



COMMERCIAL VEHICLES AND CO₂

THE BUSINESS OF FUEL ECONOMY

The increasing demand for freight transport and the need for environmental protection pose a challenge to the transport sector, our governments and the energy sector alike. This flyer highlights what the European commercial vehicle manufacturers contribute and what other actions are key.

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“YOU BOUGHT IT, TRUCKS BROUGHT IT”

More transport provides the world with increasing prosperity and together, we need to ensure that mobility remains sustainable.



TRUCKS DO THE BUSINESS

The cars we drive, the clothes we wear and the food we eat; one common theme binds these products, the way they are delivered.

Trucks and light commercial vehicles are the workhorses of our roads. They carry nearly 80% of all freight in industrialised countries and deliver around 70 kg of goods to each European citizen, every day.¹

They bring us the things we take for granted in our personal lives and they drive the business community. Without commercial vehicles and those who drive them, society would quickly grind to a halt.

A CHALLENGE FOR MANY

Demand on a global scale presents real opportunities for truck, van and bus manufacturers. It also brings into sharp focus a challenge: the need to use limited resources responsibly and protect the environment. The European commercial vehicle industry is proud of its reputation for delivering the highest quality, most technologically advanced vehicles

in the world. The industry has a positive story to tell based on an on-going commitment to act. Advanced technologies and the increased efficiency of vehicle engines have been key to help reduce the pressure on the environment. And progress will continue. The automotive sector invests more than any other in research and development, with € 20 billion spent annually on technologies that are delivering vehicles that already make a significant difference.

The industry wants to continue moving forward on this road, together with others in the transport business, with governments, and with other industries.



1. European / International Road Federation

ACEA MEMBERS
COMMERCIAL VEHICLES

DAF

DAIMLER

IVECO

MAN

SCANIA

VOLKSWAGEN
AKTIENGESELLSCHAFT

VOLVO



TRANSPORT DEMAND IS SET TO GROW

According to the European Union, freight traffic is forecast to grow, measured in tonnekilometres, by 63% across the main European markets by 2030.

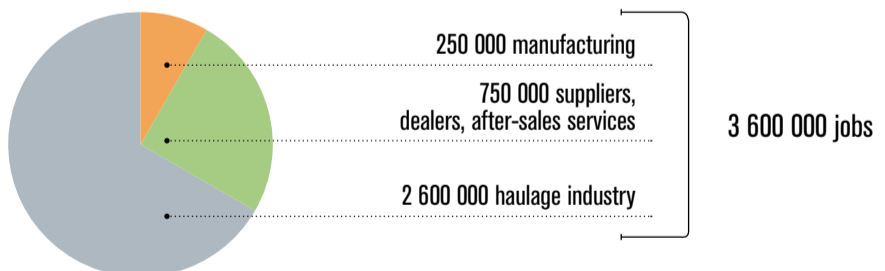
In new member states, growth is expected to be even higher at 71%. The European Commission has recognised that road transport will remain the main means of distributing goods. Increased efficiency of all forms of transport (road, rail, waterways), combined with an increased cooperation between these transport modes, offers the best strategy to cope with future demand and the challenges that come with it. Similar choices have to be made around the world. Transport growth, and therefore strong demand for trucks and buses, comes also from emerging economies like Brazil, Russia, India and China too. These countries are keen to share in the economic prosperity enjoyed over the past 30 years by the west.

KEEPING SOCIETY MOVING

The truck industry plays a key role in the European economy. Around 2.6 million commercial vehicles are made every year, generating a turnover of nearly € 70 billion. A quarter of a million skilled staff are employed in their manufacture.

Three quarters of a million more Europeans depend on the industry for their jobs, including parts suppliers, distributors, dealers and those providing after-sales care. A further 2.6 million, employed in the € 250 billion-a-year haulage industry, complete the picture.

