Strategic Growth Opportunities in Global Carbon Fiber Market

PRESENTED BY
Lucintel

DATE
May, 2021
Global Carbon Fiber Market is Expected to reach $2.9 Billion by 2026 with CAGR of 6.5%

Trends and Forecast for the Global Carbon Fiber Market (US $B) (2015-2026)

Opportunities for Global Carbon Fiber by Various End Use Industries, Precursor Type, Tow Size and Modulus

End Use Industry
- Aerospace
- Industrial
- Sporting Goods

Precursor Type
- PAN Based Carbon Fiber
- Pitch Based Carbon Fiber

Tow Size
- Small Tow (≤24k)
- Large Tow (≤24k)

Modulus
- Standard Modulus
- Intermediate Modulus
- High Modulus

Top Companies
- Toray Industries
- Teijin Limited
- Mitsubishi Rayon
- Hexcel Corporation
- SGL Carbon Group

Source: Lucintel
Global Carbon Fiber Opportunities are Evolving From Aerospace Applications to Medical Applications

- **1950**: Carbon fiber was first used by Rolls Royce in their Jet Engines in the year 1967.
- **1970**: CFRP First Used in Jet Engines.
- **1972**: First Carbon fiber used in fishing rod.
- **1973**: First CFRP used in Golf Clubs shafts.
- **1974**: First Carbon composites used in car in mid 1970s.
- **1979**: First carbon fiber used in radio telescope.
- **1982**: Carbon composites was used first time in cargo door of Space Shuttle.
- **1984**: First carbon composites drive shaft was manufactured by Ford.
- **1990**: In 1990, Carbon composites first used in compressor blades of large compressor turbofan for Boeing.
- **1990s**: Guide vanes, and Fairing were also adopted carbon composites in 1990s.
- **2000-2010**: Automotive chassis, roof, trunk lid, radiator core supports were developed by carbon composites in between 2000-2010.
- **2009**: Carbon composites first used in laptop cover in the year 2009.
- **2010**: Carbon composites used in MRI, X-Ray table after 2014.
In this market, Aerospace is the largest end use industry of global Carbon Fiber, whereas PAN Based Carbon Fiber is largest in precursor type.

### Global Carbon Fiber Market by End Use

- **Aerospace**
- **Industrial**
- **Sporting Goods**

### Global Carbon Fiber Market by Precursor Type

- **PAN Based Carbon Fiber**
- **Pitch Based Carbon Fiber**

#### Growth Rate

- **CAGR (2020-26)**
  - Negative: <0%
  - Flat: 0%-3%
  - Growing: >3%

Source: Lucintel
In Terms of Regions, North America Provides the Largest Opportunity for Global Carbon Fiber Followed by Europe and ROW

Source: Lucintel
Most of the Carbon Fiber Manufactures are Backward Integrated in the Carbon Fiber Ecosystem

<table>
<thead>
<tr>
<th>Precursors Manufacturer</th>
<th>Carbon fiber and Intermediate Material Suppliers (Textile, Prepreg, and Compound)</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘TORAY’ Innovation by Chemistry</td>
<td>‘TORAY’ sgl carbon</td>
</tr>
<tr>
<td>HEXCEL</td>
<td>POLYTEC GROUP</td>
</tr>
<tr>
<td>MITSUBISHI RAYON</td>
<td>menzolit Composites Solutions</td>
</tr>
<tr>
<td>TEIJIN</td>
<td>Continental Structural Plastics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part Manufacturers</th>
<th>End Use/ OEMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORTHROP GRUMMAN</td>
<td>BMW</td>
</tr>
<tr>
<td>BENTELER-SGL AUTOMOTIVE COMPOSITES</td>
<td>BOEING</td>
</tr>
<tr>
<td>‘TORAY’</td>
<td>FORD</td>
</tr>
<tr>
<td>MAGNA COSMA INTERNATIONAL</td>
<td>VOLKSWAGEN</td>
</tr>
<tr>
<td>‘TORAY’</td>
<td>TOYOTA</td>
</tr>
<tr>
<td>‘DONG’</td>
<td>JAGUAR LAND ROVER</td>
</tr>
<tr>
<td>‘DOWAKSA’</td>
<td>LUXE</td>
</tr>
<tr>
<td>‘CORE’</td>
<td>CORE MILANO TECHNOLOGIES</td>
</tr>
</tbody>
</table>

Source: Lucintel
Growing demand for lightweight Material and Growth of End Use Industry are Major Drivers of Global Carbon Fiber Market

