

# Lightweighting: a solution to low carbon mobility

Policy options for the revision of regulation 2009/443

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## Background

The new strategy on low-emission mobility presented by the European Commission in July 2016 frames the legislative steps that must be taken at European level to decarbonise the transport sector. Europe is not on the right track to reach its objective of reducing CO<sub>2</sub> emissions from transport by 60% by 2050, compared to 1990 levels; emissions from transport have even increased by 20% since 1990.

To take the next step in fuel efficiency for cars, it is fundamental to use all available technologies to reduce the energy consumption. Lightweight materials like aluminium have significant potential to deliver low carbon mobility solutions and to decouple growth in transport demand from an increase in CO<sub>2</sub> emissions.

The revision of the Regulation 2009/443 limiting CO<sub>2</sub> emissions from cars and vans gives an opportunity to consider lightweight materials as part of the solution. The current system, based on the mass of the vehicle, does not enable car manufacturers to reap the full benefits of lightweight solutions.

The new regulation should instead remain technology neutral and give car manufacturers the possibility to invest in the most cost efficient solutions to reach their CO<sub>2</sub> reduction objective.

## Our focus

The potential of lightweight solutions should be considered in the next revision of regulation 2009/443 for 2025 targets to further contribute to a low-emission mobility in Europe.

### ➤ **Option 1: Move from a mass to a footprint based system**

To reach future CO<sub>2</sub> targets in the most cost efficient manner, the potential of lightweighting solutions should be better taken into account. The current system leads to a paradox, as heavier cars are allowed to emit more CO<sub>2</sub> emissions than lighter cars. On the contrary, a footprint based system – referring to the space between the four wheels – is technology neutral and would ensure car manufacturers to get the full benefit of their investment, no matter the technology that is chosen.

The mass based regulation has not allowed car manufacturers OEMs to fully benefit from lightweighting. Most of the progress towards meeting the CO<sub>2</sub> targets have instead been realised through powertrain technologies and other innovations geared at improving vehicles' fuel economy. A study<sup>1</sup> by Ricardo-AEA showed that switching to a footprint

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<sup>1</sup> Study for the European Commission by AEA Ricardo:

[https://ec.europa.eu/clima/sites/clima/files/docs/0103/downweighting\\_en.pdf](https://ec.europa.eu/clima/sites/clima/files/docs/0103/downweighting_en.pdf)

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based regulation for a 2025 CO<sub>2</sub> target would in fact be 16% cheaper on average for car manufacturers than maintaining the mass based system. The revision of the new CO<sub>2</sub> standards for cars and vans is the opportune time to change the original design of the European fuel economy legislation and the parameter on which it is based.

### ➤ **Option 2: Phase out the mass based correlation**

The mass based correlation of the CO<sub>2</sub> target could also be phased out by basing future targets on the same percentage reduction for all manufacturers. Asking all individual manufacturer groups to reduce their emissions by X% between 2021 and 2025 would give the manufacturers full flexibility to choose their CO<sub>2</sub> reduction strategy. Lightweighting and engine efficiency improvement would be treated equally, ensure technology neutrality and higher cost-efficiency.

Our industry is ready to discuss other solutions to better take into account the potential of lightweight solutions in the regulation, e.g. through eco-innovation or other measures.

## Why lightweight materials like aluminium can accelerate the transition to low emission mobility

- **Europe needs lighter vehicles to further decarbonise transport:** Today, an average European car contains 150 kg of aluminium. Projections show that aluminium content in cars could grow to almost 200 kg by 2025 if lightweighting is not discouraged by European legislation. Using 200 kg of aluminium in a car reduces the CO<sub>2</sub> emissions by up to 16 grams per kilometre.
- **Weight reduction solutions can boost intelligent and electrified mobility, preventing excessive weight increase:** With the high battery prices today, lightweighting can be used to improve the range of the vehicles or to reduce the battery capacity and price of electric vehicles. Both are important factors in increasing customer acceptance of electric vehicles.
- **Lightweighting is a strategic priority for the European car industry:** If European legislation does not encourage innovation also on the material side, European manufacturers risk losing their competitive advantage on lightweight materials. Other important regions like the US – the second largest car market in the world – uses footprint as the basic metric of their fuel economy legislation, which has triggered an acceleration of the use of lightweight technologies.
- **Lightweighting vehicles matters for consumers:** Thanks to the lower fuel consumption of a lighter vehicle, the break-even point for CO<sub>2</sub> emissions can come as fast as 5,000 km. Consumers will benefit from a lower fuel bill throughout the life of the vehicle. Lighter vehicles are also delivering fuel efficiency improvements in all conditions, independent of road conditions or test cycles. Lightweighting also enhances road safety for both

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occupants and for vulnerable road users alike as it reduces the crash energy in case of a collision and shortens braking distance.

- **Fully recyclable materials like aluminium are key to delivering on the overall ambition of circular economy and climate change agendas.** Recycling aluminium saves 95% of the energy used for primary production. Today, more than 90% of the aluminium included in a car is actually recycled when the car has reached its end of life in Europe. The scrap generated during the production process is also fully recycled and can be used over and over again for new car parts or other aluminium components without any loss of properties.

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