

2017 Top Markets Report **Composites** Sector Snapshot

The global demand for U.S. composites is anticipated to grow at a compound annual growth rate (CAGR) of 4.2 percent in 2017 and 2018. In 2016, the United States exports of composites totaled approximately \$2.5 billion, and exports are expected to reach \$2.7 billion by 2018. Emerging trends, such as the development of low-cost carbon fibers and high-performance glass fiber, are driving this increased demand for composites.

Understanding Composites

A **composite** is a material made from two or more constituent materials with significantly different physical or chemical properties that, when combined, produce a material with characteristics different from the individual components. Two common forms of composites are carbon and glass fiber. Carbon and glass fibers are strong, lightweight, advanced composite materials. Carbon fiber reinforced composites (CRFP) are replacing steel and aluminum in a growing range of products.. Glass fiber is similar to carbon fiber in strength and weight but is slightly more flexible than carbon fiber.

Carbon fiber is significantly more expensive than glass fiber and therefore is still primarily used in high-performance applications where weight-saving requirements are critical. Even though carbon fibers are making inroads in the composite industry, glass fibers are still primarily used in the manufacturing of thousands of products. The glass fiber industry is constantly evolving to meet higher mechanical and chemical requirements.

Applications

Carbon and glass fibers are currently used in sectors that demand high mechanical performance, such as aerospace, automotive, construction, wind energy, industrial, marine and sporting goods.

The **automotive** sector is the largest market for composite materials. The automotive industry is continuously looking for innovative materials to help reduce vehicle weight and achieve fuel efficiency and carbon emission targets. Perhaps the biggest trend in the automotive industry is the development of technologies for making carbon fiber parts for mass-volume vehicles. Carbon fiber demand by the automotive industry will rise sharply in coming years as lightweight vehicles become increasingly important.¹

Construction continues to be the second largest market for composite materials after transportation. The increase in housing starts, which grew for the sixth consecutive year in 2015, has driven the demand for composite materials used in the manufacturing of bathtubs, doors, windows, and other

applications.² This growth was also propelled by a continuous increase in U.S. employment, low mortgage rates and slowing inflation in housing prices..

The **aerospace** market is one of the most important to the composites industry. Commercial aircraft, military craft, helicopters, business jets, general aviation aircraft and space craft all make substantial use of composites. Composite material consumption has increased significantly in the commercial aerospace sector. Aerospace is increasingly turning to composite materials for their low weight, high strength, low electrical conductivity, and durability. A large portion of this demand comes from premiere wide-body jets. Currently, wings, fuselages, tail assemblies and landing gear of civilian airliners all make use of composite materials. Composites also are used to form engine housings, fan casings, floorboards and interior components. During the 1990s, aircraft contained only 5 to 6 percent of composite materials. Today, however, aircraft contain close to 50 percent of composite materials.³

One factor driving the growth of the global **wind energy** market is increased foreign government support for wind power projects. The increasing need for energy independence and geopolitical energy security and increasing wind power capacity across the globe is creating a huge demand for composite materials in wind turbine manufacturing.⁴

Figure 1: Ranking of Projected Composite Export Markets (2017-2018)

1. Mexico	11. Korea	21. Malaysia
2. Canada	12. Brazil	22. Austria
3. Germany	13. India	23. Israel
4. China	14. United Arab Emirates	24. Vietnam
5. Japan	15. Australia	25. Thailand
6. Italy	16. Singapore	26. S. Africa
7. Netherlands	17. Belgium	27. Denmark
8. United Kingdom	18. Spain	28. Sweden
9. United Arab Emirates	19. Taiwan	29. Qatar
10. France	20. Turkey	30. Costa Rica