Employment commercial vehicle industry



- VANS**
 - Light Commercial Vehicles + minibus/coaches ≤ 3.5t
- TRUCKS**
 - Medium Commercial Vehicles > 3.5t but ≤ 16t
 - Heavy Commercial Vehicles > 16t
- BUSES & COACHES**
 - Buses > 3.5t

Production	2007
	1 909 597
	667 864
	35 546
TOTAL	2 613 007

Registrations	2007
	2 288 988
	443 077
	39 616
TOTAL	2 772 065

Exports	2006
	11 962 (Mn €)

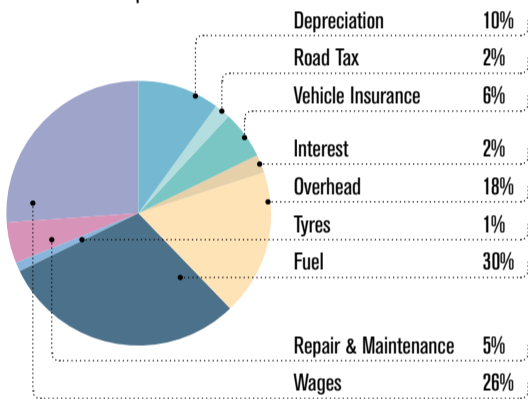
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REDUCING CO₂ EMISSIONS A CLEAR BUSINESS CASE

In freight transport, there has been a clear business case to minimize fuel consumption for decades, and that is why commercial vehicles are well positioned in the strive to reduce CO₂ emissions. Environmental performance has never been in sharper focus than today.

WORKING WITH THE TRANSPORTATION INDUSTRY

For many transport companies, fuel is the main operating cost. For others, it constitutes a significant part of their overall budget, and soaring fuel prices have hit businesses hard across Europe.



Total Operating Costs (TOC)

40-tonne Tractor - Semitrailer Combination

SOURCE IVECO

There is a strong business case for fuel efficiency and this is, in effect, also a benefit for the environment. It is common sense: for every litre of diesel burnt, 2.6 kg of carbon dioxide is released into the atmosphere²; and therefore, less fuel used means lower emissions. And lower costs for business.

DRIVING TECHNOLOGICAL PROCESS

The intense competition on the commercial vehicle market is, and has long been, driving

technological progress. Vehicle manufacturers are softening the blow brought to operators by higher fuel prices through more fuel-efficient vehicles.

Furthermore, thanks to vehicle manufacturers investment in telematics and sophisticated vehicle monitoring systems, operators have dramatically cut the number of journeys made by trucks running empty.

Truck trailer and body producers, hauliers and transportation companies are also profiting from the industry's many technologies, programmes and training courses that allow them to realise a commercial vehicle's full potential at the lowest cost to the environment.

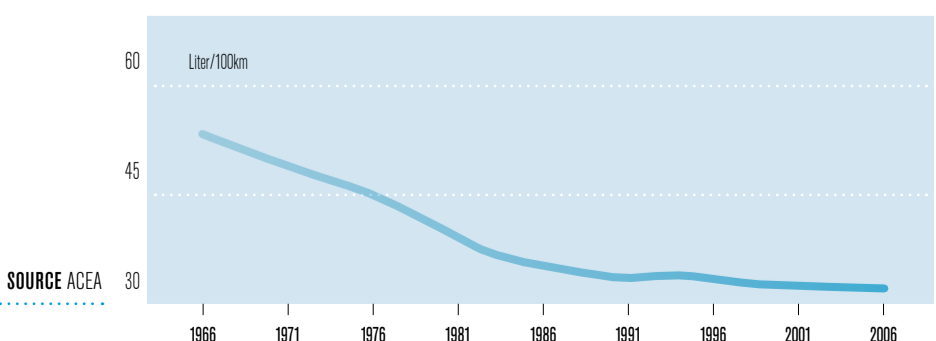
HYBRIDS IN ALL PORTFOLIOS

All European manufacturers are working on hybrid technology, as hybrid trucks can cut fuel consumption by between 15 and 25%, depending on the type and distance of transport involved and the number of stops by the vehicle. In city distribution, vehicles can run short distances purely on electric power. As well as boosting fuel economy, this means no harmful emissions like NO_x and PM. In electric mode, noise is also kept to a minimum.

