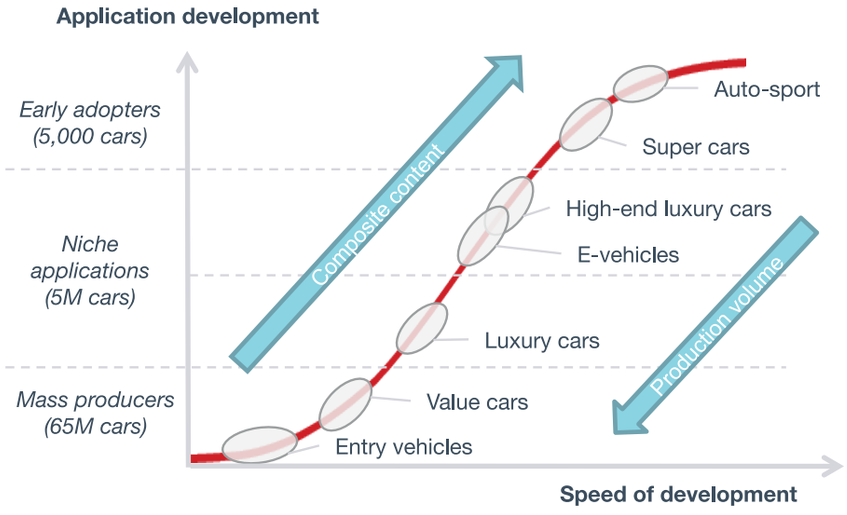
The transforming automotive market: Is the time right for carbon fibre?

FutureMaterialsGroup

The automotive market is still growing steadily across all platforms but it may be at a pivotal point in its history. Expanded regulatory requirements and a shift in consumer demand are uniting to bring about a change in product mix and an increase in lighter, more sustainable vehicles and electric cars. This is driving greater use of lightweight materials, including carbon fibre.

Lightweighting is one solution automotive OEMs are pursuing in order to reduce their fleet emissions in line with more severe environmental regulations, and lighter weight structures are essential to counteract the heavy batteries employed in electric vehicles. Enhanced vehicle performance and image, part consolidation and reduced tooling cost are further benefits of carbon fibre composites, but considerable barriers exist in increased part cost and poor recyclability. A complex industry transformation would also be required.

The nascent automotive market for carbon fibre composites is very diverse and fragmented



Examples of materials	Material value ($/kg)	Role	Performance	Volume production
CF reinforced thermoset prepregs	20	Structural	High	Few hundreds/year
Thermoplastic prepregs	20			
Long fibre materials	10			
Moulding compounds	5	Semi structural	Low	>15,000/year

Source: FMG analysis

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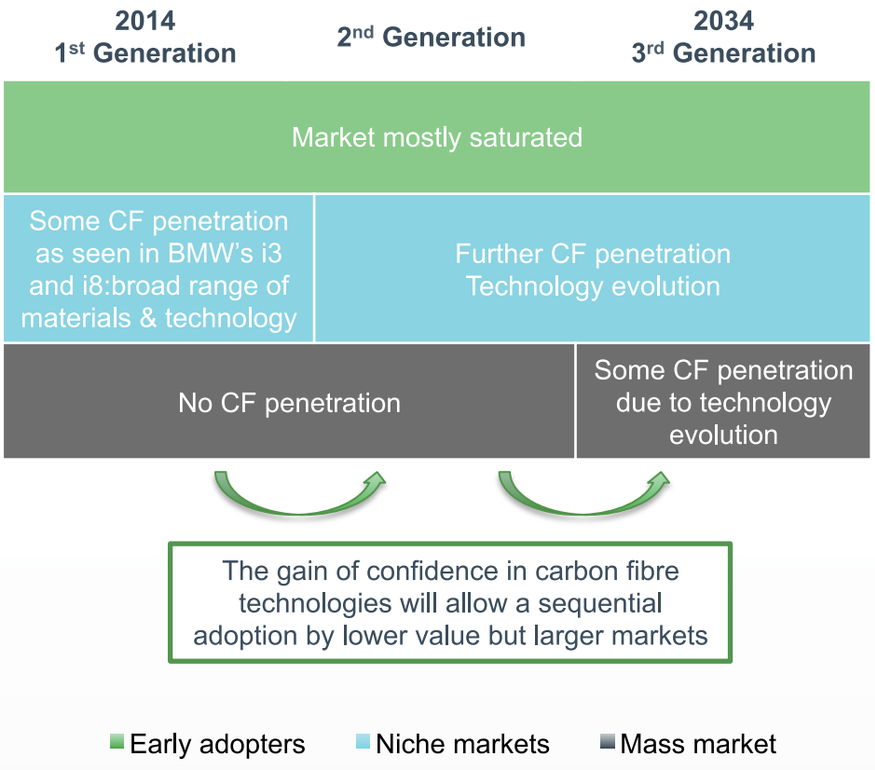
Carbon fibre composites represent less than 0.1% of today's automotive materials market. The low volume motorsport and supercar segments have employed carbon fibre for many years, and it is now beginning to find a place in niche vehicles such as luxury cars and electric vehicles. A variety of carbon fibre materials can be used, ranging from aerospace-grade thermoset prepregs for structural applications, through to low cost moulding compounds suitable for semi-structural, higher volume parts. Currently no carbon fibre is present in entry-level cars. However, its increased penetration in the next generations of niche cars will lead to more confidence in carbon fibre technologies and allow a sequential adoption by the lower value, but larger, market segments.

