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INTRODUCTION

The composites industry is a very dynamic sector, with very robust growth prospects:

Our data, compiled by Estin & Co, refers to composite materials consisting of a fiber reinforcement and an organic matrix. The most commonly used materials are glass fiber reinforced polymer (GFRP) and carbon fiber reinforced polymer (CFRP) composites, followed by composites reinforced by aramid or natural fibers.

Following a decline in production volumes in 2020, the global composite materials industry is returning to pre-pandemic growth rates, with the energy, E&E, construction, marine and consumer goods markets showing the fastest recoveries. New growth opportunities are also opening up in emerging sectors such as electric and hydrogen vehicles. And the list goes on ... from marine, sports & recreation, to medical, electrical & electronics and oil & gas, to furniture & design, defence and security, renewable energy and much more. Today and tomorrow, composites providing higher performing, lighter, more energy-efficient and more durable products, will reach an ever-increasing range of applications and markets.
01. Global market figures and trends

The composites industry produces parts and products for more than 15 application sectors, with an estimated output value exceeding $100 billion, and a volume of more than 12 million tons (Mt) in 2021.

The composites market is quantified at the level of composite materials that are consumed to produce composite parts, and at the level of composite parts.

In 2021, the global market for composite materials is estimated at ~ 12 Mt and ~ 37 B$.

After a decline in 2020, the composites industry in 2021 is already exceeding the volumes recorded in 2019. After a period of strong growth (CAGR 8% p.a.) up to 2010, followed by a decade of development (CAGR 4% p.a.), the industry lost opportunities during the Covid-19 crisis, but still grew at a CAGR of 2% from 2019 to 2021. From 2021, the average growth of the market should be above pre-pandemic levels (5% CAGR from 2021 to 2026).
The global composites industry is estimated to employ approximately 2 million people and requires a qualified workforce

The continued development of composites materials in various industries, above all new ones, demands a skilled global workforce, educated and trained in the manufacture and processing of composite materials, as well their design, analysis, and testing.

Regional composites market dynamics reflect economic growth trends

The development of the global composites market correlates with regional economic growth. With the Covid crisis, structural differences in terms of growth are confirmed between regions. Over 2019-2021, China and Emerging Asia have maintained their positions as major growth drivers for the composites industry.

The Asian composite materials market is the largest market at global level. Americas and EMEA markets still have higher added value than the Asian market.
In the future, long-term trends should resume, with economic growth driven by Emerging Asia: China’s growth is expected to exceed 5% CAGR p.a., higher than Europe and the US; India, Philippines, Indonesia and Malaysia should grow at a comparable rate. In the mid-term (2021-2026), the composites market should resume growth in all regions, and there is still strong potential for long-term growth, especially in Asia (energy, E&E, …). In North America and Europe, growth should be driven by transportation (expected recovery in 2023; development of electric and hydrogen vehicles which are more composites-intensive than conventional cars).

The composite materials market is expected to resume its long-term trend after 2021.
02. Composites market and trends per application

In 2021, several application sectors for composite materials have recovered from the Covid crisis. Aerospace and transportation have not recovered yet.

The expansion of several key application sectors is fueling the growth of the composites industry:

The further expansion of the composite materials industry is driven by increasing demand in several application sectors (see appendix for details), with three major trends:

- **Growth of sectors where composites already have a strong penetration, such as wind energy, marine, and electrical/electronics (E&E).** In these markets, composites represent respectively 66%, 52% and 35% of the volume of materials needed. They also have a strong traction due to the following factors:
  - Steady growth in wind turbine installations, both onshore and offshore
  - Increasing demand for computers, electrical equipment but also telecoms appliances
  - Anticipated robust worldwide growth in the marine sector, especially leisure boats.

- **Increasing penetration in sectors where technological breakthroughs are a game changer for composites adoption:**
  - Automation and fast-paced manufacturing processes meeting the requirements of mass production in automotive and other sectors
  - New applications made possible by composites, such as hydrogen storage tanks for the fuel-cell powered vehicles for trains, trucks and passenger cars, and future planes and ships. The rise of electric vehicles is also driving more demand for composites to integrate, isolate and protect battery packs.
  - In building and construction, many composite products and applications are gaining more and more traction, thanks to their unique properties (e.g. corrosion resistance, insulation, light weight). From composite rebars for reinforcing concrete, to pultruded profiles for windows frames, and composite roofing tiles, composite products are not only enabling more sustainable designs, but also provide an effective solution to repair, upgrade or strengthen existing buildings, bridges etc.
Emerging markets driven by new manufacturing and sustainable technologies:

- Many technologies have been upgraded thanks to innovative players in the composites manufacturing value chain: Fiber placement, filament winding and all aspects of additive manufacturing, including 3D printing, consolidation of parts, etc.
- The development of new materials, both resins and fibers, with an improved focus on sustainability, is matching the demand of end user industries requiring such technologies: the rise of thermoplastic resins, bio-resins, natural fibers are some significant examples.
- Interest in recycling and reuse of materials is high and key players in the composites industry are involved in many initiatives. The application sectors are also setting ambitious goals in this area, e.g. Europe’s wind industry is committing to reuse, recycle or recover 100% of turbine blades by 2025.

