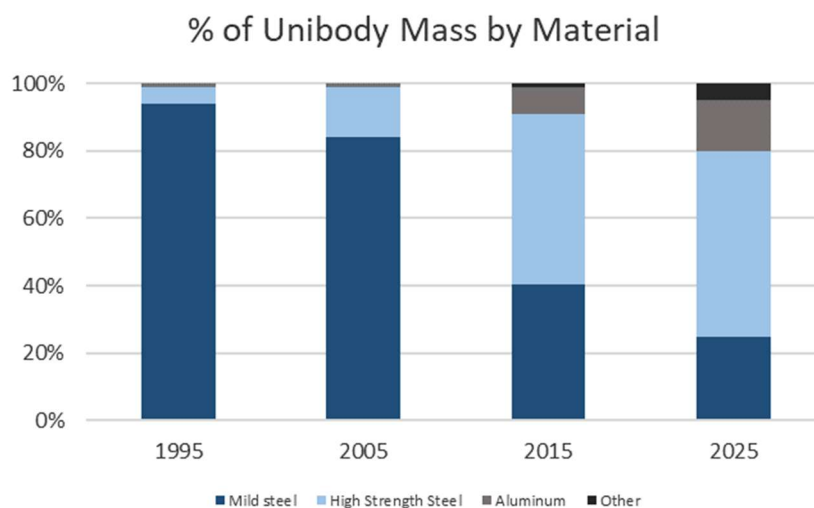


**By Marc Benevento**  
**Industrial Market Insight**

## **Automotive composites outlook**

Composites account for about 1% of the average vehicle, by weight, and remain a niche material in the industry, despite the fact that 4 billion pounds of composite materials are sold into automotive applications on an annual basis. While optimism about the growth prospects of composites is warranted due to regulatory and technological drivers, barriers to adoption of composites remain to be overcome, and market conditions will create a challenging environment for suppliers to the industry over the next few years. Composites will win new applications, but will remain in a niche position in the market. Like other materials, composites will be selected for use only when they offer superior value, in terms of overall cost, weight, and performance, versus the competition. The primary drivers and barriers to the adoption of composites in automotive applications are discussed below.

**Figure 1**

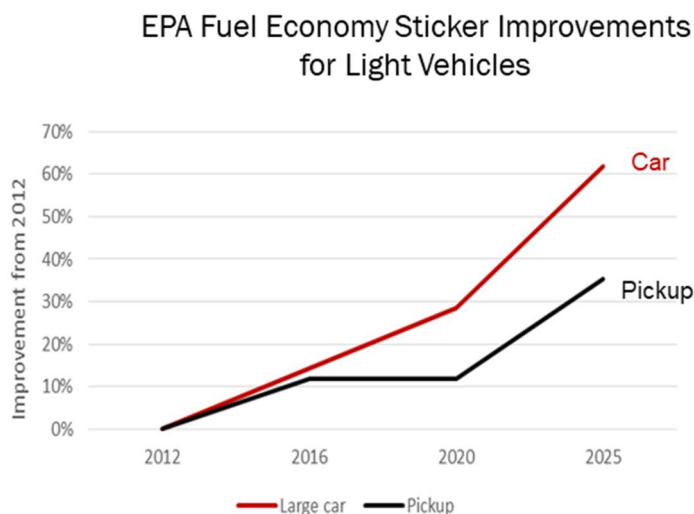


## **Global fuel economy standards -- Driver**

In North America and elsewhere, allowable carbon dioxide emissions from light vehicles continue to decrease, requiring automakers to develop vehicles that are more fuel efficient. Figure 1 shows the percentage that EPA fuel economy ratings will change versus a 2012 baseline. OEMs are pursuing multiple paths to reach these aggressive targets, among which is reduction of vehicle mass. Vehicle mass reduction is a desirable avenue to achieve fuel economy because mass reduction is accompanied by dynamic performance improvements. As a rule of thumb, a 10% reduction in vehicle mass yields a 7% increase in fuel economy. In addition, lighter vehicles require less power to accelerate, so they remain fun to drive when paired with smaller, fuel-sipping engines. As a result, OEMs are investing in lightweight materials to deliver efficient, yet exhilarating

vehicles. Composites will play a role, the significance of which will be dictated by the value they deliver versus other materials along with their ability to fit into the automotive infrastructure.