Hybrid vehicles are powered by a conventional engine in combination with an electric motor. The vehicle accumulates and stores energy generated during braking to then feed the motor, either exclusively at low speeds during stop-and-go city driving or to boost the work done by the engine at other times.

COMMERCIAL VEHICLES - A BENCHMARK FOR FUEL EFFICIENCY

Trucks contribute around 6% to global CO₂ emissions which is a significant issue. At the same time, modern trucks are the benchmark for fuel efficiency thanks to technologies like common rail injection, automated gearboxes, turbo charging and intercooling. A 40-tonne truck built today burns around a third less fuel than one made in the 1970s. Per tonne transported, this corresponds to a fuel consumption of just one litre of diesel per 100 tonnekm, with significant CO₂ savings. Today's buses are also leading the way with average fuel consumption per bus-passenger that can challenge the performance of many a trip per train. Further improvements in fuel efficiency remain a prime priority for Europe's manufacturers.



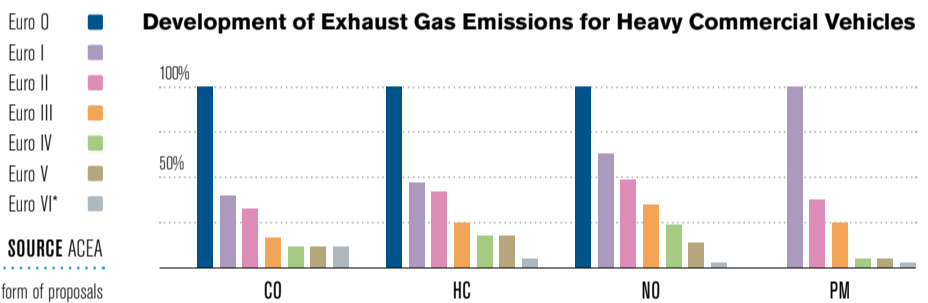
SOURCE ACEA



AIR QUALITY POLLUTANTS: SLASHED

Aside from CO₂ and fuel economy improvements, modern trucks emit a fraction of air quality pollutants compared to their predecessors. In fact, latest Euro V models produce around a tenth of the emissions of a 1980s equivalent. Truck NOx emissions have been cut by 86% compared to levels in the 1990s.

Particulate emissions are down by 95%.³ In Europe, the result has been an overall 60% reduction in particulate matter from trucks, despite a 60% increase in 'work done' or freight transport measured in tonnekilometres.⁴



ALTERNATIVE FUELS MAKE A KEY CONTRIBUTION

Alternative fuels, such as compressed natural gas (CNG), can significantly cut pollutant emissions. Others, like bio-ethanol, can reduce CO₂ by up to 90% on a well-to-wheel basis. Renewable diesel produced from vegetable oils (HVO), synthetic diesel produced from biowaste (BTL, biomass-to-liquid) and natural gas (GTL, gas-to-liquid) have the advantage of being compatible for use in all diesel engines.

Many vehicle manufacturers have developed specific models for use with a dedicated biofuel. However, for a general market fuel for the future, investments in second-generation biofuels must be encouraged by policy makers and speed-up to help meet the European Union's future greenhouse gas reduction targets.

HYDROGEN FOR THE LONG RUN

Commercial vehicles are also particularly suited to run on hydrogen fuel cells, combining compressed hydrogen with air in a chemical reaction in a fuel cell that creates electricity.

This powers the vehicle and produces only water vapour from the tailpipe.

Since the introduction of the first vehicle in 1997, fuel cell bus trials have taken place across the globe. Still, much more study is needed into hydrogen production, storage and distribution before this advanced technology is ready for a large-scale use.

