

Global Fiber-Reinforced Plastic (Frp) Recycling Market Forecast 2024-2032

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Report description:

KEY FINDINGS

The global fiber-reinforced plastic (FRP) recycling market is expected to reach \$975.96 million by 2032, growing at a CAGR of 8.19% during the forecast period 2023-2032. The base year considered for the study is 2023, and the estimated period is between 2024 and 2032. The market study has also analyzed the impact of COVID-19 on the fiber-reinforced plastic (FRP) recycling market qualitatively as well as quantitatively.

In terms of volume, the global fiber-reinforced plastic (FRP) recycling market size was 85768.90 tons in 2023 and is expected to reach 172539.79 tons by 2032, growing at a CAGR of 7.79% during the forecast period, 2024 to 2032.

Fiber-reinforced plastic (FRP) recycling refers to the process of reclaiming and reusing materials from products made of FRP composites, which consist of a polymer matrix reinforced with fibers such as glass, carbon, or aramid. The process aims to reduce waste and environmental impact by recovering valuable materials from FRP products, which might otherwise end up in landfills or incinerators.

FRP recycling typically involves methods such as mechanical shredding, pyrolysis, chemical dissolution, or energy recovery to break down FRP materials and extract reusable components like fibers and polymer matrices for incorporation into new products or applications.

MARKET INSIGHTS

Key enablers of the global fiber-reinforced plastic (FRP) recycling market growth:

- Growing accumulation of composite waste
 - o Growing accumulation of composite waste, particularly from carbon and glass fiber composites (CFRP & GFRP), poses a significant global concern. These materials, widely used in industries like wind energy, aerospace, and automotive, are expected to contribute substantially to the waste stream.
 - o According to industry sources, by 2050, the aircraft and wind turbine sectors alone will generate 840,300 tonnes of CFRP waste annually. The surge in composite waste is exacerbated by escalating plastic consumption, which has quadrupled over three decades, leading to inadequate recycling rates.
 - o This escalating crisis underscores the critical role of the growing global FRP recycling market in addressing environmental degradation and fostering sustainability.
- Stringent regulations on composite disposal
- Innovative CFRP reutilization campaigns

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- Heightened environmental awareness

Key growth restraining factors of the global fiber-reinforced plastic (FRP) recycling market:

- Inadequate recycling techniques for CFRP and complex FRP recycling process

o Efficiently recycling carbon fiber-reinforced plastic (CFRP) poses a significant challenge in the global FRP recycling market. Despite the increasing demand for sustainable practices, the unique properties of CFRP, such as its exceptional strength-to-weight ratio, durability, and lightweight nature, present formidable obstacles to traditional recycling methods.

o Separating the carbon fiber from the resin matrix, essential for recycling, requires intricate processes involving mechanical, thermal, or chemical treatments. However, these processes can be costly and energy-intensive, limiting their scalability and cost-effectiveness.

o Moreover, the complexity of fiber-reinforced plastic (FRP) recycling procedures, which often involve multiple steps such as shredding, sorting, and chemical treatment, further complicates the recycling process. The lack of standardized techniques and infrastructure specifically tailored to CFRP recycling exacerbates these challenges, hindering widespread adoption and the realization of its environmental benefits.

- Awareness deficiency regarding CFRP recycling

Fiber-Reinforced Plastic (FRP) Recycling Market | Top Trends

o The FRP recycling market is experiencing a surge in the production and utilization of recycled fiber-reinforced plastic products. This trend is driven by growing environmental awareness and the demand for sustainable materials across various industries.

o Continuous advancements in composite recycling technologies are reshaping the FRP recycling market. Innovations such as improved sorting techniques, mechanical recycling methods, and chemical processes are enhancing the efficiency and scalability of FRP recycling operations.

o Research and development efforts are focused on addressing key challenges in FRP recycling, including the separation of fibers from polymer matrices and the development of novel recycling processes.

