



Automotive

Vehicle weight reduction



This consists of **developing lighter materials** to lighten vehicles and thereby reduce the impact that their weight has on the **consumption of fuels and energy sources**. Reducing overall vehicle weight is one of the most effective ways to improve mileage from fuel, but there are other options that contribute to this ultimate objective, such as incorporating hybrid powertrains, reducing the size of the engines or the number of cylinders (downsizing). To reduce vehicle weight, **plastic and aluminium** stand out among the lightest materials. In the plastics industry, the **application of composites** is particularly relevant.

ORIGIN OF THE INVESTMENT OPPORTUNITY



ECONOMIC/BUSINESS



DEMAND



REGULATIONS



TECHNOLOGY

Reducing vehicle weight is one of the main objectives of car manufacturers to meet **global environmental regulations** such as the Kyoto Protocol, the rules of the European Commission or the US Corporate Average Fuel Economy (CAFE) establish CO₂ emissions standards from industry for 2020.

Specifically in Europe, the use of cars accounts for 12% of total emissions of CO₂ (the main greenhouse gas). Therefore, in order to reduce **energy dependence, pollution and improve the future competitiveness** of the automotive industry and transport in the future, the European Union establishes the maximum emissions of new cars that are manufactured to be 95 g/km of CO₂ by 2020.

Spain has set the aim of building 3 million vehicles again in 2017 (*Plan 3 Millones*), supported by the investments announced by manufacturers and new models allocated to Spanish factories. To achieve this, production needs to increase to 200,000 units annually.

LOCATION OF THE INVESTMENT OPPORTUNITY IN THE SECTOR VALUE CHAIN

Components industry

Assembly industry

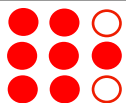
Commercialisation
and sales

After-sales service and
maintenance

The use of lightweight materials to reduce vehicle weight, and thus the emission of polluting gases, requires the **introduction of new components suppliers in the manufacturing process** as well as new functionality of lighter materials. To do this, vehicle manufacturers should contact auxiliary industries that supply the automotive industry.

DIFFERENTIATING FACTORS OF THE INVESTMENT OPPORTUNITY

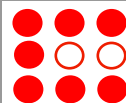
CONSUMER/USER



Innovation
Price
Quality

- Reducing fuel consumption allows cost savings for vehicle use. It is estimated that **for every 10% that weight is reduced, fuel use will improve about 7%**. Achieve a longer distance without recharging the battery in electric cars.
- Improved vehicle performance.** A reduction in mass significantly dampens noise, vibration and softens the ride.

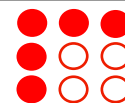
COMPANY/INNOVATION



Operations
Supplies
New business lines

- Compliance with **environmental regulations**, avoiding payment of fines and penalties for exceeding emissions limits.
- Development and involvement of the whole value chain** (raw materials, components and assembly industries).
- Improved **corporate image** because of concern for environmental sustainability.

SOCIETY



Environment
Well-being
Safety

- Reducing **greenhouse gas** emissions.
- Reducing **air pollution and resulting costs** in healthcare. It is estimated that the total benefits of improved air quality in the European Union could reach **88 billion euros per year by 2050**.
- Ecosystem improvement and global warming relief.

INVESTMENT OPPORTUNITY LIFE CYCLE

DEVELOPMENT

INTRODUCTION

GROWTH

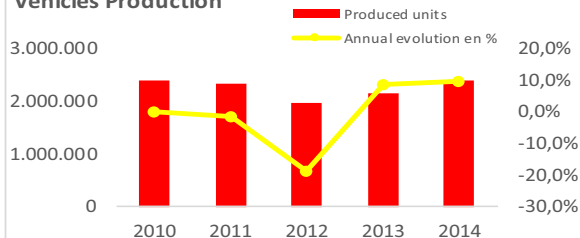
MATURITY

It is anticipated that by 2020 **the total weight of steel will decrease to 46%** of the total weight of the vehicle. It currently represents 56% on average. Whereas, for the same dates, it is estimated that the **aluminium engine blocks will represent 69%** of global production of these components against 59% today. Recently, **various projects have been carried out and various technologies developed that will incorporate composites reinforced with carbon fibre** in the large-scale manufacture of vehicles, which until now was limited to the construction of the structure of cars in the early stages of technical development. It is expected that in **2030** the automotive industry will use composites in complying with environmental regulations.

