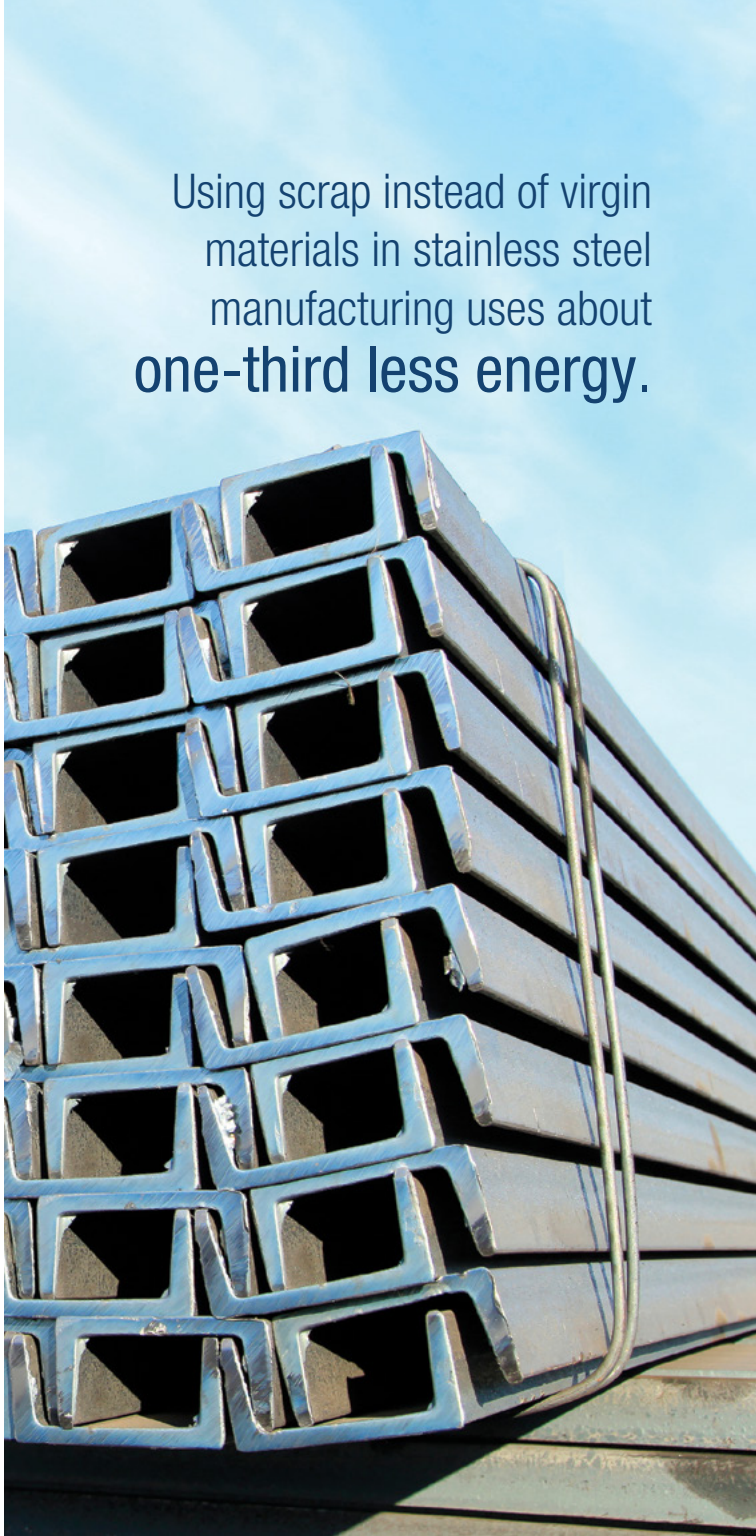
Nickel exhibits characteristics of both ferrous and nonferrous metals. In manufacturing, it's an essential alloying element for steel to produce stainless steel, which is valued for its resistance to corrosion. Consumer products and industrial applications that need steel-like strength, but where corrosion-causing moisture may be a problem, often use stainless steel.

Manufacturers produce a wide range of stainless steel alloys based on the properties they desire, such as strength, hardness, formability, and corrosion resistance. One alloy, 18-8 stainless steel (named for its 18% chromium and 8% nickel content), is the destination for a large proportion of nickel and is a major source of nickel scrap. Nickel also is used in nonferrous alloys, superalloys—those developed for high-temperature or high-mechanical-stress applications—and electroplating. And nickel is an important base metal for electric vehicle batteries, with it comprising as much as 75% of a battery cell's chemistry.

About **68% of nickel** available from consumer products is recycled worldwide.

Source: Nickel Institute

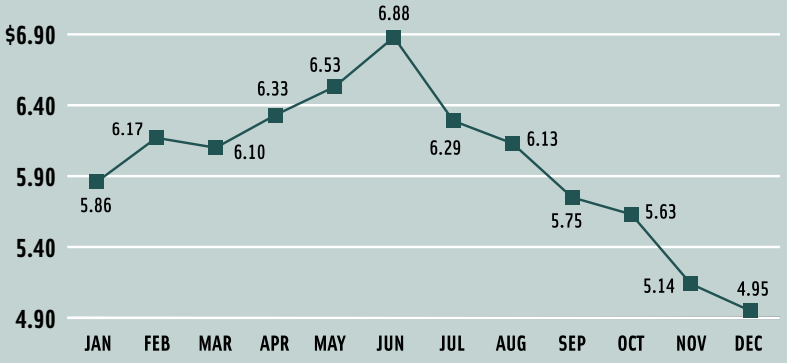
Using scrap instead of virgin materials in stainless steel manufacturing uses about **one-third less energy.**



NICKEL & STAINLESS STEEL PRICE AND SCRAP VOLUMES

NICKEL & STAINLESS

2018 LME THREE-MONTH AVERAGES (per pound)
2018 AVERAGE: $5.98, 26% ABOVE 2017



	OLD & NEW NICKEL SCRAP RECYCLED (metric tons)	TOTAL PRIMARY/ SECONDARY NICKEL CONSUMED (metric tons)	SCRAP MARKET SHARE	STAINLESS STEEL SCRAP EXPORTS (metric tons)
14	102,000	238,000	43%	548,000
15	101,900	210,000	49%	514,000
16	90,000	210,000	43%	654,000
17	90,000	231,000	39%	488,000
18	140,000	270,000	52%	778,000

Sources: USGS, USITC

U.S. AND EXPORT MARKETS

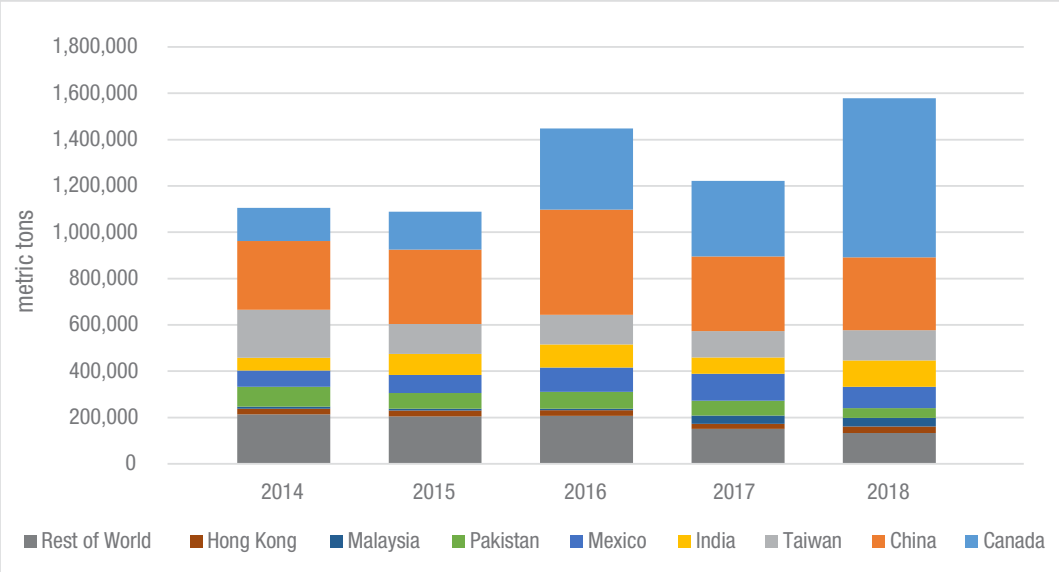
The United States recycled 140,000 mt of old and new nickel scrap in 2018, up 55% from 2017, according to USGS. That supply met 52% of U.S. nickel manufacturing needs, up from 39% in 2017. Although global nickel prices fluctuated over the course of the year, the London Metal Exchange three-month average price for nickel was 26% higher in 2018 than in 2017.

U.S. stainless steel scrap exports totaled 778,000 in 2018, up 59% from 2017. Canada, Taiwan, India, China, and Mexico were the largest markets for U.S. stainless steel scrap. **About 46% of U.S. stainless scrap exports went to Canada and Mexico last year**, more than double the amount buyers in those countries purchased in 2017. China and Hong Kong, in contrast, imported about 47% less stainless steel scrap in 2018 than they did in 2017.

Any stainless steel object contains an average of **60% recycled material:** 25% old scrap and 35% new scrap.

Source: International Stainless Steel Forum

U.S. NICKEL & STAINLESS STEEL SCRAP EXPORTS



Source: U.S. Census Bureau/U.S. International Trade Commission

Recovered Paper & Fiber

The paper recycling industry's total economic impact in the United States is nearly **$34 billion.**

Since 1990, Americans have recycled more than **1.1 billion tons** of recovered paper.

Recycling one ton of paper saves **3.3 cubic yards** of landfill space.

Manufacturing **paper and paperboard** with recycled materials uses up to **68% less energy** than using virgin materials.

THE PAPER RECYCLING PROCESS

Here's how newspapers get recycled into corrugated cardboard boxes.

Sources: John Dunham & Associates, EIA, EPA, American Forest & Paper Association, ISRI

RECOVERED PAPER & FIBER

Paper and paperboard are some of the most widely recycled materials in the world. About 80% of U.S. paper mills rely on recovered fiber to make some or all of their products, due in part to recovered fiber's significant cost and energy savings compared with virgin fiber.

Recovered paper is classified into several broad categories. Old corrugated containers consist of a rippled middle layer sandwiched between two layers of linerboard. News grades contain newsprint, whether from printed newspaper or other uses. Mixed paper can contain discarded mail, telephone books, paperboard, catalogs, and magazines. High-grade deinked paper is high-grade paper such as letterhead, copier paper, envelopes, and printer scrap that has gone through the printing process and then is deinked for sale to companies that will use it to manufacture new high-grade paper products or tissue. Pulp substitutes may be shavings or clippings from high-grade papers that come from converting operations at paper mills and print shops. Mills can use pulp substitutes in the place of virgin fiber in producing high-grade paper.

U.S. AND EXPORT MARKETS

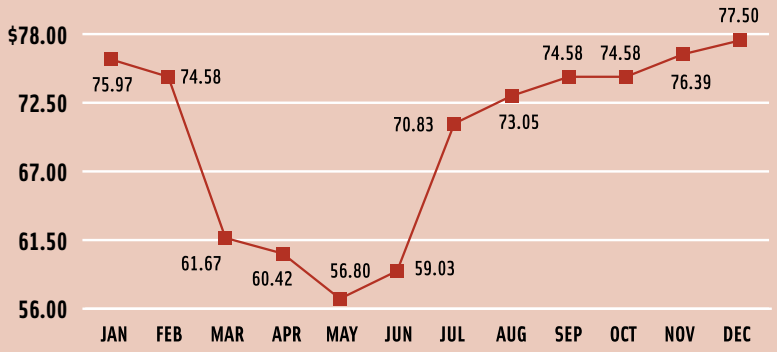
The United States recycled 77.3 million tons of recovered fiber in 2018, slightly more than in 2017. **More than 68% of U.S. paper available for recycling was recovered in 2018, reaching a 30-year high.** Chinese import policy changes had a significant impact on prices, with the 2018 average price for recovered paper falling 38% from 2017.

