

# Innovation Mega Trends in Composites Industry

By Dr. Sanjay Mazumdar, CEO of Lucintel, © Lucintel 2014

## 1 Innovation Mega Trends in Applications

- In the next 50 years, there will be significant innovations in the composites industry across various segments such as automotive, aerospace, wind energy, pipe and tank, pole, construction, etc. Light-weighting and cost reduction are the two mega trends in various segments such as in automotive, aerospace, and wind energy.
- In the automotive industry, there will be many new applications emerging with carbon composites. Government regulations on fuel efficiency are putting pressure on OEMs to make their vehicles lighter. Automakers such as BMW, Mercedes, Ford, and GM are putting effort into incorporation of carbon composites in mass volume cars.
- In aerospace, more carbon composite and nano composite applications will emerge in the future. Boeing 787 and Airbus 350 XB incorporated significant composites in structural parts (about 50% by weight).
- Lockheed Martin has revealed carbon nano-reinforced polymers (CNRP) to replace approximately 100 components made with other composites or metals throughout the F-35's airframe. CNRP offers up to 30% weight reduction at one tenth of the cost of CFRP and has strength that is several times higher.
- The aerospace industry is moving towards more automated tape laying (ATL) and automated fiber placement (AFP) processes to increase throughput.
- In wind energy, there is a growing trend towards developing one-piece and modular wind blade technology.
- Another trend in wind energy is to use carbon fibers in blades as blade lengths are increasing with an increase in turbine capacity.



## 2 Innovation Mega Trends in Fibers

- Significant innovation is expected in future development of low-cost carbon fibers for automotive, wind and industrial applications. Low-cost alternative precursors such as Textile PAN, lignin, and polyolefin are being considered for development. Also there is focus on reducing energy cost.
- Continuous innovation is expected in development of high performance glass fibers to meet higher mechanical and chemical requirements.
- Focus on green materials would give momentum to development of high strength natural fiber to increase penetration in Automotive, Construction, and other industries.

## 3 Innovation Mega Trends in Resin

- More and more new product launches in resin will focus on shorter cure time in the range of 1-2 minutes for mass volume applications. Momentive and Huntsman have developed epoxy resin systems with short cycle times for High Pressure Resin Transfer Molding (HP-RTM) and Compression Molding.
- There is an increasing trend towards development of resins with optimum gel times for long wind blades.
- Low-cost and high strength nano-resins will gain traction in future wider applications.
- The use of bio resin is seeing a continuous uptrend in different applications due to growing environmental concerns.

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## 4 Innovation Mega Trends in Cores

- Significant requirements for lighter weight in structural components while maintaining mechanical properties is expected to create greater opportunities for core materials.
- Lower density with high shear strength core materials for longer wind blades is the innovation trend.
- Low density with high tensile strength core materials for automotive applications is another future trend.

## 5 Innovation Mega Trends in Composites Technology

- Lucintel expects significant innovation mega trends in composite technologies targeting faster cycle time, better product quality, lower capital, and lower processing cost.
- A major composites technology challenge is to achieve the targeted 1-2 minutes cycle time for mass volume automotive applications and it is expected to be addressed in near future with the advent of technologies such as High Pressure Resin Transfer Molding, Compression Molding, CFRTP, Pressure Press, Forged Composite, etc.
- There would be a growing trend towards development of processes with the combined capabilities of AFP and ATL for reduction in capital cost and in improving throughput.
- Improved techniques for carbon composites recycling to strengthen life cycle robustness is another mega trend. A recent example is the Closed Loop Recycling technique for BMW i3 carbon fiber composite parts.
- Notable efforts are expected in the development of better weaving techniques for carbon fiber addressing the challenge of lower compressive strength for wind blade applications.
- Inline compounding (ILC) system such as D-LFT, D-GMT, and D-SMC is expected to gain momentum for better operational efficiency and lower operational cost
- A shift towards Out of Autoclave (OOA) processing is expected to mitigate capital cost, cycle time, and energy cost.

## 6 About Author and Lucintel



### About Author:

Dr. Sanjay Mazumdar is an accomplished Author, Speaker, Thought Leader and Strategist. Dr. Mazumdar has more than 15 years of management consulting and market research experience and is CEO of Lucintel. He has led Lucintel in diverse projects such as strategic growth consulting, M & A, due diligence and opportunity analysis. He is a subject matter expert for composites, aerospace, automotive, & energy industries, and authored a book titled "Composites Manufacturing". He provided advisory services to hundreds of small to Fortune 500 clients such as 3M, Audi, Carlyle, Cytec, Evonic, GE, Mitsubishi, & Momentive.

### About Lucintel:

**Vision:** Passion for data, insights, strategy, and innovation. Empower companies to take better decisions.

**History:** Founded in 1998. Over 120 full time analysts/consultants. Global presence.

**Industry Leadership:** Over 1000 clients across globe. Fifteen years of proven management consulting & market research experience.

**Services:** Lucintel offers growth strategy, market entry strategy, M & A services, due diligence, and opportunity screening. Contact us by email at [helpdesk@lucintel.com](mailto:helpdesk@lucintel.com)

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