

# Reducing CO<sub>2</sub> from trucks: progress in practice

## Third-party assessment

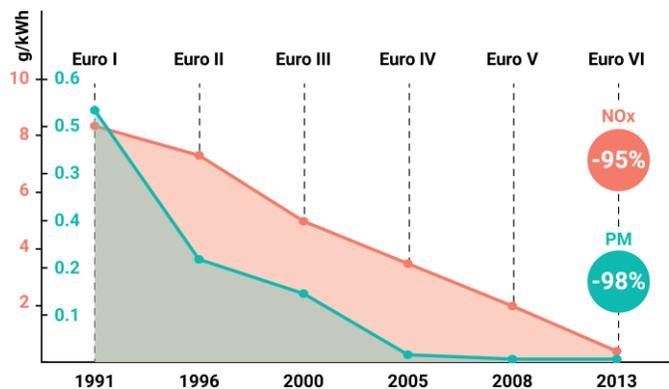


April 2017

# WHAT PROGRESS HAS BEEN MADE?

## Pollutant emissions have been slashed to near-zero levels

Between the early nineties and 2013, the main focus of policy makers and the truck industry was on achieving dramatic decreases in pollutant emissions, such as nitrogen oxides (NOx) and particles (PM). To that end, six sets of 'Euro' standards were introduced in just over 20 years.

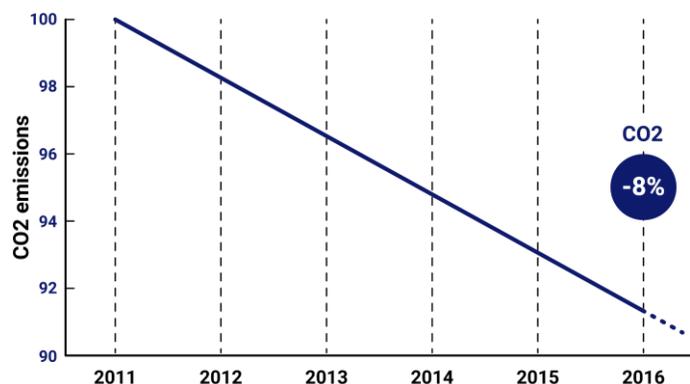


As a result, pollutant emissions from the latest Euro VI heavy-duty vehicles have been slashed to near-zero levels.

However, it should be understood that reducing pollutant emissions requires conflicting measures to reducing CO<sub>2</sub> emissions. This 'technological trade-off' made it extremely difficult to decrease CO<sub>2</sub> emissions simultaneously.

## Further reducing CO<sub>2</sub> emissions from heavy-duty vehicles

With the major investments in reducing pollutant emissions behind it, the industry then shifted focus to reducing CO<sub>2</sub> emissions, and have been succeeding at this as well. The fuel consumption of trucks, and with that CO<sub>2</sub> emissions, has been reduced by about 8% over the last five years.



Data: Lastauto Omnibus, Trucker Magazine & Green Truck Award

As the chart above shows, data collected by various independent truck testing organisations between 2011 and 2016 confirm the progress made by the truck industry.

## PROGRESS IN PRACTICE

To demonstrate that the fuel efficiency of heavy-duty vehicles, and with that their CO<sub>2</sub> emissions, did not only improve in databases but also in practice, each ACEA member company contracted an independent third party to compare the on-road performance of different trucks from the past two decades.

The tests were performed by conducting comparative test drives with an older vehicle (in most cases 20 years or older) and a truck of the latest generation. For each test, a pair of comparable trucks from the same manufacturer was selected, with both vehicles respecting the following criteria:

- Same mission profile (eg long-haul transport)
- Comparable vehicle configuration (eg truck-trailer combination)
- Tested at the same speed and carrying the same payload
- Truck representative of the market at the time of its introduction

All tests were conducted and performed under the strict supervision of well-respected testing agencies.