The United States exported more than 21 million tons of recovered fiber in 2018, up 4% from 2017, to buyers in 92 countries. More than 50% of U.S. recovered fiber exports are corrugated containers. China

RECOVERED PAPER PRICE AND VOLUMES

PAPER

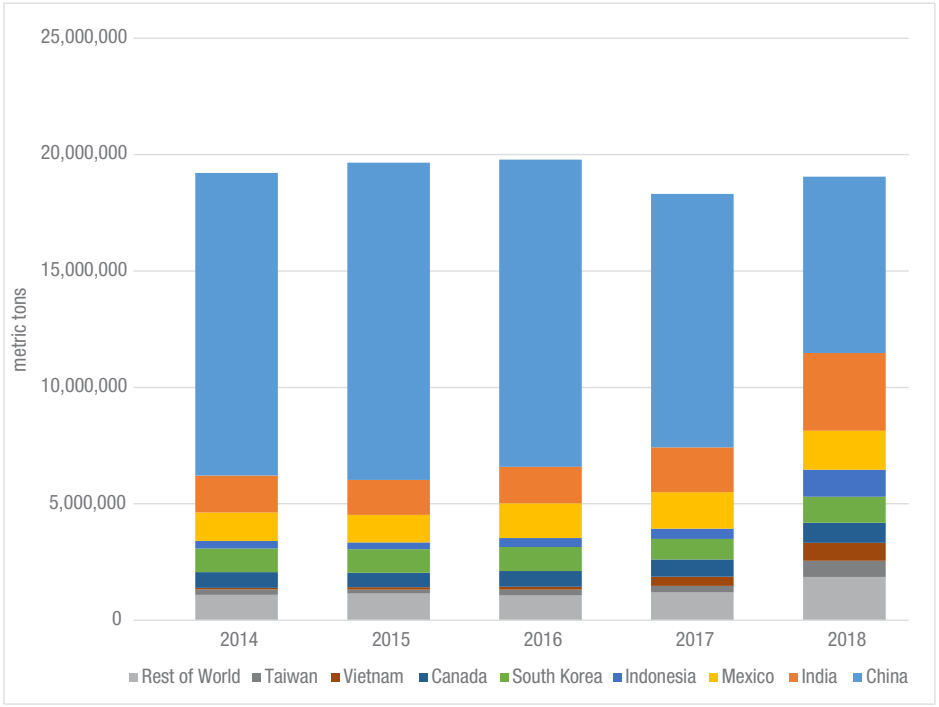
2018 MONTHLY COMPOSITE (per short ton)
2018 AVERAGE: $69.62, 38% BELOW 2017



	NEW SUPPLY (short tons)	RECOVERED (short tons)	RECOVERY RATE	U.S. EXPORTS (short tons)
14	78,206,000	51,171,000	65%	21,177,000
15	77,895,000	52,040,000	67%	21,668,000
16	77,729,000	52,196,000	67%	21,817,064
17	77,269,000	50,822,000	66%	20,186,804
18	77,312,000	52,676,000	68%	21,038,867

Sources: *The Paper Stock Report*, American Forest & Paper Association, USITC

TOP U.S. RECOVERED PAPER EXPORT MARKETS



Source: U.S. Census Bureau/U.S. International Trade Commission

remains the largest export market for U.S. recovered fiber, but its buyers purchased 30% less scrap paper in 2018 than in 2017. Other significant and growing markets for U.S, recovered fiber are India, Mexico, Indonesia, South Korea, Canada, Vietnam, and Taiwan.

The grades of U.S. recovered fiber most in demand by overseas buyers changed from 2017 to 2018, in large part due to China's import restrictions. Demand for pulp substitutes increased 49%, and OCC demand increased 27%. Seeing lower demand were news grades (down 31%) groundwood grades (down 29%) mixed paper (down 25%), and pulp derived from recovered paper (down 16%).

The **first-ever specification** for a recyclable commodity was for linen rags, likely used in paper-making.

Plastics

Recycling 1 ton of plastic bottles reduces greenhouse gas emissions by **3,380 lbs.,** which is the equivalent of **173 gallons** of gasoline.

At least **1 billion pounds** of U.S. plastic bags and film were collected for recycling in 2017, up 54 percent since 2005. **10,000** homes for a year.

The plastic recycling industry's total economic impact in the United States is **$6 billion.**

THE PLASTIC RECYCLING PROCESS

Here's how recycled plastic bottles get recycled into new plastic products.

Sources: EPA, John Dunham & Associates

PLASTICS

Plastics manufacturing continues to grow rapidly, reaching 348 million mt worldwide in 2018. With that growth comes the need to ensure that these materials are recycled in an environmentally responsible manner once they reach the end of their useful lives. Recycled plastic products can provide enormous environmental benefits compared with their virgin counterparts. For example, composite lumber made from recycled plastic bags conserves trees and reduces the need for hazardous wood-treatment chemicals. Using recycled plastics in manufacturing also saves up to 88% of the energy needed to produce plastics from virgin materials.

Containers from food, beverages, and household products are a large part of the residential recycling plastics stream, but engineered and industrial plastics are other important sources of recycled plastics. Those materials come from a wide array of products, such as electric motors, automobile parts and components, appliances, electronics, medical equipment, and construction materials.

Technologies to cost-effectively sort and recycle plastics have only been developed over the past 25 years, and those technologies continue to evolve. Most recently, chemical recycling technologies that break down plastics to their molcular-level building blocks such as monomers, polymers, and hydrocarbons have begun to show potential for hard-to-recycle plastics. Even so, many challenges remain, including products that were not designed for recycling, such as those made from multiple polymers or incompatible manufacturing methods. These challenges are not insurmountable, and plastic recyclers are providing leadership to overcome them.

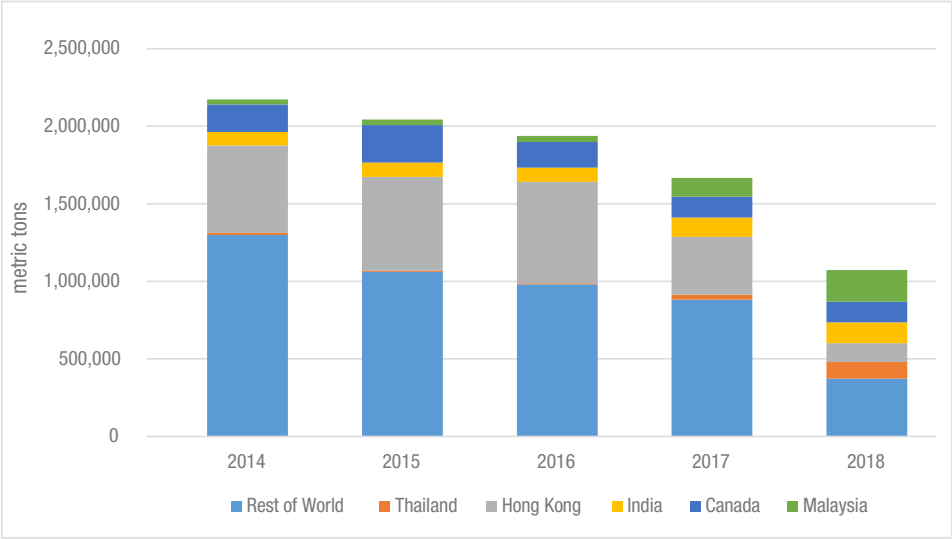
U.S. AND EXPORT MARKETS

The overall U.S. plastics recycling rate is estimated to be 9%. U.S. plastic bottle recycling declined slightly, from 2.9 billion lbs. to 2.8 billion lbs., in 2017, according to the Association of Plastic Recyclers and the American Chemistry Council. Plastic bags and film recycling in the United States reached 1 billion pounds in 2017, down 31% from 2016, according to a report More Recycling conducted for ACC.

The United States exported 1.1 million mt of plastic scrap to buyers in nearly 100 countries in 2018, down 36% by volume compared with 2017. Exports to China and Hong Kong fell 82% from 2017 to 2018, more than offsetting increased purchases in Malaysia, India, Thailand, Taiwan, South Korea, and other markets.

Globally, an estimated **20%** of end-of-life plastic was recycled in 2015.

U.S. PLASTICS SCRAP EXPORT MARKETS



Source: U.S. Census Bureau/U.S. International Trade Commission

Using recycled materials to manufacture plastic saves up to **88%** of the energy of using virgin materials.

Sources: Our World in Data, EPA

Electronics

More than **90%** of used electronics collected in the United States remains in the United States.

Recycling **1 million** cellphones will produce **33 lbs.** of palladium, **75 lbs.** of gold, **772 lbs.** of silver, and **35,274 lbs.** of copper.

U.S. recyclers process more than **5 million tons** of electronic products a year.

THE ELECTRONICS RECYCLING PROCESS

Here's how a computer can be repaired, refurbished, or recycled into new products.

Sources: Massachusetts Institute of Technology, U.S. National Center for Electronics Recycling, EPA