The composite materials market is expected to resume its long-term trend after 2021

<table>
<thead>
<tr>
<th>Year</th>
<th>CAGR (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-19</td>
<td>2.2%</td>
</tr>
<tr>
<td>2020-21</td>
<td>2.3%</td>
</tr>
<tr>
<td>2021-26</td>
<td>2.5%</td>
</tr>
</tbody>
</table>

Notes: (1) CAGR = Compound Annual Growth Rate; (2) Difference in 2020 with the previous forecast: 7%
Sources: Lucintel, Estin & Co analyses and estimates

Perspective of applications markets – 2010-2026 – In volume

Global composites market by application (in Mt)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Others</th>
<th>Aerospace</th>
<th>Marine</th>
<th>Consumer goods</th>
<th>Energy</th>
<th>Rail</th>
<th>Transportation</th>
<th>Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>0.8 Mt</td>
<td>0.3 Mt</td>
<td>0.2 Mt</td>
<td>0.2 Mt</td>
<td>0.1 Mt</td>
<td>0.1 Mt</td>
<td>0.1 Mt</td>
<td>0.1 Mt</td>
<td>0.1 Mt</td>
</tr>
<tr>
<td>2015</td>
<td>1.3 Mt</td>
<td>0.4 Mt</td>
<td>0.3 Mt</td>
<td>0.3 Mt</td>
<td>0.2 Mt</td>
<td>0.2 Mt</td>
<td>0.2 Mt</td>
<td>0.2 Mt</td>
<td>0.2 Mt</td>
</tr>
<tr>
<td>2020</td>
<td>1.9 Mt</td>
<td>0.5 Mt</td>
<td>0.4 Mt</td>
<td>0.4 Mt</td>
<td>0.3 Mt</td>
<td>0.3 Mt</td>
<td>0.3 Mt</td>
<td>0.3 Mt</td>
<td>0.3 Mt</td>
</tr>
<tr>
<td>2025</td>
<td>2.4 Mt</td>
<td>0.6 Mt</td>
<td>0.5 Mt</td>
<td>0.5 Mt</td>
<td>0.4 Mt</td>
<td>0.4 Mt</td>
<td>0.4 Mt</td>
<td>0.4 Mt</td>
<td>0.4 Mt</td>
</tr>
<tr>
<td>2030</td>
<td>2.9 Mt</td>
<td>0.7 Mt</td>
<td>0.6 Mt</td>
<td>0.6 Mt</td>
<td>0.5 Mt</td>
<td>0.5 Mt</td>
<td>0.5 Mt</td>
<td>0.5 Mt</td>
<td>0.5 Mt</td>
</tr>
</tbody>
</table>

Comparison of forecast before COVID 19 with previous forecast underestimation: -7% (2020)

Summary of expected key futures trends for composites by application sectors

<table>
<thead>
<tr>
<th>Application Sector</th>
<th>Illustrative Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>Wind energy, Oil utilities (pipes, tanks)</td>
</tr>
<tr>
<td>Electrical &amp; Electronic</td>
<td>PCBs, Electrical housings, Electronic connectors, Application-specific antenna solutions, Switch panels</td>
</tr>
<tr>
<td>Construction</td>
<td>Residential infrastructure, Utility poles, Bridge, Architectural products, Railing, Catwalks,</td>
</tr>
<tr>
<td>Marine</td>
<td>Sailing boats, Motorboats, Golf clubs, Bicycle, Fishing rods, Ski, Sails, Rackets, Service trugs, Furniture, Household appliances</td>
</tr>
<tr>
<td>Consumer Goods</td>
<td>Medical equipment, Industrial machine housings, Stools, Safety wear, Service trugs, Furniture, Household appliances, 4G/5G equipment</td>
</tr>
<tr>
<td>Others</td>
<td>Medical equipment, Industrial machine housings, Stools, Safety wear, Service trugs, Furniture, Household appliances, 4G/5G equipment</td>
</tr>
<tr>
<td>Transportation</td>
<td>Automotive, Trains, Buses, Subways, Motorcycles</td>
</tr>
<tr>
<td>Aerospace</td>
<td>Commercial aircrafts, Drones, Military aircrafts, Satellites</td>
</tr>
</tbody>
</table>

Source: JEC, Lucintel, Estin & Co analyses

Lost opportunity due to covid before COVID 19

Illustrative examples – Not exhaustive

Growth in 2020/2021 despite the crisis

Quick recovery

Slow recovery
Composites are key enablers of a more sustainable world:

Composites materials are helping many application sectors to achieve ambitious sustainability goals, such as reduction of CO₂ emissions from transportation, growth in renewable energy capacity, or preservation of water resources. The durability of composites is also contributing to the building of infrastructure and construction products with a longer lifespan, with less resources needed during installation and use. They also make the renovation and repair of existing buildings and urban equipment possible, avoiding the cost- and labor-intensive works associated with replacement and disposal.