SEGMENTATION ANALYSIS

Market Segmentation - Product Type, Recycling Technique, and End-User

Market by Product Type:

- Glass-Fiber-Reinforced Plastic

o Glass-fiber-reinforced plastic is anticipated to be the fastest-growing product type in the market. Glass-fiber-reinforced plastic (GFRP) recycling is vital for managing the environmental impact of this composite material. Through processes like sorting, shredding, and separation, GFRP waste is transformed into reusable materials, reducing the need for virgin resources and minimizing landfill waste.

o The market for GFRP recycling is driven by tightening environmental regulations, heightened awareness of sustainability issues, and advancements in recycling technologies.

o However, challenges remain in the intricate process of separating glass fibers from the polymer matrix, as well as ensuring the quality of recycled materials. Overcoming these obstacles requires ongoing innovation and investment in recycling infrastructure and technology.

- Carbon-Fiber-Reinforced Plastic

Market by Recycling Technique:

- Thermal/Chemical Recycling

- Incineration and Coincineration

- Mechanical Recycling (Size Reduction)

Market by End-User:

- Industrial

- Transportation

- Building and Construction

o In 2023, the majority of the market share was captured by the building and construction segment under the end-user category. The building and construction industry extensively uses FRP materials in applications such as infrastructure, architectural elements, and renewable energy systems.

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o However, the disposal of FRP waste generated during construction and demolition activities poses challenges. Building and construction FRP recycling aims to mitigate these challenges by reclaiming and recycling waste FRP materials for use in new construction projects.

o While key drivers augmenting the segment's growth entail green building initiatives, sustainable construction practices, and demand for recycled materials, challenges include the need for efficient collection and sorting of FRP waste from construction sites. Additionally, compatibility with construction standards and regulations may hinder the expansion of the segment, as well.

- Sports

- Other End-Users

REGIONAL ANALYSIS

Geographical Study based on Four Major Regions:

- North America: The United States and Canada

- Europe: The United Kingdom, Germany, France, Italy, Spain, the Netherlands, and Rest of Europe

o In 2023, the majority of the market share was captured by Europe. European countries like Germany and France have strict regulations regarding waste disposal, pushing companies to find sustainable solutions like FRP recycling. Landfilling FRP waste is often prohibited.

o The European Union (EU) prioritizes transitioning to a circular economy where resources are kept in use for as long as possible. This encourages innovation and investment in recycling technologies, including FRP recycling. The region boasts a well-developed recycling infrastructure for various materials, as well, and this existing infrastructure can be adapted and expanded to handle FRP waste.

o Further, Europe is a leader in environmental technology and research and development. This fosters innovation in FRP recycling technologies, leading to more efficient and cost-effective solutions.

- Asia-Pacific: China, Japan, India, South Korea, Indonesia, Australia & New Zealand, and Rest of Asia-Pacific

- Rest of World: Latin America, the Middle East & Africa

COMPETITIVE INSIGHTS

The major players in the global fiber-reinforced plastic (FRP) recycling market:

- Carbon Fiber Recycle Industry Co Ltd

- Conenor Ltd

- Global Fiberglass Solutions

- MCR Mixt Composites Recyclables

- Mitsubishi Chemical Group Corp (MCGC)

- Neocomp GmbH

- Procotex

Key strategies adopted by some of these companies:

- In October 2023, Toray Industries Inc introduced TORAYCA? T1200 carbon fiber, achieving a record-breaking strength of 1,160 kilopounds per square inch (Ksi), the highest in the world.

- In 2023, C12 Technology and Carbon Conversions Inc (CCI) partnered to innovate groundbreaking new technology and materials, culminating in the creation of the world's first eco-friendly rotational molded carbon fiber products.

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Frequently Asked Questions (FAQs):

- What are the common methods used for recycling fiber-reinforced plastics (FRP)?

A: Recycling methods include mechanical recycling, where FRP waste is shredded and granulated for reuse; chemical recycling, involving the breakdown of polymers into raw materials; and thermal recycling, such as co-incineration with other fuels to recover energy.