ELECTRONICS

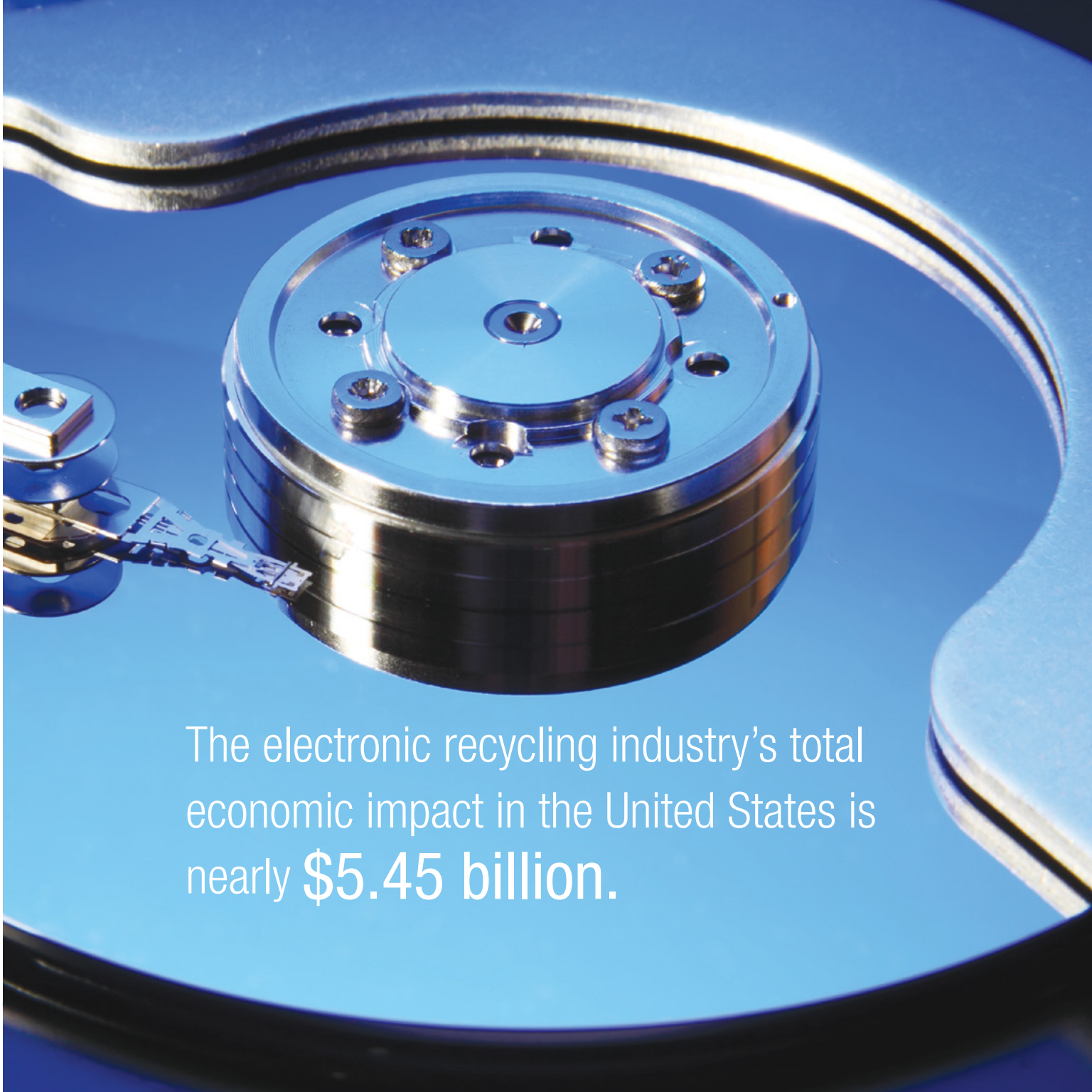
The electronics recycling sector has seen tremendous growth over the past decade. Recycling is one of a set services more broadly called **IT asset management** or IT asset disposition. ITAM companies may provide collection, storage, upgrading, and transportation of electronic products; data erasure; device repair, refurbishment, and resale; and dismantling for parts resale as well as recycling. Up to 75% of the ITAD material stream by volume comes from businesses and other commercial sources.

Electronics recyclers have become highly efficient at dismantling devices, removing potentially hazardous materials such as lithium batteries and fluorescent bulbs, and recovering their many and varied materials. Electronic products may contain ferrous and nonferrous metals—including precious metals and rare earth metals—plastics, glass, and other recyclable commodities. The electronics manufacturing industry is constantly innovating, and recyclers must ensure their processes can keep pace with the changes.

A February 2013 study by the U.S. International Trade Commission found that more than 80% of used electronic products collected in the United States were recycled, reused, or refurbished within the United States, while only 17% were exported. A subsequent 2013 report from the Massachusetts Institute of Technology Materials Systems Laboratory and the U.S. National Center for Electronics Recycling indicates that more than 90% of used electronics collected for recycling within the United States remain in the United States for processing. These research studies provide irrefutable evidence that the vast majority of U.S. used electronics products are reused and recycled in the United States, not “dumped” into developing countries.

More than **45,000** people work in electronics recycling in the United States.

Source: John Dunham & Associates



The electronic recycling industry's total economic impact in the United States is nearly **$5.45 billion.**

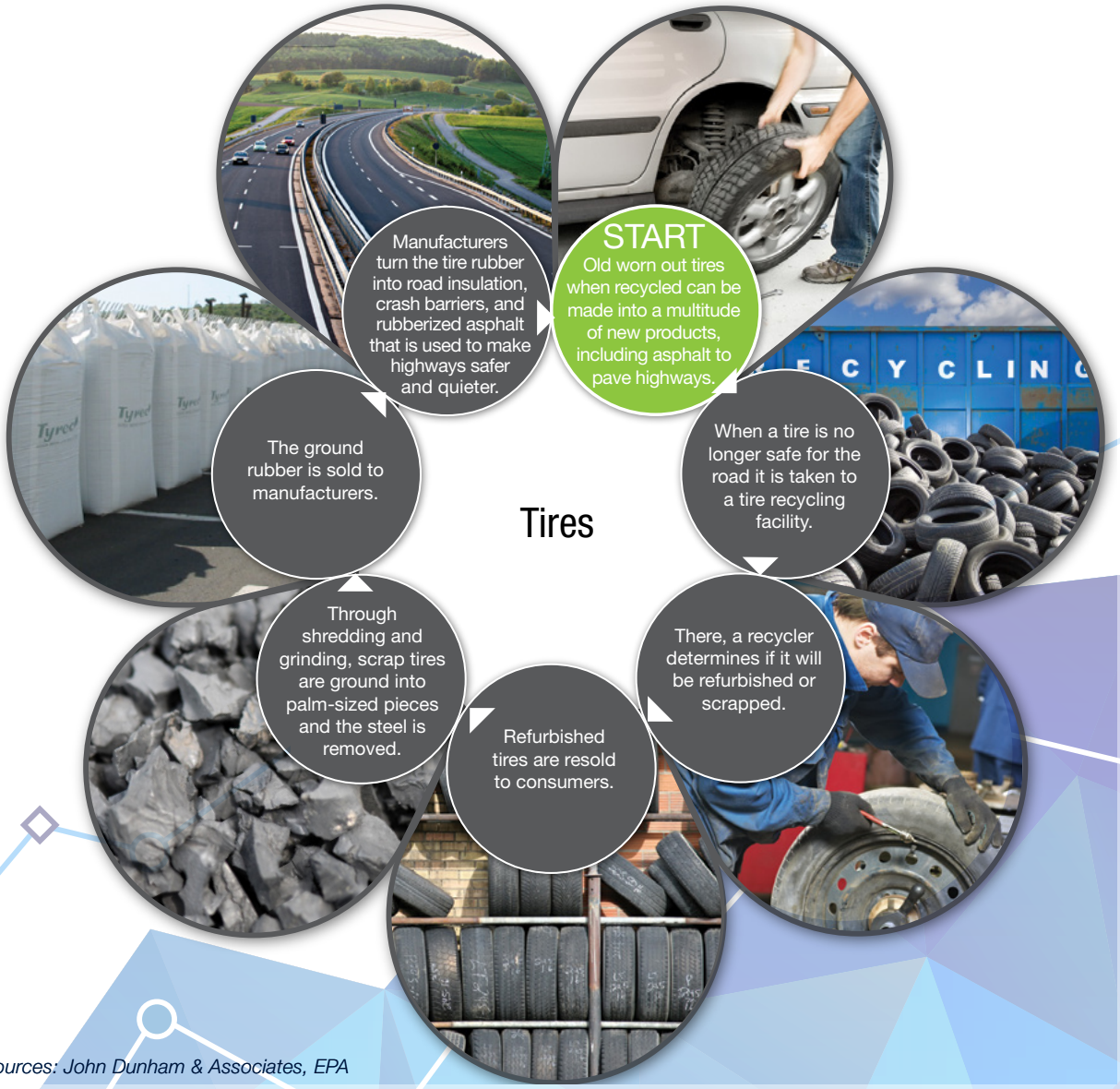
Tires and Rubber

The tire and rubber recycling industry's total economic impact in the United States is **$2.47 billion.**

The use of recycled rubber in molded products reduces greenhouse gas emissions **25 to 80%** compared with the use of virgin plastic resins.

THE TIRE RECYCLING PROCESS

Here's how tires get recycled into road surfaces.



Sources: John Dunham & Associates, EPA

TIRES AND RUBBER

In the past, scrap tires were often dumped illegally. Today, scrap tires' value is more properly recognized. Rubber from recycled tires is used to manufacture new tires, playground surfaces, equestrian mats, rubberized asphalt, and a variety of other products. Some manufacturers are combining scrap tires with materials such as scrap plastic to produce flower pots, roofing tiles, and auto parts.

A tire is a highly engineered composite product that is virtually indestructible. Today's tire recyclers have two approaches for tire processing: Ambient shredding uses powerful interlocking knives to cut tires into pieces at room temperature. Cryogenic processing uses liquid nitrogen to change the physical properties of the tires, making them brittle. Powerful hammer-style shredders then smash the tire into small pieces. Grinders and granulators can reduce the material to a fine powder.

In 2016, 1.2 billion pounds of crumb rubber, including 92 million used tires, were used in the creation of new products. Of that number, 70 million are processed into crumb rubber, which becomes playground surfaces, synthetic turf infill, and other products. Another 20 million tires are used for civil engineering projects such as road embankments and rail vibration dampening. Agricultural applications are the destination of 5 million tires.

Rubber from recycled tires is used to manufacture new tires, playground surfaces, equestrian mats, rubberized asphalt, and a variety of other products.


The tire and rubber recycling industry
supports more than 8,500 U.S. jobs.

Glass

Glass manufacturers are requiring more and more high-quality recycled container glass to meet market demands for new glass containers. Glass can be recycled again and again with no loss in quality or purity. Every ton of glass recycled saves large quantities of raw materials—1,300 lbs. of sand, 410 lbs. of soda ash, 310 lbs. of limestone, and 160 lbs. of feldspar—as well as saving energy, reducing emissions, and extending the life of glass-manufacturing equipment. Furnace-ready scrap glass is called **cullet**. Color-sorted, contaminant-free recycled glass helps ensure that these materials are recycled into new glass containers. Drop-off and commercial collection programs help ensure that recycling programs yield high-quality container glass.

An estimated **80%** of recovered glass containers are made into new glass containers.

The glass recycling industry's total economic impact in the United States is **$634 million.**

The container and fiberglass industries purchase **3.35 million tons** of recycled glass annually.

THE GLASS RECYCLING PROCESS

Here's how glass containers get recycled into new containers.

Sources: Glass Packaging Institute, NAIMA, Strategic Materials, John Dunham & Associates

Textiles

TEXTILES

U.S. textile recyclers processes billions of pounds of cotton, wool, synthetic, and synthetic-blend products each year. The sources of these scrap materials range from apparel and home furnishing manufacturers to textile mills and consumers. About 45% of recycled textiles are sold as secondhand clothing, which typically is exported to developing countries, providing jobs for both exporting and importing countries. Another 30% gets turned into wiping and polishing cloths. And 20% becomes fiber used as raw materials for the automotive, furniture, mattress, home furnishings, paper, and other industries.

The textile recycling industry's total economic impact in the United States is nearly **$1.2 billion.**

The United States exported **$715 million** of used textiles and clothing in 2018.

Sources: John Dunham & Associates, Census Bureau, USITC

U.S. textile recyclers processes **billions of pounds** of cotton, wool, synthetic, and synthetic-blend products each year.

