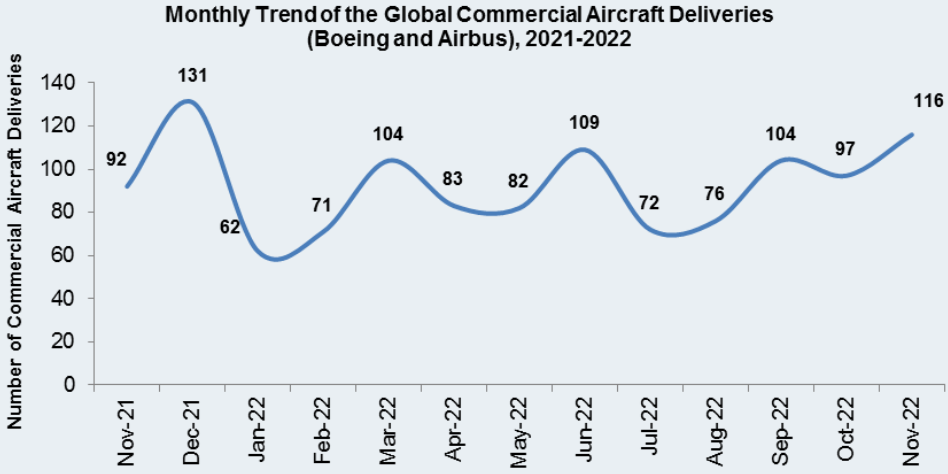
US Composites Market Monthly Insights
November 2022

Composites Market Update for November, 2022

The composites market in November was down on a YoY basis by 7 to 8%. November was also down from October from a month-to-month basis, which can be somewhat attributed to typical seasonality. 2021 was an unusual year, and in Q 4 of 2022 the trends are closer to pre-pandemic cyclical trends. Construction started to soften and was down significantly from the prior year (~15% off). Distribution was also down significantly. Infrastructure was robust, and up roughly 5% and Marine continues to remain surprisingly strong. However, RV is much lower than 2021. The outlook for December is a continued and significant weakening in the market from a year over year perspective. However, due to the idiosyncrasies of December, it's too early to tell if this is a trend that will continue into Q1 of 2023, or if we'll see the composites industry level off. Raw material prices have softened with more downward pricing pressure. Regarding external factors, housing prices and interest rates are expected to dampen demand in construction in 2023. Marine is expected to drop at some point yet to be determined, but the biggest factor will be the macro-economic trends, which are difficult to predict.

Aerospace

Commercial aircraft (Boeing and Airbus) deliveries increased from 97 aircraft deliveries in October 2022 to 116 aircraft deliveries in November 2022.



Some of the highlights of November 2022 are as follows:

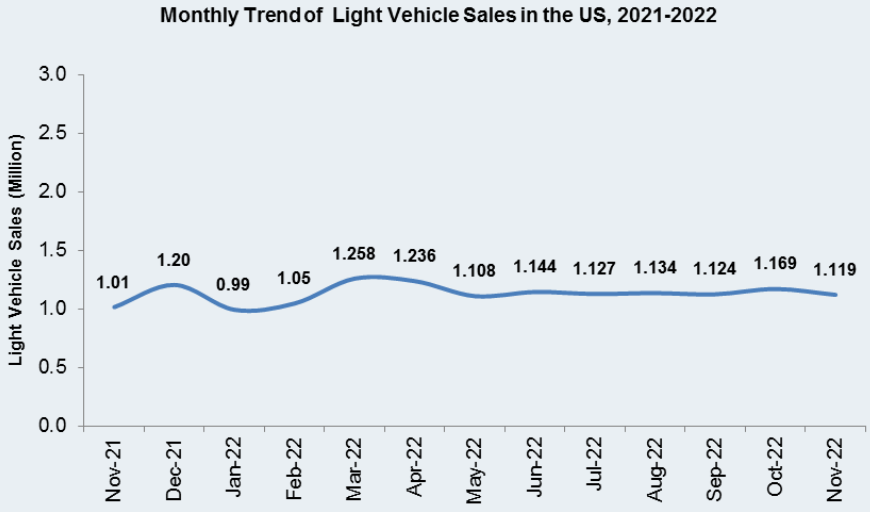
- **Jekta Switzerland Unveils Composites-Intensive 19-Seat Seaplane Design.** Jekta Switzerland has unveiled its PHA-ZE 100, a 19-seat electric amphibious aircraft made of composites, and pitched the new design as sustainable transport mobility for the population of islands, coastal megacities, and settlements. The large-volume displacement body with three seats in a row makes it possible to provide passengers with comfortable conditions in flight. Jekta says its

PHA-ZE 100 amphibious aircraft could revive the economy of coastal and island states while significantly reducing greenhouse gas emissions.