Generational change could bring technological advances which would radically transform the carbon fibre market



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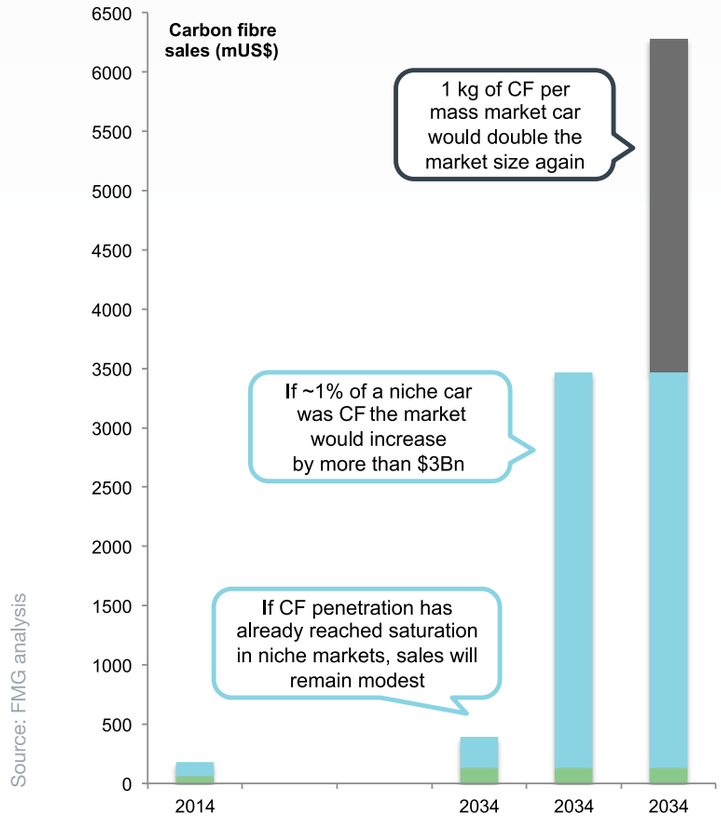

Potential growth scenarios for the automotive carbon fibre market

Because of the size of the automotive market just a small penetration of carbon fibre composite would lead to a relatively high increase in carbon fibre demand. According to FMG's research, in a scenario where just 1% of a niche car was made of carbon fibre the automotive market for carbon fibre would grow exponentially from US$250 million today to $3 billion in the next 20 years. In a scenario where 1 kg of carbon fibre were included per mass market car the market would double again to a $6.5 billion.

To satisfy this level of demand the carbon fibre industry would need to build a new carbon fibre line every two months, representing a Capex investment of over $13 billion over the next 20 years. It would also have to switch its focus from aerospace-grade small tow carbon fibre to large tow fibre suitable for higher volume applications.

"Obviously these numbers point towards a very big investment opportunity for the carbon fibre industry, but there is a lot of risk in this," comments Dr Myriam Yagoubi, Research Analyst at FMG. "However, if even half of our predictions come true, then in 20 years the automotive market for carbon fibre would be five times bigger than that of the aerospace market."