Statistical Appendices

APPENDIX A:
HISTORICAL PRODUCTION, RECOVERY, AND CONSUMPTION DATA BY COMMODITY

U.S. Iron and Steel Scrap Production, Producer Stocks, and Apparent Consumption from Purchased and Home Scrap, 1968-2018 (metric tons)

Year	Production	Stocks	Apparent Consumption
1968	85,000,000	7,150,000	79,000,000
1969	91,000,000	5,940,000	86,000,000
1970	84,000,000	6,960,000	78,000,000
1971	81,000,000	7,710,000	75,000,000
1972	91,000,000	7,410,000	85,000,000
1973	103,000,000	6,430,000	94,000,000
1974	105,000,000	7,630,000	96,000,000
1975	84,000,000	7,950,000	75,000,000
1976	90,000,000	9,060,000	82,000,000
1977	89,000,000	8,490,000	84,000,000
1978	93,000,000	7,510,000	90,000,000
1979	99,000,000	7,910,000	90,000,000
1980	85,000,000	7,270,000	76,000,000
1981	83,000,000	7,360,000	77,000,000
1982	56,000,000	5,820,000	51,000,000
1983	62,000,000	5,270,000	56,000,000
1984	67,000,000	4,770,000	60,000,000
1985	71,000,000	4,630,000	64,000,000
1986	69,000,000	3,940,000	60,000,000
1987	72,000,000	4,390,000	62,000,000
1988	79,000,000	4,130,000	70,000,000
1989	75,000,000	4,290,000	68,000,000
1990	80,000,000	4,300,000	69,000,000
1991	69,000,000	4,100,000	62,000,000
1992	71,000,000	3,800,000	63,000,000
1993	76,000,000	3,700,000	68,000,000
1994	78,000,000	4,100,000	70,000,000
1995	79,000,000	4,200,000	72,000,000
1996	77,000,000	5,200,000	71,000,000
1997	79,000,000	5,500,000	73,000,000
1998	76,000,000	5,300,000	73,000,000
1999	72,000,000	5,450,000	70,800,000
2000	76,000,000	5,320,000	74,600,000
2001	73,000,000	4,910,000	70,100,000
2002	73,000,000	4,930,000	69,500,000
2003	73,000,000	4,410,000	65,000,000
2004	73,000,000	5,400,000	66,500,000
2005	73,000,000	4,970,000	65,600,000
2006	71,000,000	4,210,000	64,600,000
2007	77,000,000	4,140,000	64,000,000
2008	84,000,000	4,340,000	67,600,000
2009	80,000,000	3,070,000	53,500,000
2010	77,000,000	3,330,000	59,700,000
2011	82,000,000	3,980,000	62,700,000
2012	80,000,000	4,200,000	63,000,000
2013	86,000,000	4,200,000	71,000,000
2014	69,000,000	4,100,000	59,000,000
2015	73,000,000	4,200,000	64,000,000
2016	71,000,000	4,300,000	56,700,000
2017	73,000,000	4,400,000	58,800,000
2018	76,800,000	5,100,000	60,100,000

Source: U.S. Geological Survey

U.S. Primary Refined Copper Production, Old and New Copper Scrap Recovery, 1968-2018 (metric tons)

Year	Primary Production	Secondary Production Old Scrap	Copper From New Scrap
1968	1,300,000	472,000	633,000
1969	1,580,000	522,000	726,000
1970	1,600,000	457,000	675,000
1971	1,440,000	404,000	685,000
1972	1,700,000	416,000	765,000
1973	1,700,000	441,000	808,000
1974	1,500,000	439,000	781,000
1975	1,310,000	335,000	547,000
1976	1,400,000	380,000	659,000
1977	1,360,000	410,000	675,000
1978	1,450,000	502,000	746,000
1979	1,520,000	604,000	948,000
1980	1,220,000	613,000	824,000
1981	1,540,000	592,000	816,000
1982	1,230,000	518,000	670,000
1983	1,210,000	449,000	634,000
1984	1,170,000	461,000	659,000
1985	1,060,000	503,000	636,000
1986	1,070,000	477,000	649,000
1987	1,130,000	498,000	716,000
1988	1,410,000	518,000	789,000
1989	1,480,000	548,000	761,000
1990	1,580,000	536,000	775,000
1991	1,580,000	533,000	667,000
1992	1,710,000	554,000	722,000
1993	1,790,000	543,000	748,000
1994	1,840,000	500,000	827,000
1995	1,930,000	443,000	874,000
1996	2,010,000	428,000	891,000
1997	2,070,000	498,000	967,000
1998	2,140,000	466,000	956,000
1999	1,890,000	381,000	949,000
2000	1,580,000	358,000	955,000
2001	1,630,000	316,000	833,000
2002	1,440,000	208,000	842,000
2003	1,250,000	207,000	737,000
2004	1,260,000	191,000	774,000
2005	1,210,000	183,000	769,000
2006	1,210,000	151,000	819,000
2007	1,270,000	162,000	772,000
2008	1,220,000	159,000	700,000
2009	1,110,000	138,000	639,000
2010	1,060,000	143,000	642,000
2011	992,000	153,000	649,000
2012	962,000	160,000	650,000
2013	993,000	166,000	640,000
2014	1,050,000	173,000	640,000
2015	1,090,000	166,000	670,000
2016	1,180,000	150,000	640,000
2017	1,040,000	145,000	715,000
2018	1,100,000	150,000	720,000

Source: U.S. Geological Survey

U.S. Primary Aluminum Production and Secondary Production from Old and New Aluminum Scrap, 1968-2018 (metric tons)

Year	Primary Production	Secondary Production Old Scrap	Secondary Prod. New Scrap
1968	2,953,000	164,000	740,000
1969	3,441,000	181,000	862,000
1970	3,607,000	179,000	728,000
1971	3,561,000	196,000	757,000
1972	3,739,000	227,000	795,000
1973	4,109,000	240,000	886,000
1974	4,448,000	276,000	887,000
1975	3,519,000	305,000	816,000
1976	3,856,000	371,000	963,000
1977	4,118,000	482,000	974,000
1978	4,358,000	522,000	996,000
1979	4,557,000	557,000	1,060,000
1980	4,654,000	617,000	960,000
1981	4,489,000	758,000	1,030,000
1982	3,274,000	782,000	884,000
1983	3,353,000	820,000	953,000
1984	4,099,000	825,000	935,000
1985	3,500,000	850,000	912,000
1986	3,037,000	784,000	989,000
1987	3,343,000	852,000	1,130,000
1988	3,944,000	1,050,000	1,080,000
1989	4,030,000	1,010,000	1,040,000
1990	4,048,000	1,360,000	1,030,000
1991	4,121,000	1,320,000	969,000
1992	4,042,000	1,610,000	1,140,000
1993	3,695,000	1,630,000	1,310,000
1994	3,299,000	1,500,000	1,580,000
1995	3,375,000	1,510,000	1,680,000
1996	3,577,000	1,570,000	1,730,000
1997	3,603,000	1,530,000	2,020,000
1998	3,713,000	1,500,000	1,950,000
1999	3,779,000	1,570,000	2,120,000
2000	3,668,000	1,370,000	2,080,000
2001	2,637,000	1,210,000	1,760,000
2002	2,707,000	1,170,000	1,750,000
2003	2,703,000	1,070,000	1,750,000
2004	2,516,000	1,160,000	1,870,000
2005	2,481,000	1,080,000	1,950,000
2006	2,284,000	1,580,000	2,800,000
2007	2,554,000	1,660,000	2,450,000
2008	2,658,000	1,500,000	2,130,000
2009	1,727,000	1,260,000	1,570,000
2010	1,726,000	1,250,000	1,540,000
2011	1,986,000	1,470,000	1,640,000
2012	2,070,000	1,630,000	1,802,000
2013	1,946,000	1,630,000	1,790,000
2014	1,710,000	1,690,000	1,870,000
2015	1,587,000	1,560,000	2,000,000
2016	818,000	1,570,000	2,010,000
2017	741,000	1,590,000	2,050,000
2018	890,000	1,600,000	2,100,000

Source: U.S. Geological Survey

U.S. Paper and Paperboard Supply, Recovery, and Recovery Rates, 1990-2018 (1,000 tons)

	Supply	Recovered	Recovery Rate
1990	86,796	29,112	33.50%
1991	85,071	31,201	36.70%
1992	88,273	33,954	38.50%
1993	91,538	35,460	38.70%
1994	95,718	39,691	41.50%
1995	95,971	42,189	44.00%
1996	94,529	43,076	45.60%
1997	99,557	43,989	44.20%
1998	101,183	45,077	44.60%
1999	105,316	46,818	44.50%
2000	102,810	47,311	46.00%
2001	97,395	46,996	48.30%
2002	98,949	47,645	48.20%
2003	98,018	49,255	50.30%
2004	101,884	50,187	49.30%

	Supply	Recovered	Recovery Rate
2005	99,613	51,272	51.50%
2006	100,665	53,314	53.00%
2007	97,007	54,325	56.00%
2008	89,838	51,822	57.70%
2009	78,711	50,036	63.60%
2010	81,784	51,545	63.00%
2011	79,444	52,767	66.40%
2012	78,619	51,092	65.0%
2013	78,761	50,128	63.60%
2014	78,504	51,171	65.20%
2015	77,895	52,040	66.8%
2016	77,729	52,196	67.2%
2017	77,146	50,822	65.9%
2018	77,312	52,676	68.10%

Source: U.S. Geological Survey

APPENDIX B:
GLOBAL SCRAP EXPORT DATA

2018 Global Scrap Trade Flow by Commodity Volume and Value

Commodity	Volume (mt)	Value ($)
Ferrous	99,565,517	$39,125,417,215
Paper	50,426,584	$9,358,399,890
Nonferrous	15,110,998	$35,158,801,697
Copper	4,928,672	$19,062,369,776
Aluminum	8,927,889	$12,986,863,863
Nickel	217,904	$823,208,831
Lead	440,394	$606,197,858
Zinc	362,361	$682,888,943

Commodity	Volume (mt)	Value ($)
Other Base Metals	233,779	$997,272,426
Plastics	7,350,486	$3,387,088,936
Rubber	1,361,396	$224,987,582
Precious Metals	252,038	$17,698,189,790
Textiles	588,415	$369,267,400
Glass	3,446,855	$412,597,578
World Total	178,102,289	$105,734,750,088

Source: United Nations Comtrade Database

APPENDIX C:
GLOBAL SCRAP FLOWS BY COMMODITY, COUNTRY, AND YEAR

Global Trade of Ferrous Scrap, Exports, 2008-2017

Top 20 Exporters	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
USA	21,544,131	22,421,369	20,498,154	24,479,347	21,336,156	18,462,548	15,851,693	12,757,824	12,635,807	14,955,411
UK	6,629,202	6,019,142	7,482,950	7,895,261	7,295,690	6,947,474	6,987,184	7,268,765	8,128,932	8,789,406
Germany	8,268,658	7,275,297	9,175,797	9,852,132	9,809,707	9,236,668	9,487,994	8,106,175	8,520,295	8,570,006
Japan	5,437,263	9,397,866	6,463,708	5,442,464	8,585,766	8,149,661	7,338,714	7,838,577	8,706,388	8,217,277
France	5,985,486	5,210,196	6,647,972	6,255,942	6,286,887	6,183,301	6,291,790	5,423,243	5,518,586	6,283,454
Netherlands	4,523,660	4,764,766	5,541,773	5,692,223	5,695,180	5,517,477	5,295,208	4,811,323	5,611,638	6,208,448
Russian Federation	6,035,629	2,386,411	4,031,752	4,377,943	4,557,101	4,542,095	5,765,412	5,580,354	5,572,857	5,254,422
Canada	3,705,300	4,794,046	5,190,665	4,845,641	4,551,810	4,537,463	4,510,092	3,420,757	3,634,286	4,501,934
Belgium	2,929,794	3,238,537	3,721,636	3,521,378	3,623,825	3,511,140	3,950,346	3,153,412	3,557,354	3,903,340
Czechia	1,832,764	1,443,888	1,811,045	2,085,362	2,085,809	1,967,522	2,125,940	1,847,040	1,881,439	2,298,382
Australia	1,750,846	1,884,924	1,584,114	1,767,939	2,198,674	2,198,625	2,300,988	1,869,225	1,579,771	1,955,921
Denmark	1,619,517	1,239,493	1,504,705	1,486,127	1,321,972	1,244,207	1,686,253	1,264,293	1,563,818	1,570,605
Sweden	1,449,321	1,438,647	1,355,138	1,505,398	1,551,724	1,316,710	1,489,924	1,249,784	1,402,797	1,422,091
Singapore	623,753	555,924	585,053	605,936	851,953	978,876	909,828	843,716	828,019	1,381,326
Hong Kong	1,016,360	865,562	779,399	877,766	804,652	896,714	924,451	868,994	1,048,817	1,378,500
Poland	1,378,317	959,965	1,396,561	1,889,352	1,930,729	1,972,367	1,986,216	1,368,470	1,267,384	1,360,574
United Arab Emirates	1,211,409	1,184,145	1,206,860	1,253,063	1,194,263	1,167,376	1,074,126	1,091,532	1,273,830	1,308,631
Austria	1,382,962	1,076,351	1,034,399	950,865	1,008,502	963,642	1,055,952	1,071,095	1,123,220	1,258,535
Hungary	1,008,287	680,324	1,076,879	1,269,437	1,185,649	1,126,929	1,057,364	862,143	918,105	942,246
Romania	1,985,975	2,565,442	2,519,235	2,348,562	1,908,067	1,947,542	1,430,949	716,646	702,228	816,340
Rest of the World	19,868,173	15,189,164	19,257,563	24,234,755	20,796,725	16,071,092	16,861,593	15,612,367	13,818,555	13,315,370
Grand Total	100,186,807	94,591,459	102,865,357	112,636,892	108,580,839	98,939,429	98,382,016	87,025,738	89,294,125	95,692,219