<table>
<thead>
<tr>
<th>Key Drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Growing demand of lightweight material</strong>: Carbon fibers offers lightweight solution with better stiffness and high tensile for which the demand for this is growing</td>
</tr>
<tr>
<td><strong>Growth of end use industries and emergence of new application</strong>: Growing automotive production and development of advanced aircraft models with higher composite content as well as emergence of new applications are likely to drive the demand for carbon fiber.</td>
</tr>
<tr>
<td><strong>Better Mechanical Properties than other materials</strong>: Carbon Fiber provides better mechanical properties like low weight, high specific stiffness, thermal stability, corrosion resistance which are better than other competing material</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Cost</strong>: High cost of carbon fiber as compared to substitute materials, such as steel and aluminum, is a big challenge</td>
</tr>
<tr>
<td><strong>COVID-19 Impact</strong>: Coronavirus (COVID-19) is having a significant impact on businesses and the economy. Industry growth will witness negative impact in the Year 2020 due to manufacturing lockdown, and labour shortage. It is expected that market will recover from the year 2021.</td>
</tr>
</tbody>
</table>

Source: Lucintel
Production of Low Cost and Growing Initiative for Recycling of Carbon Fiber are some of Emerging Trends in the Global Carbon Fiber Market

Emerging Trends in Global Carbon Market

- **Trend A**: Production of Low Cost Carbon Fiber
- **Trend B**: Growing Initiative for Recycling of Carbon Fiber
- **Trend C**: Joint Ventures of Carbon Fiber Manufacturers with OEMs and Part Fabricators

Source: Lucintel
Developing Capabilities in Recycling Carbon Fiber and Low Cost carbon Fiber manufacturing Provide Strategic Growth Paths

Strategic Considerations in Global Composites Market

- Players of global carbon fiber market can focus to develop an effective process and technology to avoid high degradation of carbon mechanical properties during reclamation
- Research and development activities to develop low cost carbon fiber without losing property.

- Strategic collaborations / acquisitions to increase geographical presence in growing countries like India, China and Indonesia
- Develop alliances to penetrate in new applications

Source: Lucintel
These Insights are Based on Below Market Report from Lucintel. It can help you Identify New Opportunities by Various Segments and Regions

Click for detail: https://www.lucintel.com/carbon-fiber-market.aspx

Market Opportunities

<table>
<thead>
<tr>
<th>Year</th>
<th>Value (US $B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td></td>
</tr>
<tr>
<td>2023</td>
<td></td>
</tr>
<tr>
<td>2024</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td></td>
</tr>
</tbody>
</table>

Market Segment Analysis

- End Use
- Precursor
- Tow Size
- Region

Regional Opportunities

- USA
- Canada
- Mexico
- Germany
- UK
- Japan
- South Korea
- Others

Market Share Analysis

- Player 1
- Player 2
- Player 3
- Player 4
- Player 5
- Others

Other Coverage in Report

- New Product Development
- Company Expansion
- Merger Acquisitions & JV
- Company Profiling

Note: These insights are based on recently launched Lucintel's Report in the Global Carbon Fiber Market, which has 350+ Page and over 150+ charts and tables. Lucintel also offers 10% free customization on above report based on your needs.
Lucintel has an Extensive Toolkit to Address Strategic Questions

Key Questions

- Is market space / opportunity of current product offerings sufficiently robust?
- Market is focus for many: how can my company profitably differentiate?
- Based on our core skills, where should we focus?
- Should we build or buy? Is build even an option?
- What game changer actions exist and/or is a more incremental approach best?
- What is the order sequence of market entry segments / products?
Lucintel - At a Glance

- Premier management consulting and market research firm. Founded in 1998.
- Deep global insights into major industries. Team of over 120 analysts / consultants across globe.
- Management comprised of PhDs, MBAs, and subject matter experts. Headquarter in Dallas, USA.

Conducted 500+ consulting projects across industries for 3M, Audi, Dupont, Carlyle, GE, etc.

**Consulting Services**

- Opportunity screening
- Market entry strategy
- Supply chain analysis
- Growth finance
- Strategic consulting
- Competitive assessment
- Due diligence
- M & A services

**Why Lucintel**

**Trusted insights:** Reliable insights. Widely cited in Wall Street Journal, Financial Times, Forbes, etc.

**Clients we serve:** Over 1000 clients from 70 countries – Fortune 500 companies

**Strategic advice:** Over 20 years of proven global strategic management consulting experience

**Industries Served**
Contact Us

Sanjay Mazumdar, Ph.D.
CEO, Author, & Strategist
Email: sanjay.mazumdar@lucintel.com

Eric Dahl, MBA, Harvard University
Senior Executive Advisor
Email: eric.dahl@lucintel.com

Brandon Fitzgerald
Director of Client Engagement
Email: brandon.fitzgerald@lucintel.com

Nigel O’Dea
Business Development Manager
Email: nigel.odea@lucintel.com