- How does the recycling of fiber-reinforced plastics (FRP) contribute to sustainability?

A: Recycling FRP helps in reducing landfill waste and conserving resources by reclaiming valuable materials like fibers and resins.

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This process contributes to environmental sustainability by promoting circular economy principles.

Table of Contents:

TABLE OF CONTENTS

1. RESEARCH SCOPE & METHODOLOGY

1.1. STUDY OBJECTIVES

1.2. METHODOLOGY

1.3. ASSUMPTIONS & LIMITATIONS

2. EXECUTIVE SUMMARY

2.1. MARKET SIZE & ESTIMATES

2.2. MARKET OVERVIEW

2.3. SCOPE OF STUDY

2.4. CRISIS SCENARIO ANALYSIS

2.5. MAJOR MARKET FINDINGS

2.5.1. INCREASING EMPHASIS ON CIRCULAR ECONOMY INITIATIVES

2.5.2. ADVANCING ADOPTION OF FRP MATERIALS

3. MARKET DYNAMICS

3.1. KEY DRIVERS

3.1.1. GROWING ACCUMULATION OF COMPOSITE WASTE

3.1.2. STRINGENT REGULATIONS ON COMPOSITE DISPOSAL

3.1.3. INNOVATIVE CFRP REUTILIZATION CAMPAIGNS

3.1.4. HEIGHTENED ENVIRONMENTAL AWARENESS

3.2. KEY RESTRAINTS

3.2.1. INADEQUATE RECYCLING TECHNIQUES FOR CFRP AND COMPLEX FRP RECYCLING PROCESS

3.2.2. AWARENESS DEFICIENCY REGARDING CFRP RECYCLING

4. KEY ANALYTICS

4.1. KEY MARKET TRENDS

4.1.1. SURGE IN RECYCLED FIBER-REINFORCED PLASTIC PRODUCTS

4.1.2. ADVANCEMENTS IN COMPOSITE RECYCLING

4.1.3. RESEARCH AND DEVELOPMENT TRENDS SHAPING FRP RECYCLING MARKETS

4.2. PORTER'S FIVE FORCES ANALYSIS

4.2.1. BUYERS POWER

4.2.2. SUPPLIERS POWER

4.2.3. SUBSTITUTION

4.2.4. NEW ENTRANTS

4.2.5. INDUSTRY RIVALRY

4.3. GROWTH PROSPECT MAPPING

4.3.1. GROWTH PROSPECT MAPPING FOR UNITED STATES

4.3.2. GROWTH PROSPECT MAPPING FOR UNITED KINGDOM

4.3.3. GROWTH PROSPECT MAPPING FOR INDIA

4.3.4. GROWTH PROSPECT MAPPING FOR LATIN AMERICA, AND THE MIDDLE EAST & AFRICA

4.4. MARKET MATURITY ANALYSIS

4.5. MARKET CONCENTRATION ANALYSIS

4.6. VALUE CHAIN ANALYSIS

4.6.1. RAW MATERIALS

4.6.2. RECYCLING AND DISPOSAL TECHNIQUE

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- 4.6.3. END PRODUCT
- 4.6.4. APPLICATIONS
- 5. MARKET BY PRODUCT TYPE (IN TERMS OF REVENUE: \$ MILLION, IN TERMS OF VOLUME: TONS)
 - 5.1. GLASS-FIBER-REINFORCED PLASTIC
 - 5.1.1. MARKET FORECAST FIGURE
 - 5.1.2. SEGMENT ANALYSIS
 - 5.2. CARBON-FIBER-REINFORCED PLASTIC
 - 5.2.1. MARKET FORECAST FIGURE
 - 5.2.2. SEGMENT ANALYSIS
- 6. MARKET BY RECYCLING TECHNIQUE
 - 6.1. THERMAL/CHEMICAL RECYCLING
 - 6.1.1. MARKET FORECAST FIGURE
 - 6.1.2. SEGMENT ANALYSIS
 - 6.2. INCINERATION AND COINCINERATION
 - 6.2.1. MARKET FORECAST FIGURE
 - 6.2.2. SEGMENT ANALYSIS
 - 6.3. MECHANICAL RECYCLING (SIZE REDUCTION)
 - 6.3.1. MARKET FORECAST FIGURE
 - 6.3.2. SEGMENT ANALYSIS
- 7. MARKET BY END-USER
 - 7.1. INDUSTRIAL
 - 7.1.1. MARKET FORECAST FIGURE
 - 7.1.2. SEGMENT ANALYSIS
 - 7.2. TRANSPORTATION
 - 7.2.1. MARKET FORECAST FIGURE
 - 7.2.2. SEGMENT ANALYSIS
 - 7.3. BUILDING AND CONSTRUCTION
 - 7.3.1. MARKET FORECAST FIGURE
 - 7.3.2. SEGMENT ANALYSIS
 - 7.4. SPORTS
 - 7.4.1. MARKET FORECAST FIGURE
 - 7.4.2. SEGMENT ANALYSIS
 - 7.5. OTHER END-USERS
 - 7.5.1. MARKET FORECAST FIGURE
 - 7.5.2. SEGMENT ANALYSIS
- 8. GEOGRAPHICAL ANALYSIS (IN TERMS OF REVENUE: \$ MILLION, IN TERMS OF VOLUME: TONS)
 - 8.1. NORTH AMERICA