Source: U.S. Census Bureau/U.S. International Trade Commission

Notes: Data tables were derived from the UN Comtrade Database (last updated November 2019). Top 20 determined by latest year of complete data. Data includes stainless steel (HTS-7204210000) and alloy steel (HTS-7204290000). Export data was adjusted for Hungary (2017), Netherlands (2009), and Canada (2008) with reported import data.

Global Trade of Ferrous Scrap, Imports, 2008-2017

Top 20 Importers	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Turkey	17,414,983	15,665,319	19,192,350	21,460,461	22,415,029	19,724,892	19,068,156	16,251,308	17,716,247	20,980,300
Rep. of Korea	7,313,414	7,800,414	8,089,529	8,626,039	10,125,916	9,261,167	8,001,567	5,745,884	5,842,211	6,131,623
India	4,603,204	5,136,907	4,676,394	6,265,265	8,179,601	5,636,399	5,699,006	6,710,088	6,380,452	5,471,123
Germany	5,675,167	3,865,111	5,305,194	6,639,700	5,792,845	5,676,700	5,324,260	4,637,419	4,259,242	4,764,308
Vietnam	1,082,299	2,065,522	2,126,335	3,234,553	3,280,695	3,232,855	3,375,564	3,185,923	3,893,842	4,726,593
USA	3,596,473	2,991,639	3,784,217	4,013,237	3,716,637	3,925,467	4,263,609	3,589,475	3,873,608	4,643,561
Belgium	4,143,336	3,643,458	4,626,473	4,563,802	4,284,462	4,595,179	4,785,015	4,171,886	4,304,573	4,583,595
Spain	6,603,208	4,930,416	5,708,900	4,764,338	4,348,807	4,851,614	4,928,153	5,120,222	4,042,165	3,934,548
Italy	5,751,165	3,347,489	4,619,195	5,753,381	5,272,709	4,960,353	5,146,318	4,649,968	4,434,285	3,650,117
Taiwan	5,542,389	3,915,292	5,374,122	5,331,247	4,955,519	4,453,005	4,272	3,373,657	3,154,978	2,918,676
Netherlands	1,842,597	2,846,151	1,988,278	2,188,452	2,378,258	2,290,454	2,359,263	2,233,172	2,471,753	2,766,596
China	3,516,417	13,620,675	5,766,245	6,692,180	4,934,728	4,439,242	2,524,060	2,283,777	2,160,644	2,322,477
Canada	1,689,516	1,416,166	3,024,594	1,861,455	2,656,533	1,753,949	2,918,818	1,717,166	1,844,290	2,263,787
Luxembourg	2,800,650	2,030,226	2,694,245	2,635,424	2,464,483	2,251,732	2,225,575	2,121,316	2,263,786	2,183,293
Pakistan	1,871,037	2,254,182	1,771,139	1,583,931	1,772,885	1,780,714	2,482,543	3,256,900	4,038,195	2,161,173
Mexico	1,257,029	849,697	786,362	732,883	946,455	863,775	914,665	1,482,877	1,892,621	1,780,550
Belarus	1,418,570	1,294,326	1,593,836	1,561,015	1,356,745	1,262,243	1,253,909	1,382,061	1,234,730	1,352,545
Austria	1,783,766	1,143,787	991,578	1,016,309	1,007,905	1,168,752	1,270,084	1,215,013	1,042,605	1,115,038
France	3,050,559	2,310,634	2,354,206	2,596,201	2,629,456	2,309,007	2,405,454	2,200,963	1,831,565	333,053
Portugal	1,165,430	1,039,658	902,988	1,252,275	1,196,298	1,407,787	1,524,391	1,515,346	1,427,592	118,382
Rest of the World	22,656,186	13,967,597	18,321,558	19,965,626	17,810,340	16,099,780	13,649,111	14,816,006	10,187,742	13,488,619
Grand Total	103,105,444	94,632,660	101,559,217	110,886,023	109,759,655	100,461,592	91,996,985	89,167,269	89,313,052	91,689,957

Source: U.S. Census Bureau/U.S. International Trade Commission

Notes: Data tables were derived from the UN Comtrade Database (last updated March 2019). Top 20 determined by latest year of complete data. Data includes stainless steel (HTS-7204210000) and alloy steel (HTS-7204290000). Import data was adjusted for Vietnam and Netherlands.

Global Trade of Copper Scrap, Exports, 2008-2017

Top 20 Exporters	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
USA	908,130	842,573	1,041,918	1,242,556	1,189,395	1,154,931	1,043,916	954,167	943,552	1,004,215
Germany	478,640	450,012	578,451	584,804	592,067	518,631	530,557	517,706	474,634	497,359
Japan	395,458	359,535	285,642	287,769	327,930	313,043	294,003	261,100	258,677	314,212
France	266,214	234,860	290,325	313,464	320,423	299,084	321,116	279,313	289,614	293,761
UK	358,159	430,373	421,131	514,347	373,751	291,924	295,739	263,912	310,403	286,029
Netherlands	241,332	143,329	283,847	315,437	322,592	295,139	326,278	303,598	278,229	282,443
Italy	151,640	160,106	167,441	174,204	181,890	172,209	173,402	176,256	199,404	199,554
Canada	101,607	146,569	157,787	178,577	182,792	154,038	161,967	156,990	160,820	185,302
Spain	84,783	100,498	102,236	87,122	159,419	156,511	150,874	156,617	157,692	183,529
Saudi Arabia	64,827	61,521	90,154	89,716	107,358	110,809	118,991	108,336	91,367	144,128
Mexico	128,715	107,995	125,982	116,266	147,260	144,087	114,051	114,313	123,419	133,433
Belgium	162,219	111,183	142,841	164,958	168,461	157,204	128,490	105,691	113,018	125,467
Rep. of Korea	191,500	186,958	100,090	84,608	119,105	95,652	85,669	71,322	82,296	96,775
Switzerland	82,687	71,204	75,973	84,373	86,964	80,104	82,237	82,921	83,224	86,742
Thailand	76,378	69,669	66,368	74,604	81,413	69,364	69,562	59,260	70,773	83,013
Australia	51,267	62,433	73,613	80,381	85,246	104,034	88,052	81,192	76,866	80,377
United Arab Emirates	53,969	48,001	71,968	86,160	102,979	102,542	95,713	82,699	78,870	79,833
Poland	60,838	53,456	71,215	59,537	48,478	58,936	61,677	62,962	74,120	68,411
Sweden	57,248	55,519	43,318	58,037	58,870	56,470	66,821	65,208	71,823	62,414
Chile	64	74	120,828	60,638	25,331	52,976	51,704	50,559	65,679	39,459
Rest of the World	1,102,671	1,035,128	1,246,076	1,330,620	1,343,201	1,201,381	1,090,762	1,067,043	986,166	642,903
Grand Total	5,018,347	4,730,997	5,557,203	5,988,176	6,024,926	5,589,066	5,351,580	5,021,164	4,990,647	4,889,357

Source: U.S. Census Bureau/U.S. International Trade Commission

Notes: Data tables were derived from the UN Comtrade Database (last updated November 2019). Top 20 determined by latest year of complete data. Export data was adjusted for the United Arab Emirates (2009) with reported import data and the United States (2008-2017) with U.S. ITC/ U.S. Census Bureau data.

Global Trade of Copper Scrap, Imports, 2008-2017

Top 20 Importers	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
China	5,576,590	3,997,436	4,363,469	4,685,721	4,858,525	4,371,650	3,873,287	3,656,925	3,348,095	3,557,117
Germany	563,559	454,753	626,443	646,282	660,890	619,121	658,986	603,783	606,841	610,112
Rep. of Korea	217,008	163,020	202,898	263,182	300,708	291,178	298,548	289,645	273,616	331,003
Belgium	245,758	212,834	265,228	253,533	303,572	334,658	291,471	234,806	296,845	295,978
Japan	138,729	97,144	159,424	136,881	142,559	127,914	160,128	169,435	228,471	217,149
India	103,334	78,540	92,399	154,783	203,493	141,417	168,529	174,340	179,375	174,824
USA	106,333	71,833	95,895	109,736	104,585	106,331	116,618	111,668	125,293	165,372
Italy	169,257	94,755	129,103	148,430	137,615	151,702	178,161	164,534	144,048	161,469
Spain	65,109	68,431	82,931	89,499	97,129	104,671	114,867	112,409	128,279	148,338
Netherlands	116,503	178,385	144,426	204,327	206,685	166,106	147,516	150,067	150,003	134,468
Taiwan	106,518	70,266	90,422	89,735	93,867	99,353	95,721	94,597	111,069	118,755
Hong Kong	210,413	190,410	155,271	127,483	105,606	116,032	119,890	128,249	97,581	115,763
Canada	51,646	41,036	73,480	65,652	57,825	81,987	67,809	69,803	76,526	100,719
Austria	114,063	134,135	145,902	130,675	127,186	102,554	105,904	88,646	83,968	91,274
Poland	19,152	15,467	24,075	26,872	52,632	49,668	63,001	67,297	75,594	79,550
Sweden	91,807	96,739	105,279	120,154	136,653	149,992	101,726	114,664	77,173	79,438
France	74,817	46,626	66,763	79,085	75,365	61,436	64,726	96,427	63,272	65,354
Bulgaria	25,330	20,721	35,464	52,461	64,561	56,040	60,453	59,728	49,543	55,438
Slovakia	30,091	31,622	39,796	30,755	38,481	28,928	34,381	25,669	34,559	36,932
UK	21,611	18,404	28,193	29,292	26,833	25,046	28,226	28,135	35,073	33,265
Rest of the World	245,528	210,724	275,393	341,759	335,706	313,469	311,689	289,235	290,973	292,912
Grand Total	8,293,156	6,293,280	7,202,255	7,786,297	8,130,476	7,499,255	7,061,637	6,730,061	6,476,197	6,865,230

Source: U.S. Census Bureau/U.S. International Trade Commission

Notes: Data tables were derived from the UN Comtrade Database (last updated March 2019). Top 20 determined by latest year of complete data. Import data was adjusted for Netherlands (2009) with reported export data and the United States (2008-2016) with U.S. ITC/U.S. Census Bureau data.