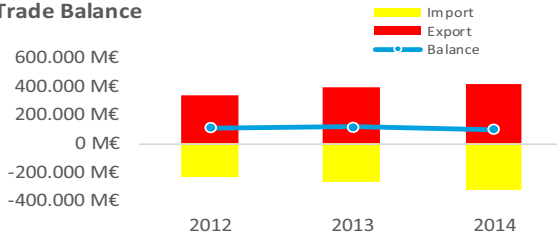
Sources: SERNAUTO. CARBURES.

CHARACTERISTICS OF THE AUTOMOTIVE SECTOR ⁽¹⁾

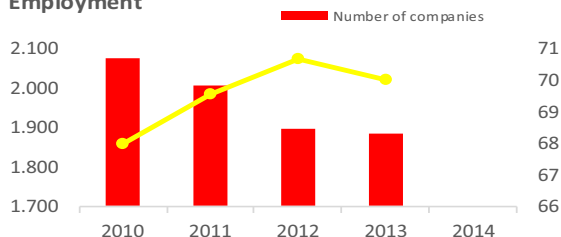
Vehicles Production



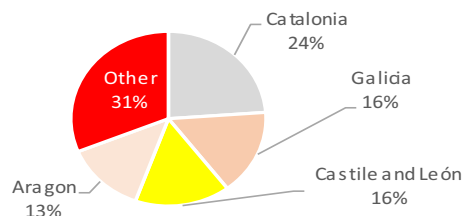
Trade Balance



Employment



Territorial distribution of turnover (2014)



SUPPLY

TOP 5 COMPETITORS IN SPAIN

#	Company	Net sales	Last available data
1	Hexcel Composites	€153.65 M	2013
2	Carbures	€22.19 M	2013
3	Constellium*	N. avai.	-
4	Sapa Group*	N. avai.	-
5	DowAksa*	N. avai.	-

* Data not available in the queried database. SABI.

DEMAND

GROWTH

- The aluminium industry predicts that the demand for this metal **from carmakers will double by 2025**, due to the demands of fuel consumption in the United States and the European Union.
- The third biggest market for the potential growth of **carbon fibre and carbon fibre reinforced plastics** is the Automotive sector. It is anticipated that by 2020, the sector will consume about 23,000 tons of carbon fibre.

SUCCESS STORIES



Recently at its El Burgo de Osma (Soria) plant, **Carbures**, a multinational specialised in the manufacture of parts and structures with carbon fibre, unveiled a line capable of producing **75,000 carbon fibre structural car pieces** annually, opening up an **international market with a potential turnover of 800 million**. This Carbures facility uses the Rapid Multi-Injection Compress Process technology that means that a line can manufacture car parts in carbon fibre at the same speed as traditional metal components. This plant will be the **only one in the world** that can currently produce parts with carbon fibre, except for BMW in Germany.



Ford and DowAksa are driving a joint research project to develop manufacturing techniques for large volumes. The goal is to get **lighter vehicles** that allow more efficient consumption, better performance and competition by creating lighter parts than those made from steel but without sacrificing the properties of strength and endurance. One example is the **Ford Lightweight Concept Fusion**, in the manufacture of which lightweight materials such as aluminium, high-strength steel, magnesium, composites and carbon fibre are used for almost every vehicle system, successfully **reducing the weight of the car by almost 25%**.



The Andaltec technological centre for plastics participates in the European project PMjoin which, led by the Basque Tekniker-IK4 technological centre, aims to develop a system for **joining plastic to metal** using laser technology contributing to lighter and cleaner vehicles. The current development of technology is based on the use of adhesives or mechanical bonds, or a combination thereof, which requires a series of assembly operations. The aim is to reduce the weight of the polymer components by inserting those pieces that have lower mechanical requirements, so that the complex process of transformation required by metals is eliminated while design specifications are still met.