A CALL FOR FUEL INFRASTRUCTURE AND CLEAR STANDARDS

An important prerequisite is also that the availability of alternative fuels reaches a viable scale. Without a proper re-fuelling infrastructure, customers will hesitate to buy the cleanest vehicles. The fuel industry must be encouraged to deliver distribution networks and fuelling stations for alternative fuels.

Government and the fuel industry should also work closely to ensure fuel production meets international quality standards. And, on biofuels, all stakeholders must be confident that fuel is produced in a sustainable way that does not compete with food production.

2. DEFRA, UK

3. ACEA

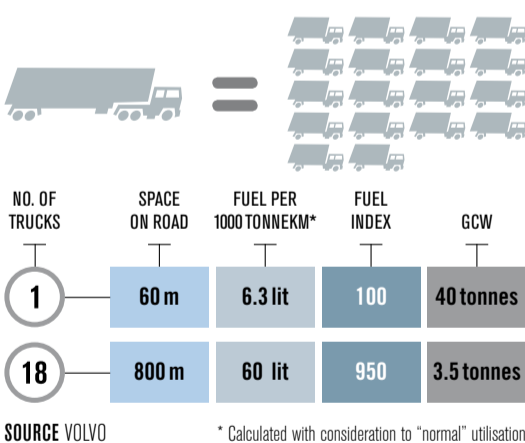
4. Tremove, TM University Leuven

Modern diesel engines are clean, fuel efficient and durable. Vehicles on alternative fuels or with innovative drive trains are now also a familiar sight on Europe's roads. However, it is the combination with better infrastructure, increased driver training, a wider use of telematics, improved transport efficiency and harmonisation of standards that will lead to sustainable mobility. We call this an integrated approach.

LARGE AND FULL IS BETTER

A large truck has a significantly smaller carbon tyre print than a smaller commercial vehicle because its work rate is higher. Put simply, it uses less fuel to move more goods.

Across Europe, the maximum permissible gross weight for a 2-axle tractor, 3-axle trailer combination is 40 tonnes. That means a maximum payload of approximately 26 tonnes. However, induced by environmental and efficiency reasons, a number of EU member states allow the use of Long heavy Vehicles of up to 60 tonnes. A recent study from the European Commission has found that the use of such longer truck combinations would increase efficiency, reduce transport costs and have positive effects on road safety and the environment. The annual CO₂ savings would amount to at least 5 million tonnes. Ensuring customers have the right vehicle for the job is just as important as supplying vehicles fitted with the latest engine technologies.



BOOSTING PERFORMANCE WITH DRIVER TRAINING

All vehicle manufacturers offer a range of training programmes. Recently, these have been developed to meet new requirements for professional competence. All commercial vehicle drivers will be required to undertake this training on a five-year basis.

But manufacturers have also offered courses that encourage more eco-friendly, safe driving since the 1960s. Skills learned by operators are helping boost fuel efficiency by around 10%⁵ and contribute to the safety of drivers and all road users.

Some of the key skills taught include:

- Adopting a driving style that anticipates hazards ahead for quicker reactions
- Selecting the right gear to stay in the engine's most economic speed regime
- Using cruise control for smooth driving
- Block shifting gears when safe to do so
- Recognising tyre maintenance, pressure, condition and axle alignment as key safety and economy issues

