



# Corporate Responsibility at MAN in 2017

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Supply chain

People

Society  
and integrity

Product responsibility

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friendly products and services

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## Responsibility for products

MAN stands for efficient and safe transportation and energy solutions. Our approach to product responsibility is broad and comprehensive: we are continuously reducing fuel consumption and focusing on alternative drive systems such as gas or electric drive technology. When developing our products, we take into account the entire product life cycle, from raw materials extraction through end-of-life disposal.

## Reducing the life cycle CO<sub>2</sub> emissions of our products

A large proportion of the total life cycle greenhouse gas emissions are generated during the use phase. Bearing in mind that most of our products have a very long service life, during which they are used intensively, we implement a future-oriented product development process aimed at reducing environmental impact to the greatest extent possible.

More than

**90%**



of greenhouse gas emissions are attributable to the use phase.

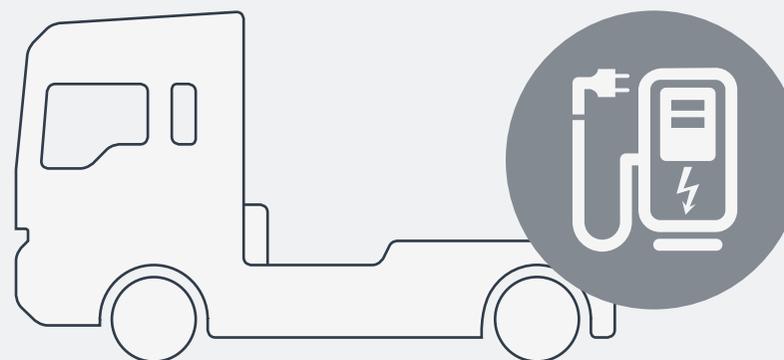
## Electricity – the climate-friendly drive technology

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With zero pollutant emissions from fuel combustion and low noise, plus a better carbon footprint with the right electricity mix, electricity is set to be the drive technology of the future – at least around town and on shorter journeys. We are preparing for the volume production of purely electric city buses and trucks. This is MAN's way of forging ahead with efforts to promote electric mobility in commercial vehicles. Our economically robust electric mobility solutions are being developed in close collaboration with cities and logistics partners.

### Field testing of electric trucks

From 2018, the first electric trucks will be put to the test in practice in cooperation with the Austrian business consortium known as the Council for Sustainable Logistics (CNL). The logistics portfolio of the CNL companies covers a wide range of applications in urban and urban-fringe distribution work and food supply, and offers MAN the ideal framework for testing electric trucks.

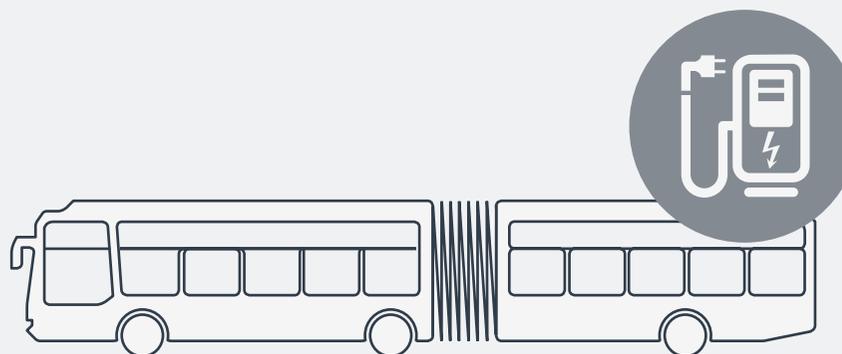


## Electric buses

MAN's solo and articulated buses will also be available with battery-electric drive systems: to begin with, a demonstration fleet will be tested under everyday conditions at several public transportation companies. Our close collaboration with public transportation companies as part of our cooperation projects has revealed a desired range of up to 200 km a day under realistic operating conditions.

### City partnerships

We are working with several cities – including Munich and Hamburg – in a quest to press ahead with the development of line-service buses powered by alternative drives. One of the aims of this collaboration is to develop a financially optimized, zero-emission concept for electric mobility.



### Hybrid buses

The optional MAN EfficientHybrid helps to reduce fuel consumption. The system recuperates and stores braking energy to operate the vehicle electrical system, among other things. The stop-start function results in complete engine shutdown at standstill – ensuring completely emission-free operation at bus stops, for example.

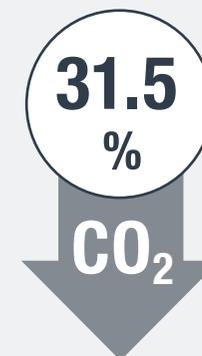


## Efficient diesel engines

Ever since Rudolf Diesel developed the diesel engine in the late 19th century together with engineers at Maschinenfabrik Augsburg – a forerunner of MAN – we have worked continuously to improve the efficiency and performance of this internal combustion engine. And our hard work has paid off: today, economical and efficient transportation and energy solutions from MAN are in operation all over the world.

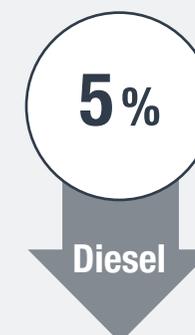
### Reducing emissions

For the purposes of a study conducted by the ACEA (European Automobile Manufacturers' Association), MAN calculated the reduction of CO<sub>2</sub> emissions in commercial vehicles between 1994 and 2016. This involved comparing semitrailer tractors from different eras as they drove three times on a 360-kilometer route accompanied by the technical inspection authority TÜV Süd. The result shows a 31.5 % reduction in fuel consumption and, as a result, in CO<sub>2</sub> emissions in the 1994–2016 period.



