

# Lightweighting: a solution to low carbon mobility

Making every gram CO<sub>2</sub> saving count

March 2018

## Background

Transport remains the only sector in Europe where CO<sub>2</sub> emissions are not falling. Rather, they continue to grow. In a race against time, every gram of CO<sub>2</sub> saved can make a difference. Aluminium contributes directly and effectively to cleaner mobility by making vehicles lighter. A lighter car is always more efficient, irrespective of whether it runs on petrol, diesel or electric power. A future-proof regulation should therefore encourage car manufacturers to reduce vehicle weights to improve efficiency and reduce CO<sub>2</sub> emissions.

Revising Regulation 2009/443, which sets targets for CO<sub>2</sub> emissions from cars and vans, presents an ideal opportunity to consider the contribution of weight reduction to low carbon mobility. The European Commission's proposal, presented on the 8 November 2017, misses an opportunity to introduce genuine technology neutrality and ensure that every gram of CO<sub>2</sub> saving is valued equally.

## Our focus

Making cars lighter is a highly efficient way of reducing their CO<sub>2</sub> emissions. For example, lowering weight by 100 kg for a petrol-driven car reduces the CO<sub>2</sub> emissions by as much as 8g/km. However, the current system, which is based on the mass of the vehicle, does not permit car manufacturers to reap the full benefits of using lightweight solutions. In fact, a manufacturer that reduces the weight of their vehicles will, in return, see their target tightened.

This has prevented car manufacturers from fully embracing the benefit of lightweighting. Most progress towards meeting CO<sub>2</sub> targets have instead focused on advances in powertrain technologies and other innovations geared at improving vehicles' fuel economy.

Distributing the burden between manufacturers based on vehicle mass also makes less sense when increasing numbers of cars are electrified. As large batteries can make many alternatively-powered vehicles heavier, the result is that manufacturers can distort their specific fleet target by introducing low-emitting, but heavy, electric or hybrid vehicles.

Several studies<sup>1</sup> - most of them published by DG CLIMA - demonstrate that using a mass-based approach is not the most cost-effective fashion for vehicle manufacturers to reach their CO<sub>2</sub> reduction objectives. In fact, they show that, for a 2025 CO<sub>2</sub> target, removing the mass-based correlation would actually make the regulation more cost effective for manufacturers.

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<sup>1</sup> [CE Delft: Assessment of the Modalities for LDV CO<sub>2</sub> Regulations beyond 2020](#)

[ICCT White paper CO<sub>2</sub> reduction technologies for the European car and van fleet, a 2025-2030 assessment](#)

[Ricardo – AEA, Improving the understanding of the potential for weight reduction in cars and vans](#)

[Ricardo – AEA Assessing the impacts of selected options for regulating CO<sub>2</sub> emissions from new passenger cars and vans after 2020](#)

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However, some of the conclusions in the Commission's impact assessment are the opposite of those studies, ignoring the fact that the cost of meeting the target are significantly lower when using a vehicle footprint-based approach – i.e. basing it on the size of the vehicle, rather than the weight.

### Our proposal

This revision of the CO<sub>2</sub> standards for cars and vans is the ideal time to remove the mass-based utility parameter once and for all. At the same time, it presents an opportunity to make the regulation future-proof, technology-neutral and more cost-effective. The alternative to a mass-based regulation is either to change the utility parameter to the footprint or to remove the utility parameter completely. Both options would offer greater incentives for manufacturers to reduce the mass of their vehicles.

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

A footprint-based system– is technology neutral. It would ensure that car manufacturers get the maximum return on their investment in lightweighting, irrespective of the engine technology chosen.

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

The mass-based correlation with the CO<sub>2</sub> target could also be phased out by giving all manufacturers a Uniform Reduction target. This could be set as an equal percentage reduction for all manufacturers, based on their 2021 target measured with WLTP.

The mass-based correlation could also be phased out by setting a Uniform Target for all manufacturers, meaning that they will all have the same CO<sub>2</sub> target for 2025 and 2030.

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

- **Europe needs lighter vehicles to further decarbonise transport:** Aluminium automotive components can be up to 50% lighter than steel components. Currently, the average European car contains 150kg of aluminium. Assuming European legislation does not discourage lightweighting; projections show that the aluminium content in cars could reach almost 200kg by 2025. 200 kg of aluminium makes the car 200 kg lighter and would reduce CO<sub>2</sub> emissions by up to 16 grams per kilometre.