Global Trade of Aluminum Scrap, Exports, 2008-2017

Top 20 Exporters	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
USA	1,935,165	1,596,601	1,821,190	2,049,151	1,967,664	1,812,917	1,666,019	1,498,303	1,279,788	1,524,346
Germany	702,737	753,216	823,810	945,815	976,412	935,339	1,056,231	1,064,372	1,043,968	1,038,790
Canada	403,882	365,356	443,996	473,247	482,748	457,277	493,456	499,982	501,550	542,729
France	342,467	345,308	403,660	428,246	424,881	448,284	482,768	450,827	454,778	471,778
UK	874,909	419,972	454,699	440,726	445,390	402,061	452,606	406,070	439,713	371,259
Netherlands	264,142	200,650	317,038	322,834	378,652	320,523	349,012	360,748	370,527	350,070
Belgium	177,550	219,804	274,632	320,103	311,159	313,183	285,677	278,763	274,128	319,548
Australia	177,078	160,948	196,259	189,361	205,016	207,246	228,379	258,970	266,061	294,534
Poland	122,681	99,522	123,979	150,581	152,463	154,829	180,076	179,880	215,418	239,213
Saudi Arabia	111,569	103,413	137,349	149,895	200,558	176,108	189,858	156,296	170,525	224,108
Mexico	186,510	162,668	183,932	194,355	234,333	169,557	151,152	156,049	180,629	222,532
United Arab Emirates	53,129	90,278	128,798	112,367	143,071	164,251	162,986	139,675	163,981	188,745
Sweden	106,580	89,939	87,491	95,495	106,761	102,955	112,675	102,166	111,549	179,515
Japan	83,776	147,695	98,621	109,443	146,450	157,903	150,737	150,054	174,115	171,920
Switzerland	125,769	116,520	132,086	138,643	141,836	149,337	157,500	139,313	146,205	162,902
Italy	66,993	88,702	107,155	103,006	103,667	107,060	111,214	144,319	151,977	159,616
Austria	87,952	117,949	122,057	105,137	128,587	151,419	173,159	151,625	199,021	158,326
Denmark	63,813	67,853	67,449	67,131	69,974	71,975	79,029	75,502	80,602	95,700
Spain	110,468	46,974	66,976	51,518	90,881	94,856	80,107	89,263	100,021	90,045
Czechia	58,438	49,251	71,398	91,192	87,699	57,714	72,423	81,820	77,986	76,603
Rest of the World	2,199,497	952,681	1,337,992	2,252,639	1,514,186	1,364,435	1,418,872	1,434,042	1,496,787	1,633,133
Grand Total	8,255,103	6,195,302	7,400,567	8,790,883	8,312,391	7,819,230	8,053,936	7,818,040	7,899,327	8,515,414

Source: U.S. Census Bureau/U.S. International Trade Commission

Notes: Data tables were derived from the UN Comtrade Database (last updated March 2019). Top 20 determined by latest year of complete data. United Arab Emirates (2009, 2017) adjusted with reported import data.

Global Trade of Aluminum Scrap, Imports, 2008-2017

Top 20 Importers	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
China	2,154,768	2,626,116	2,854,156	2,685,684	2,592,533	2,504,366	2,305,580	2,086,855	1,917,435	2,171,648
India	241,180	297,855	456,333	584,740	709,532	724,101	840,540	882,882	919,376	1,045,427
Rep. of Korea	503,154	443,898	545,692	566,953	641,800	711,174	801,211	745,958	715,173	797,149
Germany	543,837	362,582	479,416	534,989	577,092	560,691	656,604	790,138	770,140	791,742
USA	476,462	395,212	480,034	545,913	564,447	538,196	536,994	509,848	513,240	671,946
Italy	386,459	273,083	376,486	461,302	445,450	456,370	511,986	520,448	517,954	544,868
Belgium	193,475	203,681	221,425	254,967	247,463	219,054	237,096	248,872	275,997	295,093
Austria	170,815	162,155	268,845	282,707	304,271	280,710	285,563	282,557	308,272	293,369
France	193,826	215,537	259,420	291,690	266,280	245,937	231,714	215,905	260,759	273,212
Poland	66,968	66,793	84,850	106,438	107,598	176,509	205,230	238,950	235,391	224,331
Netherlands	210,203	88,053	184,066	241,081	265,741	220,965	233,610	202,103	185,978	217,455
Spain	109,861	67,321	111,942	125,190	155,371	176,445	200,411	205,856	203,673	204,002
Luxembourg	136,806	98,962	128,607	151,237	162,001	165,014	154,961	150,110	142,363	177,081
Pakistan	59,118	84,872	88,661	90,483	102,437	76,094	105,850	130,775	125,163	165,557
Malaysia	56,249	61,754	64,318	79,515	74,988	70,492	88,132	93,747	136,665	159,677
UK	149,900	117,673	126,773	110,275	103,224	113,461	168,300	123,124	123,246	149,127
Mexico	100,475	69,488	126,783	105,363	102,328	89,255	118,549	151,924	113,830	123,734
Czechia	58,686	50,279	61,714	88,951	105,390	83,294	78,491	83,103	125,211	118,893
Canada	163,312	118,266	117,870	121,575	92,098	90,898	102,034	117,890	117,266	115,319
Slovenia	51,194	37,315	51,792	52,844	61,462	69,014	77,942	84,186	91,076	91,595
Rest of the World	1,020,837	668,410	956,239	995,670	882,814	915,381	965,009	992,748	965,013	1,029,985
Grand Total	7,047,583	6,509,306	8,045,420	8,477,565	8,564,322	8,487,420	8,905,809	8,857,977	8,763,220	9,661,208

Source: U.S. Census Bureau/U.S. International Trade Commission

Notes: Data tables were derived from the UN Comtrade Database (last updated March 2019). Top 20 determined by latest year of complete data. Import data was adjusted for Mexico and Slovenia (2017) with reported export data.

Global Trade of Nickel Scrap, Exports, 2008-2017

Top 20 Exporters	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
USA	40,090	11,279	22,253	34,301	26,974	26,004	30,758	27,077	17,865	29,994
Saudi Arabia	3,747	7,202	12,575	10,626	9,919	14,429	17,797	13,224	17,641	19,346
UK	18,329	12,310	20,072	17,885	33,477	20,994	15,772	12,015	15,172	11,751
France	7,507	11,435	30,601	11,634	12,683	9,164	10,253	8,078	7,627	8,756
Canada	6,552	4,857	4,311	5,016	4,935	4,387	7,173	6,972	6,387	8,464
Germany	5,647	8,227	9,563	8,918	7,727	6,516	9,882	10,866	9,977	7,665
Rep. of Korea	10,689	9,241	17,459	6,043	4,440	4,457	7,490	8,429	7,102	7,294
Czechia	776	2,420	4,358	3,458	6,880	6,608	3,201	3,842	3,700	5,075
Japan	1,483	1,100	2,156	2,069	2,994	3,519	5,336	5,527	4,788	4,635
Netherlands	4,614	1,711	1,956	1,793	1,336	2,948	3,252	1,529	1,221	3,985
Belgium	2,809	6,813	3,371	7,364	2,418	3,146	11,769	3,477	8,382	3,946
Singapore	2,892	1,854	2,908	2,611	1,792	1,664	2,073	1,640	2,393	3,305
Mexico	2,187	1,990	2,976	3,395	3,241	2,977	3,216	2,930	2,826	3,229
Austria	1,750	2,098	1,607	2,709	2,633	3,322	5,402	3,659	5,012	3,117
Malaysia	3,943	4,026	7,109	6,442	10,633	7,418	9,170	2,186	2,046	2,823
Taiwan	1,358	1,306	1,421	1,057	1,222	1,421	1,758	1,547	1,788	2,092
United Arab Emirates	85	239	597	1,298	558	453	1,122	2,120	8,428	1,479
Sweden	1,517	1,377	1,021	1,137	13,857	1,264	1,397	1,175	1,342	1,281
Switzerland	1,603	1,519	1,090	909	1,214	1,069	1,649	992	1,522	1,145
Spain	227	875	366	376	454	339	1,284	384	1,399	1,047
Rest of the World	14,806	18,095	22,652	15,089	10,385	8,839	13,956	19,839	9,618	13,296
Grand Total	132,610	109,974	170,422	144,131	159,774	130,937	163,709	137,506	136,236	143,727

Source: U.S. Census Bureau/U.S. International Trade Commission

Notes: Data tables were derived from the UN Comtrade Database (last updated November 2019). Top 20 determined by latest year of complete data.

Global Trade of Nickel Scrap, Imports, 2008-2017

Top 20 Importers	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
USA	19,187	16,850	18,271	17,146	21,262	18,692	28,542	25,310	17,453	33,773
Canada	18,227	6,311	13,458	18,993	21,108	18,892	21,310	20,079	21,429	26,384
United Kingdom	10,890	9,736	8,783	6,729	8,834	9,887	10,999	9,405	12,325	10,906
Sweden	12,217	8,708	10,491	10,333	8,801	8,896	9,928	12,283	12,044	10,203
Japan	5,397	3,919	5,638	5,762	5,342	7,247	10,236	8,392	9,248	9,746
Germany	18,315	8,259	8,584	12,461	14,209	10,176	12,072	10,515	10,370	9,490
India	705	836	1,005	1,158	619	2,300	2,481	2,385	2,145	4,058
Netherlands	12,647	4,666	10,872	4,607	2,507	2,803	4,208	4,708	4,732	3,975
Singapore	3,019	2,466	4,062	2,520	1,432	1,802	2,234	1,135	1,419	2,803
France	2,137	1,265	2,164	2,867	2,713	3,063	3,036	3,229	2,716	2,740
Italy	943	765	1,063	656	899	1,330	1,533	1,079	2,117	1,782
Belgium	559	284	1,315	1,545	1,888	2,448	785	461	1,164	1,638
Rep. of Korea	816	874	433	573	374	313	676	1,358	1,048	1,389
Austria	1,165	368	440	527	1,917	4,359	4,376	1,959	1,248	919
Thailand	131	46	75	115	269	222	306	963	335	868
Spain	120	236	151	806	554	386	728	595	653	699
Hong Kong	79	477	40	50	308	252	1,298	213	929	360
Czechia	473	1,468	1,257	250	1,442	1,183	755	637	869	355
Taiwan	220	497	399	469	252	792	357	220	395	244
Slovenia	75	5	84	61	8	11	31	129	314	180
Rest of the World	6,425	3,851	1,341	1,523	849	1,318	892	1,251	795	1,232
Grand Total	113,748	71,886	89,927	89,151	95,587	96,372	116,782	106,307	103,749	123,743

Source: U.S. Census Bureau/U.S. International Trade Commission

Notes: Data tables were derived from the UN Comtrade Database (last updated March 2019). Top 20 determined by latest year of complete data. Import data was adjusted for Slovenia (2008-2009) with reported export data.