- **Pipistrel Makes First Canadian Delivery of All-Electric Composite Velis Electro**. Pipistrel Aircraft made its first delivery to Canada of its all-electric, high-wing two-seat aircraft, the Velis Electro. The single-engine aircraft features a three-bladed, fixed-pitch composite propeller, and an entire structure predominantly using carbon fiber, fiberglass and Kevlar materials. This delivery is not only an exciting milestone for Pipistrel and the global presence of the Velis Electro, but also represents a stepping stone for Canada's strategic investments to promote a greener aerospace industry and economy.
- **Contract between Airbus and ArianeGroup for Ariane 6 Large Carbon Fiber Structures.** Airbus and ArianeGroup have signed a contract for the next transition batch of Ariane 6 large carbon fiber structures. The contract includes the manufacturing and supply of innovative, large, lightweight structures for the next fourteen Ariane 6 launchers, to be manufactured until 2025. The contract will support ArianeGroup's ramp up to full production rate by then. Airbus builds up to four carbon fiber structures for each Ariane launcher at its Getafe site, near Madrid. The Interface Structure (upper and lower) is the largest space carbon fiber structure ever produced in Europe. The other structures include the Launch Vehicle Adapter, for the upper stage; and the Equipped Solid Rocket upper part of each rocket booster.

Automotive

The U.S. new vehicle sales of 1,119,452 units in November 2022 represented an increase of 10% as compared to 1,014,411 units in November 2021.



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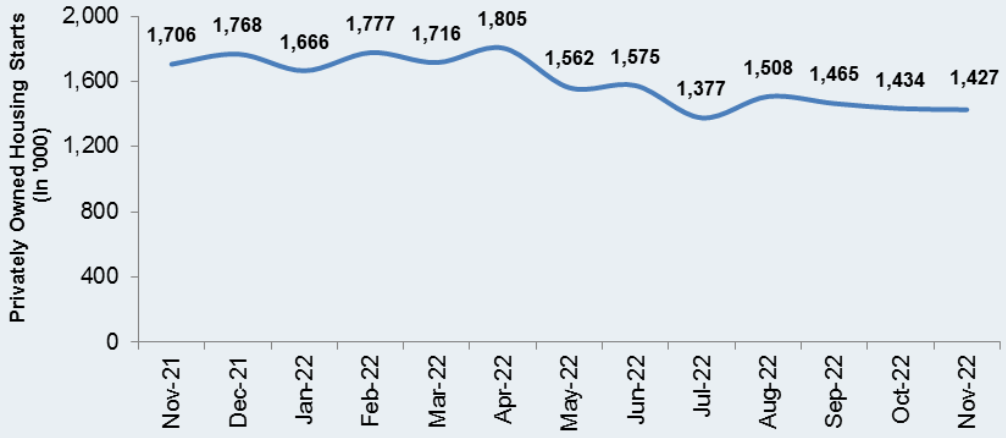
One of the highlights of November 2022 is as follows:

- **Cygnet Texkimp Develops High-Tension Carbon Fiber Overwrapping Solution**. Composites technology company Cygnet Texkimp has developed a high-tension fiber winding solution to create lightweight rotating parts with greater dimensional stability at higher speeds. The technology, which has evolved through the company's filament winding capability, has been developed to achieve more power from high-speed rotating machinery by wrapping it in carbon fiber under high tension. This reportedly enables the final part to rotate more quickly without expanding, and means that more power can be achieved from lighter parts.

Construction

Privately-owned housing starts in November were at a seasonally adjusted annual rate of 1,427,000. This is 0.5% below the revised October estimate of 1,434,000 and is 16.4% below the November 2021 rate of 1,706,000. Single-family housing starts in November were at a rate of 828,000; this is 4.1% below the revised October figure of 863,000. The November rate for units in buildings with five units or more was 584,000.