### Coaches

With its aerodynamically optimized design, the NEOPLAN Skyliner double-decker coach returns fuel consumption of less than 30 l/100 km – a saving of approximately 5 % in highway driving at a constant speed of 100 km/h. This has benefits for the environment as well, with CO<sub>2</sub> emissions of just 12 g/passenger kilometer when operating at full passenger capacity.



## Low-pollutant natural gas engines

As a clean fuel, natural gas plays a key role in our product portfolio. As well as providing low-emission propulsion for buses, trucks, and ships, natural gas is also ideally suited for use in the power generation industry.

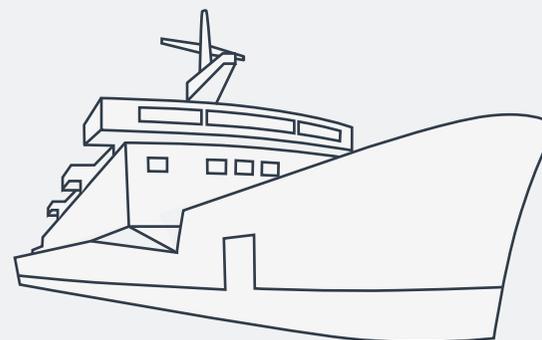
### City buses

When operated on special biogas, the MAN Lion's City GL CNG natural gas-powered city bus is virtually carbon-neutral. Gas-powered buses accounted for around one in five of all MAN city buses sold during the year under review. MAN Truck & Bus is the leading European supplier of gas buses, with a current average market share of around 30 %.



### Dual-fuel engines

With its dual-fuel engines, which are capable of operating on both gaseous and liquid fuels, MAN Diesel & Turbo offers a low-carbon propulsion solution for ships that combines energy efficiency with flexibility. As well as liquefied natural gas (LNG), MAN Diesel & Turbo also offers engines capable of running on methanol, ethanol, or liquefied petroleum gas (LPG).



## A new logistics platform

As a digital brand of Volkswagen Truck & Bus, RIO offers digital solutions for the entire transportation and logistics ecosystem on its open and cloud-based platform. The RIO Box, which forms the basis for connecting the vehicles with the platform, has already been fitted as standard in all brand new MAN truck series in Europe since August 2017. The services offered on the RIO platform allow RIO and MAN to make a significant contribution to protecting the environment and the climate: for example, MAN customers can save fuel and CO<sub>2</sub> by improving tour and route planning and avoiding empty journeys.



## Platooning

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A research project initiated by DB Schenker, MAN Truck & Bus, and the Fresenius University of Applied Sciences puts networked trucks into practical operation in everyday logistics for the first time. As part of the cooperation project agreed in May 2017, DB Schenker will be testing truck platoons as part of its regular operations and in real road traffic conditions on the A9 highway digital test field between Munich and Nuremberg for several months starting in June 2018.

MAN defines platooning as a vehicle-based system, still at the development stage, in which two or more semitrailer combinations follow each other in close proximity with the aid of driver assistance systems, steering technology, and vehicle-to-vehicle communication. The lead vehicle dictates the speed and the direction and the resulting “slipstream effect” reduces fuel consumption.

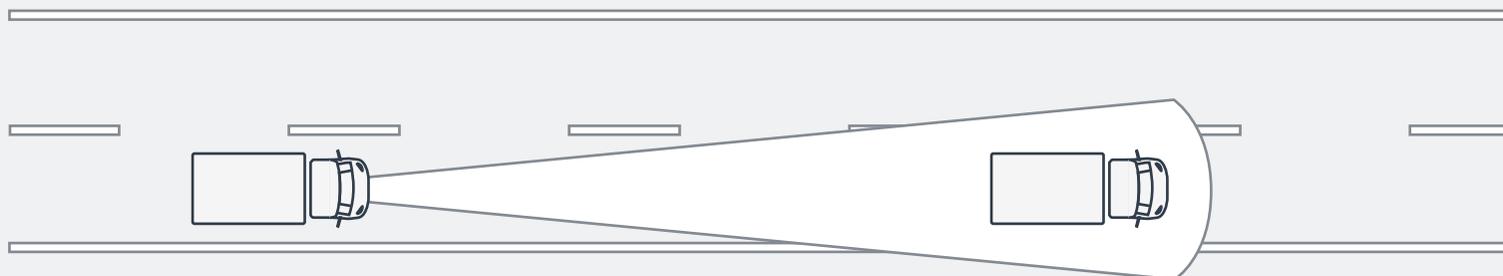
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# 10 %

fuel savings thanks to platooning

## Effective driver assistance systems

MAN's driver assistance systems improve road safety and reduce fuel consumption. This is also confirmed by the European research project euroFOT, with companies and institutions from ten different countries taking part: trucks using ACC achieved average fuel savings of almost 2 % over the period of the trial, despite also recording a higher average speed. At the same time critical events such as hard braking or sudden evasive maneuvers were reduced by more than one-third.



# 94 %

of the drivers surveyed said that Adaptive Cruise Control (ACC) significantly improved safety – and rated it as one of the most important driver assistance systems for trucks.