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- **Weight reduction can boost intelligent and electrified mobility by minimising excessive weight:** With current high battery prices, lightweighting could reduce the battery capacity required and therefore the price of electric vehicles. Alternatively, it could improve the existing range of electric vehicles. Both are important factors in increasing the acceptability of electric vehicles for users.
- **Lightweighting is a strategic priority for the European car industry:** If European legislation fails to encourage continued innovation on the material side, European manufacturers risk losing their competitive advantage in lightweight materials. Other important regions, such as the US – the second largest car market in the world – use the footprint as the basic metric of their fuel economy legislation. This is accelerating the uptake of lightweight technologies.
- **Lightweighting of vehicles matters for consumers:** Thanks to the lower fuel consumption of lighter vehicles, the break-even point for CO<sub>2</sub> emissions can come as early as 5,000 km. Consumers will benefit from lower fuel bills throughout the life of the vehicle. Lighter vehicles also deliver their fuel-efficiency improvements in all conditions, irrespective of road conditions. Lightweighting also increases road safety both for occupants and for vulnerable road users by shortening braking distances and by reducing the crash energy in the event of a collision.
- **As a fully recyclable material, aluminium is key to delivering on the overall ambitions of the circular economy and climate change agendas:** Recycling aluminium uses only 5 per cent of the energy needed for primary production. Currently, more than 90 per cent of the aluminium included in a car in Europe is recycled at end of life. The scrap generated during the production process is also fully recycled and can be used repeatedly for new car parts or other aluminium components without any deterioration in performance.

For further information, please contact:

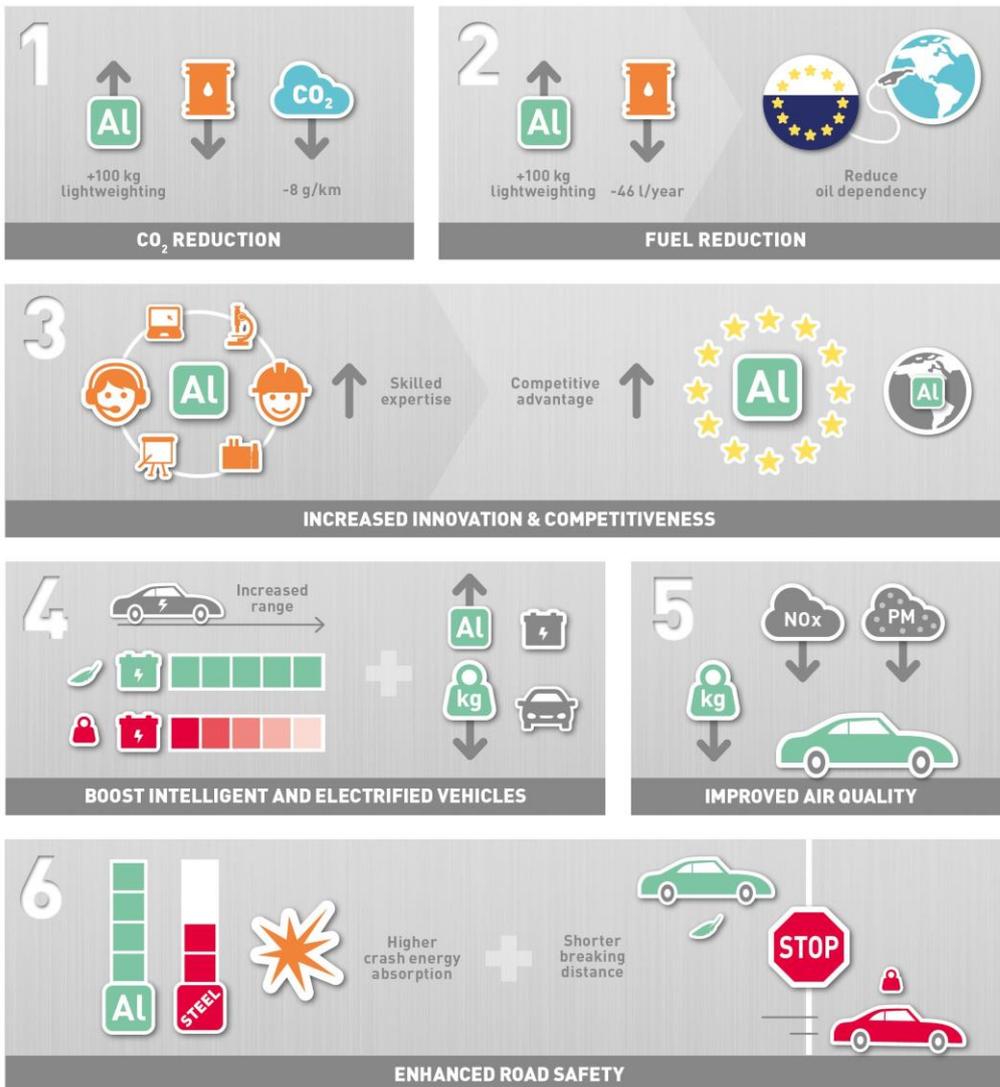
Patrik Ragnarsson, Senior Manager Automotive & Transport Group

Email: [ragnarsson@european-aluminium.eu](mailto:ragnarsson@european-aluminium.eu)

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## 6 Powers of #LightMobility

Lightweighting vehicles offers Europe the opportunity to accelerate the shift towards low-emission mobility. By making vehicles lighter using lightweight materials such as aluminium, they use less fuel and emit fewer emissions without compromising safety. From diesel to electric, lightweighting makes all cars more efficient!



For more information, contact Patrik Ragnarsson, Senior Automotive & Transport Manager: ragnarsson@european-aluminium.eu