Monthly Trend of Privately Owned Housing Starts in the US, 2021-2022



One of the highlights of November 2022 is as follows:

- **University of Maine Unveils 100% Bio-Based 3D-Printed Home.** The University of Maine Advanced Structures and Composites Center unveiled BioHome3D, a 3D-printed house made entirely with bio-based materials. The house is fully recyclable and highly insulated with 100% wood insulation and customizable R-values. The 600-square-foot prototype features 3D-printed floors, walls and a roof comprised of wood fibers and bioresins. More importantly, the technology used is designed to address labor shortages and supply chain issues that are driving high costs and constricting the supply of affordable housing — this includes less time for on-site building and printing using abundant, renewable, locally sourced wood fiber feedstock.

Wind Energy

According to the latest "Energy Infrastructure Update" report from the Federal Energy Regulatory Commission's Office of Energy Projects, the cumulative installed capacity of 35 units during January – October, 2022 was 7,378 MW as compared to 9,395 MW of 55 units during January –October, 2021. With a total installed generating capacity of 142.16 (GW), wind constituted 11.29% of the total installed generating capacity of 1,258.76 (GW) among all energy sources.

One of the highlights of November 2022 is as follows:

- **Vestas Expands Partnership with Long-Time Blades Partner TPI Composites.** Vestas has signed a multi-year framework agreement with long-time partner and supplier of wind turbine blades and services TPI Composites Inc. , to strengthen its scalable global supply chain network for current and future wind turbine blades. TPI and Vestas work closely together on global manufacturing and supply chain operations, based on Vestas' specifications and requirements. TPI will continue supply of blades from its existing global production footprint, while optimizing the production setup in current facilities, and evaluate new locations for possible future growth in strategic markets. Continuous collaborative effort is sought to strengthen the wind energy supply chain, such as production setup optimization for current and future wind blade facilities, and evaluation of future locations.

Marine

The US marine industry is anticipated to experience good growth in 2022.

Some of the highlights of November 2022 are as follows:

- **Grand Largue Composites, Sicomin Enable Flax Fiber-Built Class40 Racing Yacht.** Fibers, fabrics, epoxy resins, and adhesives from Sicomin have been used by Grand Largue Composites to construct what is said to be the first Class40 racing yacht to feature a significant quantity of flax fiber reinforcements. Class40 is one of the most competitive fleets in yacht racing. The hulls of Class40 yachts must be light in weight, strong and stiff, and durable in the most extreme of conditions. Furthermore, to keep costs down, they cannot be reinforced with carbon fibers. The quality and reliability of the resins used for the infusion and lamination of the hulls are therefore of key importance.
- **Diab Divinycell HM Foam Lightweights Mayla 44 Electric Powerboat.** Divinycell HM foam by Diab is being used to construct the Mayla 44, a new ultra-high-performance electric powerboat currently being built at Nova Mare, the marine division of Nova Composites. Due to launch in early 2023 in Dubai, the Mayla 44 is a radical 44 footer that blends classic styling elements with a state-of-the-art composite construction and electric drivetrain. Even with its novel hull design, the Mayla 44's top speed of at least 70+ knots required a very lightweight construction in the form of a carbon fiber full-sandwich composite structure.

Consumer Goods

New orders for manufactured durable goods in November, down following three consecutive monthly increases, decreased $5.8 billion or 2.1% to $270.6 billion, the U.S. Census Bureau announced today. This followed a 0.7% October increase. Excluding transportation, new orders increased 0.2%. Excluding defense, new orders decreased 2.6%. Transportation equipment, down following three consecutive monthly increases, drove the decrease, $6.1 billion or 6.3% to $91.3 billion.