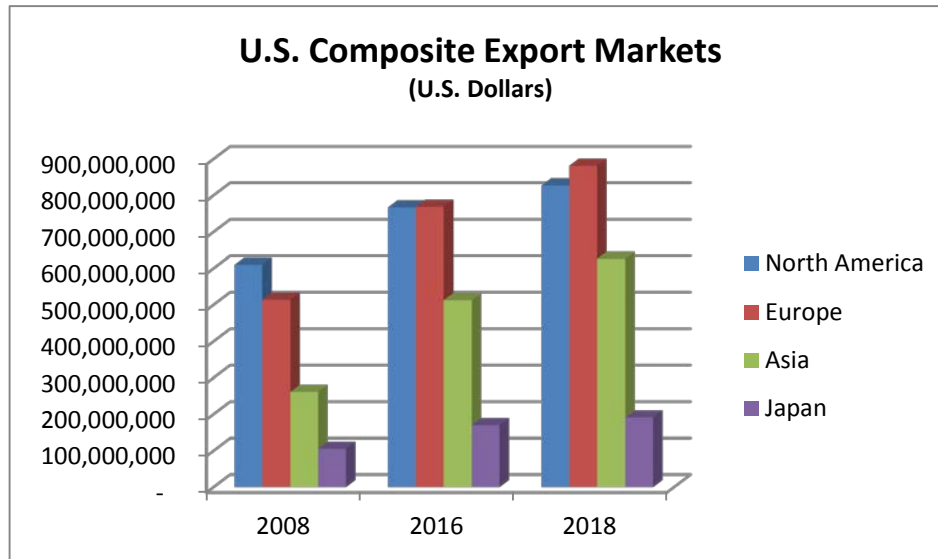
Global Export Opportunities

The outlook for U.S.-produced composites is strong. Domestic producers can meet the growing demand for these advanced products. Figure 1 ranks the top 30 markets for U.S. composite exports through 2018.

The global consumption of composites has been steadily increasing over the past decade and it should continue growing in the future. U.S. manufacturers of composite materials continue to find opportunities in North America, Europe, and Asia Pacific (the fastest growing region for composite materials), especially in the aerospace, automotive, and construction sectors. Across industries, end users are looking for products that offer better value for their money, superior quality, and increased lifespans. In turn, the composites industry is shifting gears by investing in new R&D initiatives and attempting to capture business and applications previously considered out of reach.

The value of U.S. composite exports increased by 39 percent from 2008 to 2016 on the strength of increased shipments to Asia. North America and Europe, however, remained the dominant markets during this period, with Europe projected to be the largest export market for U.S.- produced composites by 2018.

Figure 2



Three markets in particular that have strong growth potential are Mexico, India and the United Arab Emirates. The relative proximity of **Mexico** to U.S. producers makes U.S. producers more price competitive than other foreign competitors, reducing transportation and communication costs and maximizing service advantages such as shorter shipping times. Limited Mexican competition and improved market access under the North America Free Trade Agreement (NAFTA) have also been key to the U.S. industry's competitiveness in Mexico.

Mexico is the largest market for U.S. composites, with exports increasing 8 percent annually since 2008. The value of U.S. exports in 2016 was \$390 million and is forecast to reach \$455 million in 2018. Mexico's share of U.S. exports of composites increased from 11 percent in 2008 to 15 percent in 2016, and its share is expected to increase an additional 2 percentage points to 17 percent in 2018.

Due to its continued focus on high-value products like composites, especially for use in auto manufacturing, Mexico will maintain its position as the top destination for U.S. composites.

The composites market in **India** has grown at a healthy rate over the past decade. Due to the focus the Indian government has placed on the development of infrastructure (bridges, dams, roads and urban infrastructure) coupled with the lack of sufficient Indian composites to meet demand, the U.S. industry has been a competitive success in India. U.S. exports of composites to India grew at a compound annual growth rate of 11 percent between 2008 and 2016. U.S. exports of composites to India are projected to be worth \$49 million by 2018, an increase of \$9 million from 2016.

The **United Arab Emirates** is the ninth largest market for U.S.-produced composites. Exports of composites to the UAE grew at a compound annual growth rate of 22 percent between 2008 and 2016. This is the largest year-over-year growth for this market. Increased investment in large-scale infrastructure and industrial projects are a major force driving the demand for composites. Additionally, the UAE continues to invest in tourism-related projects, thus increasing their demand for construction-sector composites.

Challenges

The evolution of composites will present many challenges for the U.S. composite industry. Innovation will continue to be the key driver of the U.S. composite industry, especially in increasing performance, reducing cost and process time, and addressing environmental demands from the manufacturing sector. Additionally, the United States needs to maintain its export penetration rates in all countries. China could potentially saturate the global carbon fiber market. It is widely expected that China is positioning itself to fill gaps in production and will be competitive with the U.S. industry. China's capacity to produce carbon fiber is increasing and Chinese carbon fiber producers are investing in improving quality to compete in the global market. China is the second largest exporter of composites behind the United States. U.S. imports of composites from China have increased 191 percent since 2009, increasing from \$124 million to \$361 million.

¹Mazumdar, Sanjay. State of the Composites Industry Report for 2017. Composites Manufacturing Magazine. Jan 2016.

²Mazumdar, Sanjay. State of the Composites Industry Report for 2017. Composites Manufacturing Magazine. Jan 2016.

³Mazumdar, Sanjay. State of the Composites Industry Report for 2017. Composites Manufacturing Magazine. Jan 2016.

⁴Dvork, Paul. P&S Market Research. Wind Power Engineering. July 2016.