TELEMATICS AND FLEET MANAGEMENT FOR INCREASED EFFICIENCY

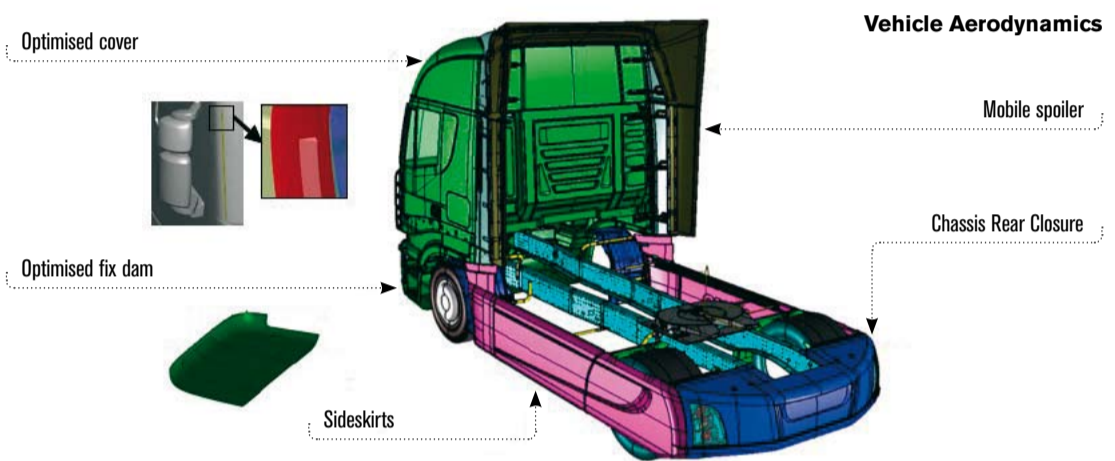
Telematics technology cuts costs and emissions. Satellite navigation systems are now helping drivers avoid traffic jams, stay mobile and steer clear of hazards like low bridges and narrow lanes.

However, telematics can also be employed by operators to track vehicle progress and monitor driver behaviour. Vehicle manufacturers are now offering programmes that assess truck and driver performance while the vehicle is in use, producing real-time reports for logistic teams back at base. These constantly monitor correct use of gears, cruise control, fuel consumption, idling time and harsh braking. Operators can quickly tell which drivers are performing well against a benchmark on economy and safety, and which need further training.

CHOOSING THE RIGHT TYRES

Commercial vehicle manufacturers are also working with tyre manufacturers to develop low rolling resistance tyres. Fuel consumption can be cut by between minimum 5% if tyres on all axles are changed to those with a lower rolling resistance.⁶

Tyre maintenance is equally important. Running a tyre at 6 BAR instead of 9 can increase fuel consumption by up to 14%. Equally, under-inflated tyres can lose up to 25% of their service life.⁷ Axle misalignment can further dent fuel economy.



IMPROVING AERODYNAMICS

Improving aerodynamics is another way operators can improve fuel efficiency. Commercial vehicle manufacturers work closely with trailer builders and transport companies to ensure the cab and body or semi-trailer combination is fitted out for optimum efficiency. Things, like correctly adjusted air deflectors on the cab roof, can drastically reduce air resistance. Fuel consumption savings of around 7% have also been reported simply by reducing the gap between truck cab and semi-trailer.⁸ Additional improvements to the front of the cab and the rear-end of trailers could be achieved with changes to the currently allowed vehicle size requirements.

OPTIMISING ROAD INFRASTRUCTURE

European governments levy total tax of € 360 billion from the automotive sector. However, only a quarter is re-invested in better roads and traffic systems. China, meanwhile, will double its investment to € 350 billion in the four years until 2010.⁹ Stop-start traffic can triple the fuel consumption and emissions of a truck. An infrastructure that prevents unnecessary stops and slow-downs will therefore cut emissions – and keep Europe's economy moving.

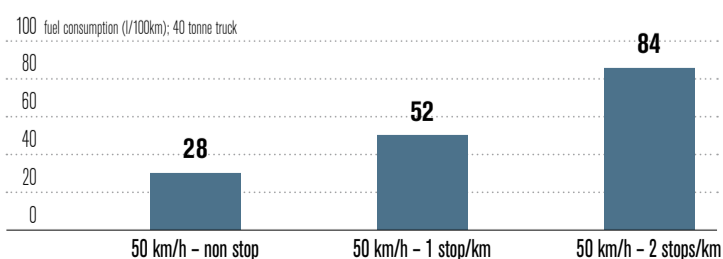
Increased road capacity and improved maintenance are part of the solution. Developing intelligent traffic and transport solutions offers further benefits. For example, substituting just half of the current traffic lights in Europe with dynamic systems for a better flow could save more than 2 million tonnes of CO₂ annually.¹⁰

HARMONISING EMISSIONS STANDARDS

Across the globe, emission regulations are tightening. But standards, test methods and emission limits differ from market to market. In the US, Europe and Japan this has led to different technical solutions and consequently different, unique certification tests at extra costs. The result is that it takes longer to bring the cleanest new vehicles to market. Harmonising global standards, for example through the UN-ECE Global Technical Regulations, on emissions, test cycles and fuels, would cut lead times and reduce development costs. This would help a global truck industry roll out new technologies more quickly, making a difference to millions of people around the world.