### Industry-wide progress on the road

The outcomes of these tests provide a clear picture of the progress made on the road over the past two decades – a summary of the key findings can be found in the table below.

Truck manufacturer:	Daimler	Scania	DAF	Volvo	MAN	Iveco
Timeframe:	1996 2016	1992 2016	2002 2015	1991 2016	1994 2016	1994 2016
	20 years	24 years	14 years	25 years	22 years	22 years
CO <sub>2</sub> reduction:	-22%	-25%	-15%	-19%	-31.5%	-21%
Yearly CO <sub>2</sub> reduction:	-1.1%	-1.04%	-1.07%	-0.76%	-1.45%	-0.95%
Test details:	page 4	page 5	page 6	page 7	page 8	page 9
Testing agency:	DEKRA	AVL	DEKRA	AVL	TÜV Süd	AVL

Note: results are OEM specific and not directly comparable, tests were performed with different boundary conditions



European  
Automobile  
Manufacturers  
Association

These third-party assessments demonstrate that the major investments made by Europe's truck manufacturers over the past decades to reduce CO<sub>2</sub> emissions have delivered clear progress in practice.

It goes without saying that the truck industry is committed to doing more in years to come. Manufacturers of heavy-duty vehicles will continue contributing to the further decarbonisation of road transport by further optimising combustion engines and investing in alternative powertrains, exploring the potential of connected and automated driving, and by looking together with other stakeholders at all those factors besides the vehicle that influence CO<sub>2</sub> emissions.

# ANNEX: TEST DETAILS

## 1. DAIMLER



Mercedes Benz SK 1844 - Euro II



Mercedes Benz SK 1845 - Euro VI

Model year:	1996	2016
Engine type:	V8 engine	6 cylinder
Engine power:	436hp	450hp

### About the test

- Third-party assessment performed by: DEKRA / Lastauto Omnibus
- Lastauto Omnibus prescribed the exact driving style with the same requirements for all test drivers. The cruising speed and overshoot/undershoot times for downhill and uphill gradients were defined and monitored by the recording personnel. Conventional cruise control was used to ensure a consistent cruising speed for the older truck. In the new truck this was ensured by Predictive Powertrain Control.
- All in all, six measuring rounds of 256 km were performed on the LastAuto Omnibus test circuit. The test drivers changed vehicles after each measuring run, and the 32-tonne trailers were also exchanged in accordance with the assigned driver. Every evening the vehicles were refuelled under precise, temperature-compensated conditions.

## 2. SCANIA



Scania Streamline 143



New Generation Scania S 500

Model year:	1992	2016
Engine type:	V8 (DSC14 09 L09)	Straight six (DC13 155 L01)
Engine power:	500hp	500hp

### About the test

- Third-party assessment performed by: AVL
- The test drives took place at the beginning of February 2017. The Scania Streamline 143 was in very good condition, it was on exhibit at the Scania museum in Södertälje prior to the test. Apart from a necessary update of the tyres, it was effectively in the same mint condition as the S 500 truck.
- During the comparative test drives, the vehicles were driven at 85 km/h on the same stretch of Swedish national road 73 south of Stockholm, at the same time, and by the same two drivers. They had the same cargo weight, which gave the new vehicle a small advantage as it was lighter overall.

### 3. DAF



DAF XF95.430 Euro III



DAF XF440 Euro VI

Model year:	2002	2015
Engine type:	DAF XEC315	Paccar MX11
Engine power:	315kw	320kw

#### About the test

- Third-party assessment performed by: DEKRA / Lastauto Omnibus
- The test route used was the standard test route of Lastauto Omnibus, eg the route used by ETM.
- The test was 256 km long and has been driven four times to cancel out influences of different driver and trailer in the pairwise comparison. So, in total more than 1,000 km has been driven with each truck.
- The route was identical to the route used for the comparison of the two Daimler trucks in summer 2016.