Some of the highlights of November 2022 are as follows:

- **New Convergence Carbon Fiber Rims & Wheels.** Kamloops, British Columbia has officially launched its new carbon fiber rim shape for bicycles that is using Boston Materials ZRT composite film. The rim, called the Convergence, has a shape that makes it look like it's been twisted, with a slightly angled profile around each spoke hole that's intended to reduce fatigue on the nipples and increase durability. Moreover, the composite rims enable lighter weight. A 29-inch Convergence Triad wheelset, for example, weighed in at 880 grams for the front wheel and 1,007 grams for the rear, for a total weight of 1,887 grams with tape and valve stems.
- **New Watch Features Carbon Fibre Case.** 9T Labs AG announced its Additive Fusion Technology (AFT) was chosen to produce the carbon composite watch case for Oris SA's new limited edition watch. According to 9T Labs, the AFT process delivered significant advantages over the state-of-the-art method of cutting the watch case out of metal blocks. For example, the AFT technology achieves light weight at high strength, low waste and distinctive aesthetics as a result of the preservation of the continuous carbon fiber, in addition to consistent high quality.

Recent Development in Material

- **Oak Ridge National Laboratory Scientists Design Recyclable Composites to Help Drive Net-Zero Goal.** Scientists at the Oak Ridge National Laboratory designed a recyclable polymer for carbon-fiber composites to enable circular manufacturing of parts that boost energy efficiency in automotive, wind power and aerospace applications. Carbon-fiber composites, or fiber-reinforced polymers, are strong, lightweight materials that can help lower fuel consumption and reduce emissions in critical areas such as transportation. However, unlike metal competitors, carbon-fiber composites are not typically recyclable, meaning wider adoption could present waste challenges. ORNL's carbon-fiber composites enable fast processing and can be repaired or reprocessed multiple times, opening pathways to circular, low-carbon manufacturing.

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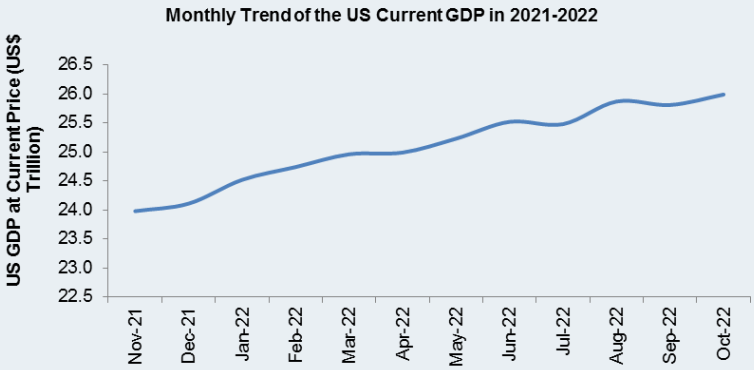
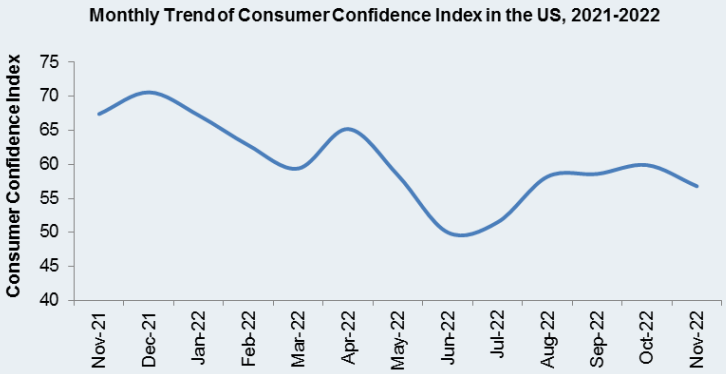
The US Economic Overview – November 2022

The US Consumer Confidence Index decreased to 56.8 in November 2022 as compared to 59.9 in October 2022. The GDP at current price of the US increased from US $25.81 trillion in September 2022 to US $25.99 trillion in October 2022.

Real gross domestic product (GDP) increased at an annual rate of 3.2% in the third quarter of 2022, according to the "third" estimate. The increase in real GDP for the third quarter reflected increases in exports, consumer spending, nonresidential fixed investment, state, and local government spending, and federal government spending that were partly offset by decreases in residential fixed investment and private inventory investment. Imports decreased.

The price index for gross domestic purchases increased 4.8% in the third quarter, an upward revision of 0.1% point from the previous estimate. The personal consumption expenditures (PCE) price index increased 4.3%, unchanged from the prior estimate. Excluding food and energy prices, the PCE price index increased 4.7%, revised up 0.1% point.





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