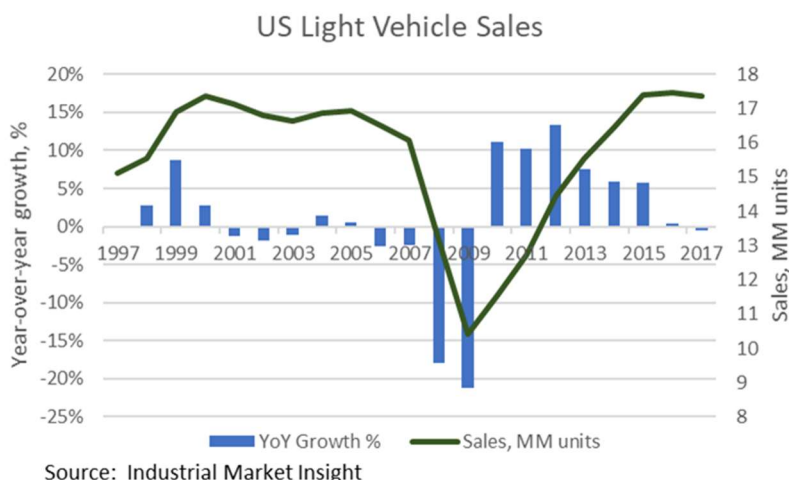
Figure 2



### Declining sales growth rate -- Barrier

Automotive suppliers have enjoyed consistent market growth since light vehicle sales in North America bottomed out at 10.4 MM vehicles in 2009. As shown in Figure 2, vehicle sales showed consistent year-over-year growth from 2010-2015, with annual rates of change well above GDP growth rates during that time. In 2015, vehicle sales topped 17 MM units, which has been the sustainable level of demand in non-recessionary periods. Although sales have remained strong in 2016 and 2017, staying above the 17 MM unit mark, year-over-growth is flat. With little headspace for the market to grow in the next few years, suppliers looking for growth will have to fight for market share with both direct and indirect competitors.

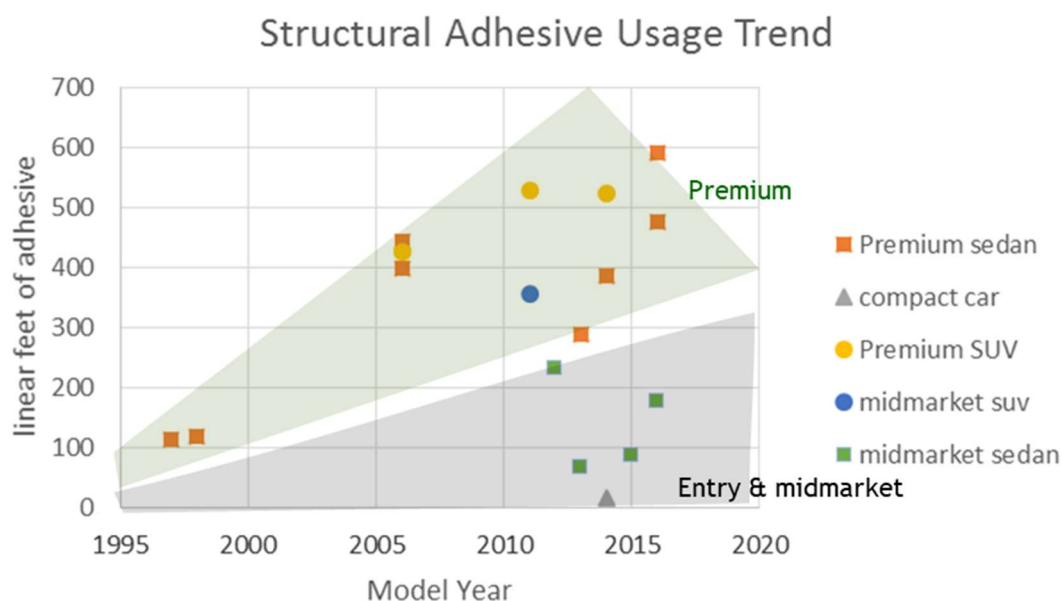
Figure 3



## Enabling Technologies -- Drivers

A long-time challenge facing the composites industry has been compatibility with joining and painting processes that were developed for metals. However, the search for weight reduction has forced OEMs to get more creative with the use of conventional materials and to consider combinations of steel, aluminum, and composites that would have been inconceivable not too long ago. The use of structural adhesives, both as a primary joining method and in concert with spot welding and riveting, has enabled a great deal of this lightweight innovation. Figure 3 shows the trend in structural adhesive use in automobiles over the past 22 years, and consumption of structural adhesive is rising rapidly, particularly in premium vehicles. It is now common for premium vehicles to contain several hundred linear feet of structural adhesives, along with spot welds or rivets. Greater presence of structural adhesives in manufacturing plants and comfort with adhesive bonding of primary structures is a gateway to widespread adoption of composites in automobile bodies.

Figure 4



Structural adhesives are growing most rapidly in premium vehicles

Source: Industrial Market Insight

## Competition -- Barrier

Suppliers to the automotive industry know the competition for business is fierce. Steel has long been the material of choice for OEMs, and the incumbent enjoys the advantage of an established manufacturing infrastructure and a low-cost position. The steel industry has not rested on its laurels, and has continued to improve, raising the bar for materials hoping to displace it. Despite these efforts, aluminum gained significant market share as OEMs placed a higher premium on weight reduction. Aluminum has been the big winner of the automotive weight reduction game, due to its familiar processing, compatibility with automotive paint systems, and “next best” cost position when compared to steel. Suppliers of competing materials, including composites, will

need to demonstrate they have superior solutions to steel and aluminum in terms of weight, performance, and cost in order to win applications. This includes demonstrating the ability to meet automotive cycle times, cost, and end-of-life concerns.

## **Outlook**

The automotive market is a challenging environment, but composites are well positioned to gain share in the coming years. Composites offer a compelling combination of cost, weight, and performance, particularly when designs are created that take full advantage of composite material and processing techniques. New designs can result in dramatic weight decreases at minimal cost, but the “clean sheet” design approach required elevates the risk, effort, time, and overall cost required to bring solutions to market in the automotive industry. Suppliers that diligently validate their value proposition before investing human and financial capital will get the best returns in this competitive market.

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