## 4. VOLVO



Volvo F12



Volvo FH

Model year:	1991	2016
Engine type:	12L in line 6 cylinder	13L in line 6 cylinder
Engine power:	405hp	460hp

### About the test

- Third-party assessment performed by: AVL
- Test route was the two-line motorway Alingsås, Göteborg, Alingsås and it was driven four times during the same day. The weather conditions were dry, low wind (below 4 m/s) and temperature between -2°C and +1°C.
- Both trucks were driven at the same time with cruise control engaged during the complete test to avoid influence from driver behaviour.
- After two test runs, the three-axle semitrailers were switched between the trucks. The trailers were loaded up to about 40 tonnes GCW.
- The average speed was 81.7 km/h for the old Volvo F12 and 82.3 km/h for the new Volvo FH.

## 5. MAN



F90 Euro II



TGX Euro VI

Model year:	1994	2016
Engine type:	D28	D26NEW
Engine power:	402ps	460ps

### About the test

- Third-party assessment performed by: TÜV Süd
- The test route was about 360 km long and it is a well-known route on the motorway, making a loop north of Munich in the Munich, Regensburg, Nuremberg, Augsburg region. Approximate journey time: 4 hours and 45 minutes.
- The test was performed three times, on three consecutive days.
- Mainly corresponding to long-haul applications.
- Trucks were equipped with tyres from the same manufacturer.
- Same trailers with the same weight (loaded to 39 tonnes) were used and when the tests were repeated, the driver-trailer combination remained unchanged.
- The trucks were refuelled each morning. The temperature of the diesel in the fuel tank was measured before and after filling up the vehicle.

## 6. IVECO



Iveco Eurostar Euro II



New Generation Stralis Euro VI

Model year:	1994	2016
Engine type:	V - engine	In line engine
Engine power:	378kw	420kw

### About the test

- Third-party assessment performed by: AVL
- The test drives took place in the middle of February 2017. The old truck was in a very good condition, as was on exhibit at the Iveco museum prior to the test, with a mileage of approximately 30,000 km. Apart from a necessary update of its tyres, it was in its original state.
- During the tests, the vehicles were driven at 85 km/h on the Torino-Genova motorway, at the same time, and by the same two drivers.
- Both trucks had the same cargo weight of 40 tonnes. The drivers were forced to swap between the two vehicles, so that driver behaviour wouldn't influence the test results.
- Moreover, the trailers were checked by performing detailed measurements of coast down in Balocco (Italy, proving ground), which demonstrated that they were basically identical.



European  
Automobile  
Manufacturers  
Association

## ABOUT ACEA

- ACEA represents the 15 Europe-based car, van, truck and bus manufacturers: BMW Group, DAF Trucks, Daimler, Fiat Chrysler Automobiles, Ford of Europe, Hyundai Motor Europe, Iveco, Jaguar Land Rover, Opel Group, PSA Group, Renault Group, Toyota Motor Europe, Volkswagen Group, Volvo Cars, and Volvo Group.
- More information can be found on [www.acea.be](http://www.acea.be) or [@ACEA\\_eu](https://twitter.com/ACEA_eu).

## ABOUT THE EU AUTOMOBILE INDUSTRY

- 12.2 million people - or 5.6% of the EU employed population - work in the sector.
- The 3.1 million jobs in automotive manufacturing represent 10.4% of EU manufacturing employment.
- Motor vehicles account for over €400 billion in tax contributions in the EU15.
- The sector is also a key driver of knowledge and innovation, representing Europe's largest private contributor to R&D, with €44.7 billion invested annually.
- The automobile industry generates a trade surplus of €100.4 billion for the EU.

European Automobile Manufacturers' Association (ACEA)  
Avenue des Nerviens 85 | B-1040 Brussels | [www.acea.be](http://www.acea.be)  
T +32 2 732 55 50 | F +32 738 73 10 | [info@acea.be](mailto:info@acea.be) | [@ACEA\\_eu](https://twitter.com/ACEA_eu)