

# ALUMINIUM: BENEFITS IN TRANSPORT

quantifying the in-use benefits of aluminium in all forms of transportation



Tramlink Nottingham

Reducing the weight of transportation vehicles is an important method of improving fuel efficiency – reducing energy consumption and greenhouse gas emissions.

All aluminium bodied Alstom Citadis 302 Trams in Nottingham, England.



A Nottingham NET Citadis 302 Tram built by Alstom in 2014, with an all aluminium body.



Michael Stacey

Advanced aluminium alloys are used in the wings and fuselage of Airbus A380 jetliners, Paris Air Show 2015.



master films / P.Pigeyre

The 20 million tonnes of aluminium used in transport today could save 400 million tonnes CO<sub>2</sub> and over 100 billion litres of crude oil over the vehicles' lives.

Aluminium is a key material, 1 kg of aluminium replacing heavier materials in a car or small truck can save a net 20 kg of CO<sub>2</sub> over the life of the vehicle or up to 80 kg CO<sub>2</sub> in trains.

Alcoa aluminium coils in Davenport, Iowa.



Alcoa

Aluminium is almost infinitely recyclable making the full life cycle cradle to cradle rather than cradle to grave. Recycled aluminium requires only 5% of the energy of primary production.



Cycles Devinci

Aluminium is used by Cycles Devinci to manufacture the Bixi city sharing bicycles, designed by Michel Dallaire. They are used in bicycle sharing schemes including London, New York and Montréal.

Designed by Michael Stacey Architects: [www.s4aa.co.uk](http://www.s4aa.co.uk)



Alupro

Aluminium has many properties that make it the material of choice for application in sustainable products: durability, recyclability, flexibility, lightness and strength, high conductivity and formability.

Aluminium intensive TGV Train manufactured by Alstom.



Alstom Transport / M.Spera

Audi's Space Frame (ASF) structure consists largely of aluminium making it approximately 40 percent lighter than a comparable steel structure.



Audi

Jaguar XK30 an example of the intensive use of aluminium in Jaguar Land Rover's range of fuel efficient vehicles.

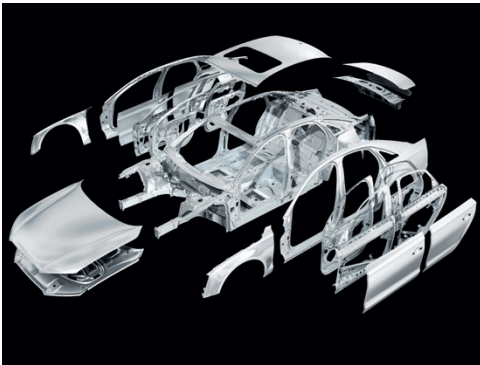


Jaguar Land Rover

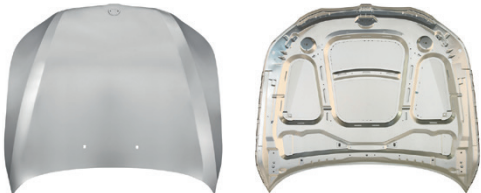
Over 80% of energy consumption and corresponding emissions are associated with the automotive use phase. The focus of measures to reduce energy consumption during the life cycle of a vehicle should therefore concentrate on the use stage.

The use of aluminium in car structures allows for greater material thickness and rigidity, improving overall safety performance, and ensuring efficient crash energy absorption without adding weight. Lighter vehicles also have reduced braking distances and lower crash forces.

About 660 million tonnes of greenhouse gas could be saved during the use phase if all transport units (including road vehicles, trains and aircraft) were replaced by lightweight vehicles of current design with the same functional properties.



Audi



Novelis

A saving of approximately 870 million tonnes of greenhouse gas would be possible if existing vehicles were replaced with advanced lightweight designs.

Lightweighting will increase intensity of use: in 2000 each automotive vehicle contained on average 100-120 kg of aluminium, in 2012 it was around 158 kg; by 2025 it is expected to be 250 kg.







The benefits of aluminium use in transport go beyond lightweighting for emissions savings. It contributes to better fuel economy, enhanced performance, easier handling and reduced wear on roads. Ballingdon Bridge, Suffolk, England, designed by Michael Stacey Architects.