Global Trade of Lead Scrap, Exports, 2008-2017

Top 20 Exporters	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
UK	19,510	30,725	37,782	36,865	21,173	18,684	56,432	42,978	65,232	63,154
USA	174,795	140,364	28,000	31,449	25,914	34,352	36,344	46,573	39,496	57,634
France	15,826	18,439	37,437	20,805	15,939	22,573	25,644	57,659	49,019	47,192
Netherlands	12,278	13,807	35,168	30,486	22,847	38,896	42,570	52,276	45,785	44,773
Ireland	49	114	638	4,144	42,384	30,834	39,979	31,871	31,620	38,609
United Arab Emirates	5,212	5,967	14,469	13,815	14,867	15,647	19,285	19,498	29,517	35,473
Australia	15,491	12,831	23,526	24,508	20,786	6,268	21,812	17,388	24,858	34,502
Belgium	18,105	21,893	21,112	18,789	18,100	18,204	18,420	16,453	15,982	15,798
Germany	13,133	13,100	9,892	12,898	8,004	12,895	16,250	8,845	11,059	14,762
Italy	7,712	9,027	10,896	10,173	14,804	11,681	12,877	7,192	7,018	8,356
Hungary	1,414	1,267	1,130	2,428	1,696	3,045	2,987	3,634	5,059	5,726
Portugal	4,230	2,241	1,811	2,047	1,348	3,522	1,866	1,753	7,854	4,638
Finland	587	357	340	328	1,231	2,130	2,576	3,392	3,837	4,593
Switzerland	3,236	4,748	5,497	5,732	5,301	4,424	4,438	4,053	4,714	4,581
Poland	960	1,517	1,506	947	1,277	1,046	946	3,776	4,004	3,209
Sweden	816	1,044	1,454	1,471	1,458	1,114	9,181	5,570	6,940	2,831
Austria	2,176	775	1,720	4,842	3,175	2,107	2,062	2,182	3,657	2,653
Norway	31	540	41	77	218	136	6,841	3,804	3,593	2,577
Romania	2,997	2,526	5,659	6,846	5,419	3,884	11,269	7,557	6,788	950
Thailand	314	738	701	1,066	2,048	351	579	256	5,223	288
Rest of the World	81,980	77,907	85,425	79,794	78,743	75,956	68,090	57,159	43,815	67,460
Grand Total	380,854	359,925	324,205	309,510	306,733	307,748	400,447	393,869	415,068	459,758

Source: U.S. Census Bureau/U.S. International Trade Commission

Notes: Data tables were derived from the UN Comtrade Database (last updated November 2019).
Top 20 determined by latest year of complete data.

Global Trade of Lead Scrap, Imports, 2008-2017

Top 20 Importers	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
India	25,212	34,811	57,012	63,067	53,615	59,455	60,386	57,620	64,923	87,537
Spain	35,556	35,703	43,432	42,236	34,702	35,284	32,249	42,845	43,740	56,504
Belgium	25,409	34,275	30,693	32,938	25,392	26,501	29,338	26,227	26,308	21,382
Poland	2,371	2,276	7,164	6,365	4,979	10,370	11,139	14,148	21,527	23,143
Bulgaria	5,478	12,143	17,461	4,627	1,660	11,050	16,660	16,484	17,827	14,466
Germany	28,230	40,546	39,652	35,823	28,071	28,412	26,401	15,455	15,355	24,131
United Arab Emirates	1,231	1,245	1,682	3,524	11,875	21,092	27,420	21,010	15,250	18,718
Ireland	17,702	16,689	12,074	12,305	14,089	16,572	16,128	12,435	12,295	15,756
Czechia	4,773	4,157	2,901	2,932	2,723	4,369	5,232	2,894	10,998	7,471
Netherlands	11,325	13,593	21,255	16,886	15,138	10,578	8,823	9,607	8,686	13,437
Portugal	493	305	822	346	1,019	4,870	961	7,085	7,971	10,783
Sweden	2,092	4,979	9,464	8,400	9,627	9,282	9,575	11,627	6,323	12,018
Greece	2,801	1,753	1,692	2,900	2,182	915	1,032	2,128	6,261	8,380
USA	5,188	7,160	20,078	25,476	19,955	9,430	12,551	4,932	5,900	9,852
South Africa	6,947	7,554	9,233	6,829	12,214	6,369	6,569	3,997	5,582	3,458
UK	4,535	4,904	9,046	4,839	3,258	4,169	7,236	6,532	5,482	3,727
Rep. of Korea	1,749	3,246	4,426	5,132	15,735	10,351	10,238	13,620	5,270	5,209
Canada	93,314	78,834	8,089	5,038	4,365	6,493	4,268	4,050	5,027	3,734
Latvia	19	24	92	1,221	502	922	3,836	4,271	4,484	3,397
Slovenia	1,506	1,979	3,807	3,655	3,787	4,117	5,056	3,659	4,406	2,785
Rest of the World	39,239	30,458	32,049	43,861	38,934	26,596	20,997	16,004	24,166	19,115
Grand Total	315,171	336,636	332,125	328,399	303,824	307,197	316,093	296,630	317,782	365,002

Source: U.S. Census Bureau/U.S. International Trade Commission

Notes: Data tables were derived from the UN Comtrade Database (last updated November 2019).
Top 20 determined by latest year of complete data.

Global Trade of Zinc Scrap, Exports, 2008-2017

Top 20 Exporters	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
France	43,750	45,976	51,481	45,491	60,946	99,123	118,166	79,287	93,173	87,053
Germany	51,800	68,648	74,269	74,965	73,263	52,770	53,342	45,865	40,739	46,279
Thailand	4,153	5,701	12,684	8,323	4,019	1,801	4,472	11,606	30,759	31,551
Netherlands	19,815	17,399	32,543	25,629	29,417	26,682	31,910	26,101	27,464	40,249
USA	90,992	47,119	77,934	85,223	90,447	88,047	71,446	55,224	26,567	33,642
Belgium	15,533	16,627	14,845	11,592	15,048	14,353	15,842	13,646	15,205	12,841
Spain	6,210	26,675	37,362	15,625	8,283	17,625	8,669	9,171	12,586	5,658
Saudi Arabia	5,003	2,628	4,603	5,522	6,792	11,045	11,444	10,247	12,405	12,790
Canada	6,121	5,690	10,770	14,257	15,069	18,127	22,341	17,561	11,704	9,973
Austria	8,306	6,099	5,757	8,583	8,591	10,440	10,077	7,663	11,424	11,949
Italy	9,060	12,429	16,452	13,143	7,149	7,024	10,407	9,262	9,160	10,090
Romania	442	1,615	711	597	672	592	885	6,753	7,653	501
Poland	403	1,593	1,086	1,046	464	570	1,388	2,981	5,740	7,182
United Arab Emirates	3,240	2,359	3,271	4,880	5,883	4,666	4,369	4,264	5,344	5,146
Malaysia	6,322	5,767	4,585	5,950	8,442	15,463	12,700	12,589	4,742	6,199
Czechia	2,885	2,716	4,798	4,474	4,971	3,769	3,539	2,941	3,514	3,170
Mexico	6,199	6,370	3,146	2,684	2,768	3,288	3,388	3,295	3,507	3,964
Japan	3,908	3,071	4,472	4,417	3,712	3,924	3,852	3,457	3,315	3,335
Denmark	2,442	2,704	2,549	2,429	2,557	2,329	2,517	3,023	3,019	2,548
UK	3,257	5,135	14,933	11,100	8,356	2,154	4,736	5,310	2,971	3,298
Rest of the World	50,062	44,382	43,333	45,426	43,919	46,202	62,020	40,963	40,173	39,257
Grand Total	339,903	310,945	418,310	391,357	400,770	429,993	457,510	371,211	371,164	376,675

Source: U.S. Census Bureau/U.S. International Trade Commission

Notes: Data tables were derived from the UN Comtrade Database (last updated November 2019). Top 20 determined by latest year of complete data. Export data was adjusted for Netherlands (2009) and United Arab Emirates (2009-2010) with reported import data.

Global Trade of Zinc Scrap, Imports, 2006-2017

Top 20 Importers	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
India	63,116	36,759	14,848	24,951	27,697	44,402	55,413	69,874	83,657	62,364	67,296	76,118
France	7,729	6,903	3,567	4,482	2,820	3,624	23,422	58,425	53,467	59,218	63,823	62,992
Italy	18,541	21,873	16,868	16,062	27,740	36,491	36,309	39,614	50,413	47,278	58,392	56,137
Spain	5,116	6,685	3,598	3,355	10,935	23,205	9,620	38,266	41,625	38,505	53,107	50,469
Belgium	44,283	59,026	39,998	60,693	71,307	64,234	57,649	51,672	50,770	48,258	38,513	37,253
Germany	32,606	19,587	17,395	16,780	23,694	25,851	25,736	20,423	23,345	17,123	21,937	18,751
China	72,483	42,171	27,886	30,607	34,462	27,941	35,590	38,111	32,004	21,712	9,876	13,818
Austria	751	150	212	599	298	4,826	9,832	9,204	12,481	9,690	12,630	12,766
USA	14,227	21,752	16,989	9,095	15,613	18,482	19,955	21,044	24,876	17,986	7,672	11,102
Netherlands	14,619	13,633	6,270	8,274	12,653	9,283	6,685	7,301	8,417	6,374	6,945	8,197
Poland	2,611	4,414	6,317	3,779	7,068	10,420	11,060	14,253	15,465	19,040	10,240	7,283
Rest of the World	11,433	10,180	8,856	5,572	6,308	6,182	6,301	5,050	5,605	6,199	3,732	5,030
Sri Lanka	24	28	2			201	1,076	1,800	3,043	2,892	3,555	2,927
Taiwan	7,523	7,365	2,796	3,892	6,091	3,126	3,442	2,243	1,573	2,116	1,790	2,537
United Arab Emirates	1,794	1,268	1,497	1,046	4,917	4,373	4,701	4,502	3,536	3,030	2,322	2,155
Japan	278	892	1,108	606	710	1,042	1,186	1,540	1,265	1,636	1,496	2,143
Czechia	334	4,008	2,791	2,434	900	912	663	208	224	496	1,734	1,931
Romania	2	32	54		246	439	1,628	1,101	1,046	1,199	1,909	1,242
Slovenia	298	623	395	186	306	300	280	384	970	617	813	678
Malaysia	45,963	892	693	939	579	600	1,276	1,991	1,936	4,374	1,030	630
China, Hong Kong SAR	956	1,308	70	75	219	341	546	429	648	1,264	902	305
Grand Total	344,688	259,551	172,210	193,426	254,563	286,276	312,368	387,433	416,366	371,372	369,717	374,464

Source: U.S. Census Bureau/U.S. International Trade Commission

Notes: Data tables were derived from the UN Comtrade Database (last updated March 2019). Top 20 determined by latest year of complete data.