Traffic Congestion increases fuel consumption

SOURCE VDA



- 5 Daimler, Volvo
- 6 Scania, Volvo
- 7 tyre manufacturers
- 8 University of Huddersfield, UK
- 9 European / International Road Federation
- 10 ACEA



COMMERCIAL VEHICLES WHAT'S IN A NAME?

Commercial vehicles come in many different types and shapes. Most are custom-built, in order to meet numerous specific requirements, starting with the number of axles to the colour of the cab and the size of the fuel tank.

GOOD TO KNOW

Sustainability is not just a question of reducing harmful emissions when manufacturing, using and recycling vehicles. It is also a matter of safety.

SAFER BY DESIGN

Modern trucks and buses are fitted with the latest passive systems to protect occupants and other road users in a crash, but also with active technologies that prevent accidents happening in the first place.

For drivers, systems like airbags, seat belt warnings, belt pre-tensioners, ABS, EBS and improved tyre safety come as standard. Front under-run protection prevents a truck riding over another vehicle in an impact, while electronic trailer braking ensures truck and trailer brakes work seamlessly together.

However, accident avoidance technologies are equally important in the modern truck's safety arsenal. Brake assist, lane departure warnings, the skid-prevention technology 'ESC' and adaptive cruise control are all helping keep trucks and other road users where they belong – apart.

POSITIVE TREND

Truck fatalities have come down by 25% in the last two decades thanks to investment in these life-saving technologies. The positive trend will continue if safer products are complemented by better road design, improved infrastructure, better driver training and road traffic law enforcement.

The parallel with reducing emissions is clear. Vehicle manufacturers in partnership with operators, government, safety organisations and other road users can deliver the safest roads for our citizens.

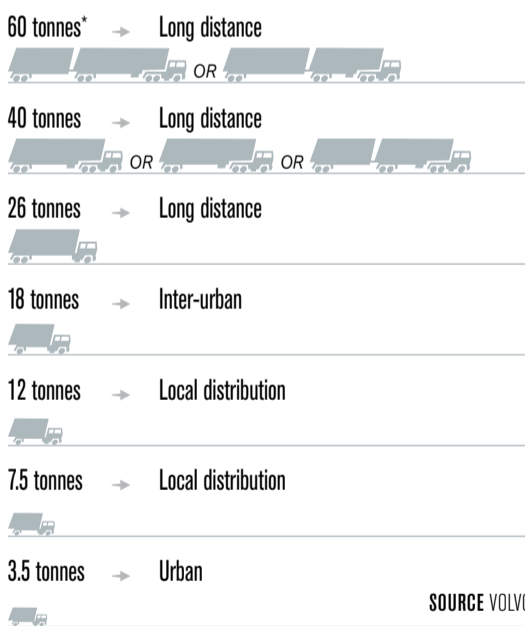
TRUCKS, TRACTORS AND TRAILERS

The word truck tends to be used for commercial vehicles weighing more than 3.5 tonnes.

They share a common construction of chassis, cab, axles, suspension and wheels, an engine and a drive-train. In Europe, they have a familiar cab-over-engine design which means the driver sits on top of the front axle.

Truck and trailer combinations are numerous and diverse. They can be combined into thousands of variant versions for each platform. Many are customer-built or specified to meet individual customer needs on load type, driving patterns and use.

The following provides a snapshot of the most common vehicle types.



SOURCE VOLVO

*not currently mandated for cross-border transport under European weight restrictions

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