Some of the most significant examples of the contribution of composites to the ecological transition are:

• **Lightweighting transportation and industry:**
  Reducing the weight of planes and transportation vehicles is a major driver for the reduction of the CO₂ emissions on the road to a zero-emission mobility. In industry, lightweighting of machine components and industrial equipment reduces electricity consumption.

• **Enabling growth in renewable energies:**
  Composites have played a crucial role in the development of larger wind turbine blades, to generate more power, and enabling the implementation of offshore wind farms.

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**End of Life strategies**

- Decommissioning & waste treatment
- Repowering or lifetime extension (optional)

**Raw material extraction**

**Manufacturing**

**Operation & Maintenance**

**Transportation & Installation**

Source: WindEurope.
• **Assisting the transition to zero-emission mobility?**

Electric vehicle batteries rely on composites for many reasons, including their insulation, waterproofing and fire resistance properties. In addition to battery technologies, the storage of hydrogen in composite pressure tanks is a cornerstone of fuel cell technology, making this clean mobility possible for cars, trucks, trains, ships and, in future, planes.

In Europe, the production of electric vehicles (composites intensives) is expected to reach ~25% in 2025.

![Transportation – Europe – Mix of new passenger cars (2019-2026)](image)

**Production of hydrogen cars is expected to grow over the next decade.**

![Transportation Global annual hydrogen vehicle production (k units)](image)

• **Building strong, durable infrastructure?**

Key properties of composites like corrosion, UV and thermal resistance allow the production of products and infrastructure that can withstand the harshest conditions (e.g. coastal environments) and offer extended service life with low maintenance requirements.
JEC World, the place to be to discover the composites industry

JEC World offers a complete overview of the global composites industry:

Taking place every year for more than half a century (except during the Covid 19 pandemic), JEC World gathers the whole value chain of composite materials in Paris, France, a country which has always been one of the world’s composites hot spots. The event brings together not only all major stakeholders of the composites industry but is also the place to be for innovative startups in the field of advanced materials, and for experts, academics, scientists and R&D leaders. For professionals from the various application sectors of composite materials, it is a unique showcase of what composites can offer, and an unlimited source of inspiration. As composites innovation is the result of teamwork, the event is the best networking platform to ignite and set-up partnerships, nurture an existing collaboration or foster a future one.

**JEC WORLD CONNECT**: New hybrid format in 2022. The show will welcome visitors in Paris and also online.
## JOIN THE GLOBAL COMPOSITES VALUE CHAIN*

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw materials</td>
<td>23%</td>
</tr>
<tr>
<td>Equipment, tools &amp; ancillary products</td>
<td>23%</td>
</tr>
<tr>
<td>Intermediate products</td>
<td>18%</td>
</tr>
<tr>
<td>Engineering/ R&amp;D</td>
<td>10%</td>
</tr>
<tr>
<td>Services</td>
<td>9%</td>
</tr>
<tr>
<td>Composites parts producers and processors</td>
<td>7%</td>
</tr>
<tr>
<td>Distribution, agent &amp; representation</td>
<td>6%</td>
</tr>
<tr>
<td>Composites end-users and integrators</td>
<td>4%</td>
</tr>
</tbody>
</table>

* 2019 edition figures

For more information about the coming edition of the show:  
www.jec-world.events
Manufacturing processes are used in proportions that strongly vary greatly across application sectors.

The entire composites value chain at a glance
Discover it
JEC Observer
Overview of the global composites market, 2021-2026
149 € VAT Excl.

SUMMARY
1. Perimeter and definitions
2. Overview of the composites industry in 2021
3. Dynamics by region
4. Dynamics by application

The book « Overview of the global composites market, 2021-2026 » is on sale online at www.jeccomposites.com/e-store

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About JEC Group
JEC Group is the world’s leading company dedicated entirely to the development of information and business connections channels and platforms supporting the growth and promotion of the composite materials industry. Publisher of the JEC Composites Magazine - the industry’s reference magazine, JEC Group drives global innovation programs and organizes several events in the world, including JEC World (the foremost and world-leading international exhibition dedicated to composite materials and their applications), which takes place every year in Paris. www.jeccomposites.com

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