Global Trade of Recovered Fiber, Exports, 2008-2017

Top 20 Exporters	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
USA	18,227,721	19,067,095	18,777,917	21,009,012	20,142,035	18,964,015	18,469,673	19,566,483	19,752,523	18,261,334
UK	4,916,230	4,463,158	4,397,726	4,490,055	4,475,740	4,266,385	4,514,306	5,045,183	4,964,681	4,754,489
Japan	3,490,838	4,914,185	4,373,578	4,432,132	4,929,315	4,889,715	4,618,628	4,261,372	4,138,080	4,416,627
Netherlands	3,671,452	3,018,050	3,584,906	3,896,997	3,553,697	3,025,029	2,780,061	3,044,991	3,058,185	2,990,080
France	2,171,191	2,739,764	2,623,678	2,924,478	3,052,896	2,895,122	2,855,845	2,868,832	2,858,269	2,896,282
Germany	3,291,667	3,472,987	2,898,459	3,412,633	3,082,461	2,785,491	2,468,553	2,644,858	2,720,539	2,854,438
Canada	1,224,604	1,698,604	1,864,690	2,049,243	2,341,126	2,128,628	2,085,177	2,344,550	2,576,480	2,523,762
Italy	1,522,216	1,861,347	1,626,848	1,737,597	1,933,141	1,685,179	1,677,646	1,821,317	1,939,935	1,866,807
Australia	1,281,067	1,392,835	1,467,171	1,406,825	1,603,241	1,479,868	1,469,948	1,564,261	1,469,784	1,385,747
Belgium	2,305,828	2,426,758	2,095,007	2,300,875	2,017,862	1,867,588	1,633,718	1,580,974	1,457,083	1,594,831
Spain	732,422	954,049	664,796	782,817	709,901	665,860	891,583	1,013,825	1,152,768	1,062,442
Czechia	382,637	409,865	476,420	545,877	642,053	711,857	731,631	795,423	818,204	861,879
Hong Kong	1,091,196	1,027,229	1,194,535	1,278,674	1,162,294	1,032,344	947,859	822,889	805,599	794,241
Poland	547,874	358,947	398,815	531,215	525,390	593,123	579,044	661,677	688,372	813,422
Rep. of Korea	292,981	324,226	271,987	323,617	547,378	428,212	482,050	554,553	635,458	573,087
Singapore	675,415	626,376	739,229	769,089	697,913	681,131	647,437	604,565	610,361	715,994
Denmark	711,374	727,302	701,627	712,923	686,961	585,989	561,959	587,373	588,206	569,670
United Arab Emirates	260,682	278,144	280,048	359,092	391,175	438,328	471,462	456,308	521,842	549,998
Sweden	339,885	318,223	395,164	478,873	431,363	451,439	453,130	466,853	501,829	452,418
Switzerland	542,404	550,441	589,798	573,381	539,251	520,576	499,651	485,420	477,643	467,583
Rest of the World	4,503,900	5,377,447	5,229,244	5,929,045	6,960,448	6,384,169	6,491,726	6,358,859	6,332,863	6,347,279
Grand Total	52,183,585	56,007,031	54,651,643	59,944,450	60,425,641	56,480,048	55,331,087	57,550,568	58,068,703	56,752,408

Source: U.S. Census Bureau/U.S. International Trade Commission

Notes: Data tables were derived from the UN Comtrade Database (last updated November 2019).
Top 20 determined by latest year of complete data. Export data was adjusted for the United Arab Emirates.

Global Trade of Recovered Fiber, Imports, 2008-2017

Top 20 Importers	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
China	24,205,826	27,501,707	24,352,351	27,278,635	30,067,145	29,236,774	27,518,476	29,283,649	28,498,511	25,716,582
Germany	3,164,258	2,860,872	3,624,764	4,108,603	4,021,672	3,907,364	3,954,795	4,001,180	4,285,733	4,543,913
India	1,739,619	2,161,685	1,962,983	2,079,101	2,303,727	2,531,167	3,187,792	3,088,921	3,177,568	3,280,683
Netherlands	2,568,851	1,376,270	2,928,725	3,193,646	2,931,399	2,739,020	2,383,691	2,618,133	2,748,707	3,250,333
Indonesia	2,080,390	2,284,656	2,412,462	2,323,760	2,292,488	2,216,424	2,280,384	1,692,351	2,021,051	2,192,203
Vietnam	525,867	289,623	591,162	556,700	384,196	450,556	637,453	648,232	712,826	1,800,878
Spain	1,170,728	921,186	1,279,188	1,154,169	1,226,263	1,544,586	1,505,165	1,627,547	1,638,323	1,525,263
Thailand	1,217,338	969,850	1,023,857	923,981	999,833	858,301	856,513	1,133,075	1,086,867	1,498,913
Rep. of Korea	1,306,820	1,121,827	1,355,990	1,530,872	1,467,150	1,589,486	1,547,289	1,542,292	1,562,258	1,459,811
Austria	1,288,989	1,172,977	1,299,671	1,387,955	1,284,855	1,212,240	1,162,476	1,226,687	1,279,027	1,210,376
Taiwan	834,122	562,640	568,558	596,030	864,889	790,494	845,821	586,012	708,933	1,105,864
Mexico	1,429,525	1,408,012	1,478,018	1,414,239	1,304,863	1,259,274	1,407,736	1,384,800	1,531,175	1,076,687
France	948,400	787,686	877,312	886,447	749,516	771,529	940,699	1,015,194	977,765	986,729
Belgium	1,473,890	1,643,748	1,454,905	1,456,191	1,311,531	1,335,797	1,147,548	1,089,102	1,069,313	909,540
USA	716,081	300,088	711,534	911,543	992,497	817,785	787,768	712,125	806,420	897,704
Canada	1,764,051	1,314,241	1,057,584	802,379	1,205,258	721,825	628,656	736,422	762,639	799,710
Turkey	84,827	82,246	115,965	71,922	52,501	80,068	183,834	301,404	450,913	753,444
Hungary	17,188	103,115	359,743	390,415	415,333	442,558	428,249	398,172	433,586	462,764
Poland	14,240	17,843	264,677	306,645	392,984	457,695	518,191	444,857	479,079	412,530
Sweden	841,728	894,365	1,059,611	976,319	871,241	612,446	618,816	462,590	454,577	398,199
Rest of the World	4,024,671	3,487,311	4,566,075	5,701,488	4,470,456	4,146,485	3,914,857	4,016,453	3,035,239	4,599,917
Grand Total	50,224,886	50,852,536	52,200,636	56,743,390	58,274,716	56,789,556	55,519,616	57,243,891	56,867,666	58,882,043

Source: U.S. Census Bureau/U.S. International Trade Commission

Notes: Data tables were derived from the UN Comtrade Database (last updated March 2019).
Top 20 determined by latest year of complete data. Import data was adjusted for Vietnam (2012) with reported export data.

Global Trade of Plastic Scrap, Exports, 2008-2017

Top 20 Exporters	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
USA	1,593,703	2,020,770	2,040,483	2,127,877	2,011,095	1,909,335	2,171,691	2,043,124	1,616,967	1,667,736
Japan	1,513,419	1,487,705	1,638,962	1,631,455	1,673,620	1,681,733	1,670,228	1,606,271	1,526,921	1,431,561
Germany	774,655	1,445,533	1,418,680	1,462,561	1,511,349	1,324,863	1,453,609	1,376,833	1,445,155	1,218,352
UK	654,393	711,223	838,188	880,577	811,509	648,614	764,404	791,554	805,072	679,066
Belgium	369,552	453,559	396,963	414,619	456,860	471,666	437,310	430,720	440,849	496,630
France	390,634	447,683	477,954	502,826	508,034	454,119	483,026	468,754	483,957	457,667
Netherlands	357,819	245,322	361,137	381,131	428,666	464,294	431,322	505,903	481,088	387,883
Mexico	435,085	372,442	414,021	442,197	522,143	517,067	862,744	449,974	429,537	374,148
Spain	112,448	166,850	217,892	192,363	236,880	225,844	333,466	329,937	318,926	302,260
Vietnam	19,342	18,929	39,760	102,059	110,246	223,408	202,021	119,292	276,395	302,159
Thailand	145,309	166,370	205,915	232,170	263,128	317,540	346,912	265,390	306,372	296,839
Italy	139,913	212,414	263,949	269,601	228,019	191,621	175,859	223,076	234,262	260,565
Rep. of Korea	285,244	307,717	201,549	161,358	182,975	183,291	192,851	187,609	208,826	199,572
Canada	229,263	188,862	190,252	197,638	203,046	170,783	191,778	208,955	213,690	197,142
Indonesia	53,203	53,728	116,354	166,430	204,750	231,747	193,842	148,735	203,586	193,545
Poland	66,831	97,153	107,541	102,736	101,301	99,431	138,834	166,378	192,224	166,503
Malaysia	114,943	123,627	134,326	153,865	197,598	250,809	247,007	182,271	163,622	165,810
Australia	125,183	204,739	156,388	151,209	193,087	155,085	185,705	206,060	199,743	146,780
Taiwan	149,536	166,445	182,693	164,825	157,914	120,210	146,153	145,125	155,244	133,347
Slovenia	23,641	28,126	35,362	28,177	69,251	71,594	97,581	103,849	180,460	109,580
Rest of the World	2,466,761	2,551,903	3,527,297	2,752,215	2,218,891	2,168,939	2,031,824	1,909,652	1,860,761	1,682,124
Grand Total	10,020,878	11,471,102	12,965,664	12,517,888	12,290,363	11,881,993	12,758,169	11,869,461	11,743,659	10,869,267

Source: U.S. Census Bureau/U.S. International Trade Commission

Notes: Data tables were derived from the UN Comtrade Database (last updated November 2019).
Top 20 determined by latest year of complete data. Export data was adjusted for Slovenia (2017) with reported import data.

Global Trade of Plastic Scrap, Imports, 2008-2017

Top 20 Importers	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
China	7,074,626	7,325,810	8,009,674	8,384,190	8,877,767	7,881,304	8,254,247	7,354,229	7,347,176	5,828,750
Hong Kong	4,503,012	4,752,654	4,795,350	3,962,054	3,200,487	2,506,171	3,080,676	2,864,769	2,877,956	1,889,224
Netherlands	238,843	144,459	295,928	374,308	467,433	531,881	622,941	598,127	611,300	633,601
Malaysia	38,194	92,323	81,885	142,860	176,779	301,435	225,986	249,941	287,673	549,786
Germany	227,723	214,448	296,940	302,344	420,106	423,052	501,628	545,607	548,029	516,740
USA	412,156	356,098	379,490	342,014	361,294	372,705	417,046	393,392	447,945	442,544
Turkey	10,848	7,169	23,260	55,780	56,497	67,396	105,287	104,031	159,569	261,863
Belgium	294,000	350,481	285,426	322,250	292,285	259,805	226,729	259,728	312,587	246,820
Austria	148,423	106,394	146,137	210,909	218,640	194,626	250,263	245,451	240,589	220,192
Taiwan	150,203	119,829	148,887	153,084	149,491	201,522	204,365	221,499	177,934	202,099
Italy	162,786	116,475	138,291	145,795	138,957	134,360	160,232	153,379	178,631	195,905
India	97,936	478,491	116,252	131,419	195,988	259,614	251,546	185,746	166,859	145,580
France	81,392	58,708	98,940	109,177	109,822	111,921	110,017	117,055	122,987	144,688
Canada	161,881	129,748	148,031	153,294	155,107	146,523	186,390	249,179	171,657	140,662
Indonesia	8,588	3,175	39,906	90,535	106,994	135,993	107,423	97,146	120,979	128,951
Czechia	54,849	48,074	58,555	93,122	111,373	122,698	128,088	131,523	129,925	124,109
Poland	42,222	47,907	113,677	113,133	67,305	57,771	62,416	85,814	118,800	119,191
United Kingdom	75,784	46,256	53,110	64,237	73,907	93,487	111,097	87,280	130,021	117,314
Portugal	14,876	13,514	21,625	55,617	45,308	51,078	82,725	134,784	107,251	112,446
Sweden	87,251	138,100	300,324	255,449	134,230	213,483	153,842	179,539	139,748	27,654
Rest of the World	768,681	784,800	889,657	1,070,135	1,045,232	1,202,175	1,138,664	1,118,591	1,087,326	1,339,123
Grand Total	14,654,275	15,334,914	16,441,343	16,531,706	16,405,000	15,268,998	16,381,608	15,376,810	15,484,941	13,387,243

Source: U.S. Census Bureau/U.S. International Trade Commission

Notes: Data tables were derived from the UN Comtrade Database (last updated March 2019).
Top 20 determined by latest year of complete data. Import data for Slovenia (2017) corrected with reported export data.

Notes

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