 - 8.1.1. MARKET SIZE & ESTIMATES
 - 8.1.2. NORTH AMERICA FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET DRIVERS
 - 8.1.3. NORTH AMERICA FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET CHALLENGES
 - 8.1.4. KEY PLAYERS IN NORTH AMERICA FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET
 - 8.1.5. COUNTRY ANALYSIS
 - 8.1.5.1. UNITED STATES
 - 8.1.5.1.1. UNITED STATES FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
 - 8.1.5.2. CANADA
 - 8.1.5.2.1. CANADA FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
 - 8.2. EUROPE

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- 8.2.1. MARKET SIZE & ESTIMATES
- 8.2.2. EUROPE FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET DRIVERS
- 8.2.3. EUROPE FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET CHALLENGES
- 8.2.4. KEY PLAYERS IN EUROPE FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET
- 8.2.5. COUNTRY ANALYSIS
 - 8.2.5.1. UNITED KINGDOM
 - 8.2.5.1.1. UNITED KINGDOM FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
 - 8.2.5.2. GERMANY
 - 8.2.5.2.1. GERMANY FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
 - 8.2.5.3. FRANCE
 - 8.2.5.3.1. FRANCE FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
 - 8.2.5.4. ITALY
 - 8.2.5.4.1. ITALY FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
 - 8.2.5.5. SPAIN
 - 8.2.5.5.1. SPAIN FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
 - 8.2.5.6. THE NETHERLANDS
 - 8.2.5.6.1. THE NETHERLANDS FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
 - 8.2.5.7. REST OF EUROPE
 - 8.2.5.7.1. REST OF EUROPE FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
- 8.3. ASIA-PACIFIC
 - 8.3.1. MARKET SIZE & ESTIMATES
 - 8.3.2. ASIA-PACIFIC FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET DRIVERS
 - 8.3.3. ASIA-PACIFIC FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET CHALLENGES
 - 8.3.4. KEY PLAYERS IN ASIA-PACIFIC FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET
 - 8.3.5. COUNTRY ANALYSIS
 - 8.3.5.1. CHINA
 - 8.3.5.1.1. CHINA FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
 - 8.3.5.2. JAPAN
 - 8.3.5.2.1. JAPAN FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
 - 8.3.5.3. INDIA
 - 8.3.5.3.1. INDIA FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
 - 8.3.5.4. SOUTH KOREA
 - 8.3.5.4.1. SOUTH KOREA FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
 - 8.3.5.5. INDONESIA
 - 8.3.5.5.1. INDONESIA FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
 - 8.3.5.6. AUSTRALIA & NEW ZEALAND
 - 8.3.5.6.1. AUSTRALIA & NEW ZEALAND FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
 - 8.3.5.7. REST OF ASIA-PACIFIC
 - 8.3.5.7.1. REST OF ASIA-PACIFIC FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
- 8.4. REST OF WORLD
 - 8.4.1. MARKET SIZE & ESTIMATES
 - 8.4.2. REST OF WORLD FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET DRIVERS
 - 8.4.3. REST OF WORLD FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET CHALLENGES
 - 8.4.4. KEY PLAYERS IN REST OF WORLD FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET
 - 8.4.5. REGIONAL ANALYSIS
 - 8.4.5.1. LATIN AMERICA
 - 8.4.5.1.1. LATIN AMERICA FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES

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- 8.4.5.2. MIDDLE EAST & AFRICA
 - 8.4.5.2.1. MIDDLE EAST & AFRICA FIBER-REINFORCED PLASTIC (FRP) RECYCLING MARKET SIZE & OPPORTUNITIES
- 9. COMPETITIVE LANDSCAPE
 - 9.1. KEY STRATEGIC DEVELOPMENTS
 - 9.1.1. PRODUCT LAUNCHES & DEVELOPMENTS
 - 9.1.2. PARTNERSHIPS & AGREEMENTS
 - 9.2. COMPANY PROFILES
 - 9.2.1. AERON COMPOSITE PVT LTD
 - 9.2.1.1. COMPANY OVERVIEW
 - 9.2.1.2. PRODUCTS
 - 9.2.2. CARBON CONVERSIONS
 - 9.2.2.1. COMPANY OVERVIEW
 - 9.2.2.2. PRODUCTS
 - 9.2.3. CARBON FIBER RECYCLE INDUSTRY CO LTD
 - 9.2.3.1. COMPANY OVERVIEW
 - 9.2.3.2. PRODUCTS
 - 9.2.4. CARBON FIBER RECYCLING
 - 9.2.4.1. COMPANY OVERVIEW
 - 9.2.4.2. PRODUCTS
 - 9.2.5. CONENOR LTD
 - 9.2.5.1. COMPANY OVERVIEW
 - 9.2.5.2. PRODUCTS
 - 9.2.6. GEN 2 CARBON LIMITED
 - 9.2.6.1. COMPANY OVERVIEW
 - 9.2.6.2. PRODUCTS
 - 9.2.7. GLOBAL FIBERGLASS SOLUTIONS
 - 9.2.7.1. COMPANY OVERVIEW
 - 9.2.7.2. PRODUCTS
 - 9.2.8. MCR MIXT COMPOSITES RECYCLABLES
 - 9.2.8.1. COMPANY OVERVIEW
 - 9.2.8.2. PRODUCTS
 - 9.2.9. MITSUBISHI CHEMICAL GROUP CORPORATION
 - 9.2.9.1. COMPANY OVERVIEW
 - 9.2.9.2. PRODUCTS
 - 9.2.9.3. STRENGTHS & CHALLENGES
 - 9.2.10. NEOCOMP GMBH
 - 9.2.10.1. COMPANY OVERVIEW
 - 9.2.10.2. PRODUCTS
 - 9.2.11. PROCOTEX
 - 9.2.11.1. COMPANY OVERVIEW
 - 9.2.11.2. PRODUCTS
 - 9.2.12. TORAY INDUSTRIES INC
 - 9.2.12.1. COMPANY OVERVIEW
 - 9.2.12.2. PRODUCTS
 - 9.2.12.3. STRENGTHS & CHALLENGES
 - 9.2.13. UCOMPOSITES A/S
 - 9.2.13.1. COMPANY OVERVIEW

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9.2.13.2. PRODUCT
9.2.14. VARTEGA INC
9.2.14.1. COMPANY OVERVIEW
9.2.14.2. PRODUCTS

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