FACTSHEET

CO2 STANDARDS FOR HEAVY-DUTY VEHICLES

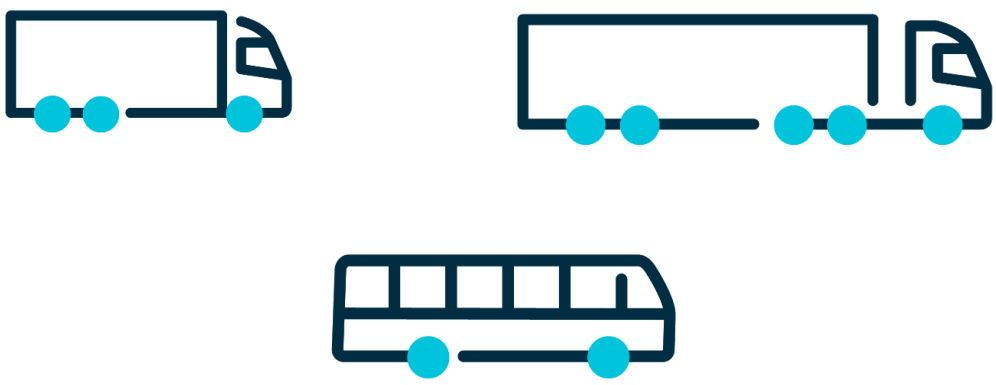
Why are trucks so important?

Road freight is the backbone of trade and commerce on the European continent. **Trucks carry 77% of all freight transported over land** in the European Union, and function as part of a logistics chain whose components also include inland waterways, shipping, air and rail transport. Not only do trucks remain the most flexible, responsive and economic mode of transport for the vast majority of goods and freight, they are also essential to the functioning of the wider integrated European logistics and transport system.

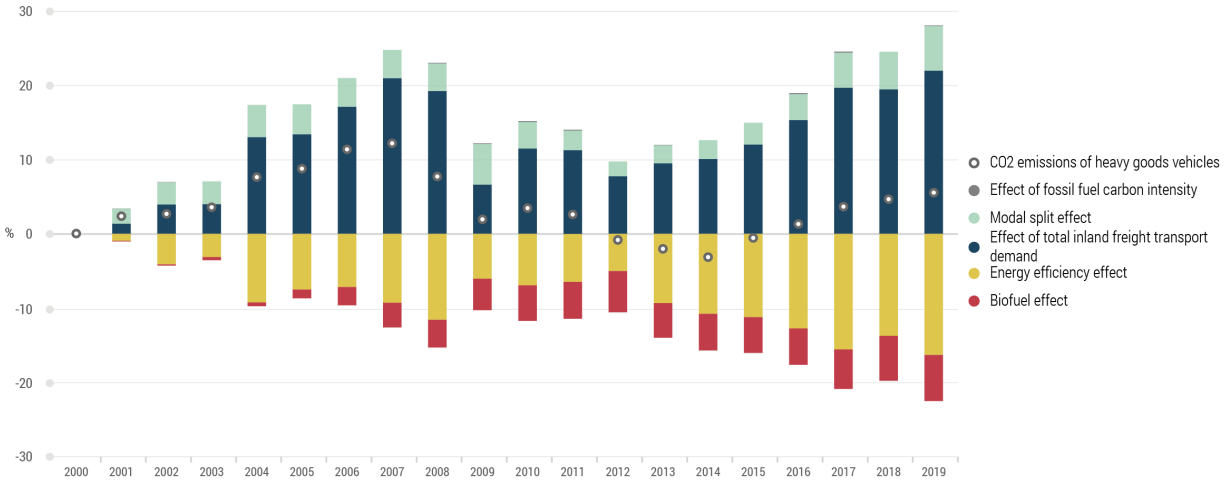
Most of our daily necessities depend on trucks at some point in the distribution chain. Many essential public services are delivered by trucks, such as garbage collection, fire services and construction services.

What are the CO2 emissions from heavy-duty road transport?

The heavy-duty sector is responsible for just over a quarter of the greenhouse gas (GHG) emissions from road transport, and for about 6% of the EU's total GHG emissions. Between 2000 and 2019, emissions from heavy-duty road transport increased by about 5.5%. A key factor behind this rise was the growth in transport demand, which increased by almost 25% over this period. At the same time, **significant improvements in energy efficiency have limited the increase in emissions**: energy consumption per tonne-kilometre transported decreased by almost 15% between 2000 and 2019. Changes in the CO2 intensity of fossil fuels used by heavy goods vehicles played a negligible role, as diesel remained the dominant fossil fuel. The diesel share in fossil fuels was 99.5% in 2000 and 98.9% in 2019.



DECOMPOSITION ANALYSIS OF THE CO2 EMISSIONS OF HEAVY GOODS VEHICLES IN THE EU, 2000-2019 — PERCENTAGE CONTRIBUTION



Note: **CO2 emissions: percentage change compared to the year 2000.**
Driving factors: **percentage contribution of driving factors to percentage change in CO2 emissions from HGVs**

Source: **European Environment Agency (EEA)**

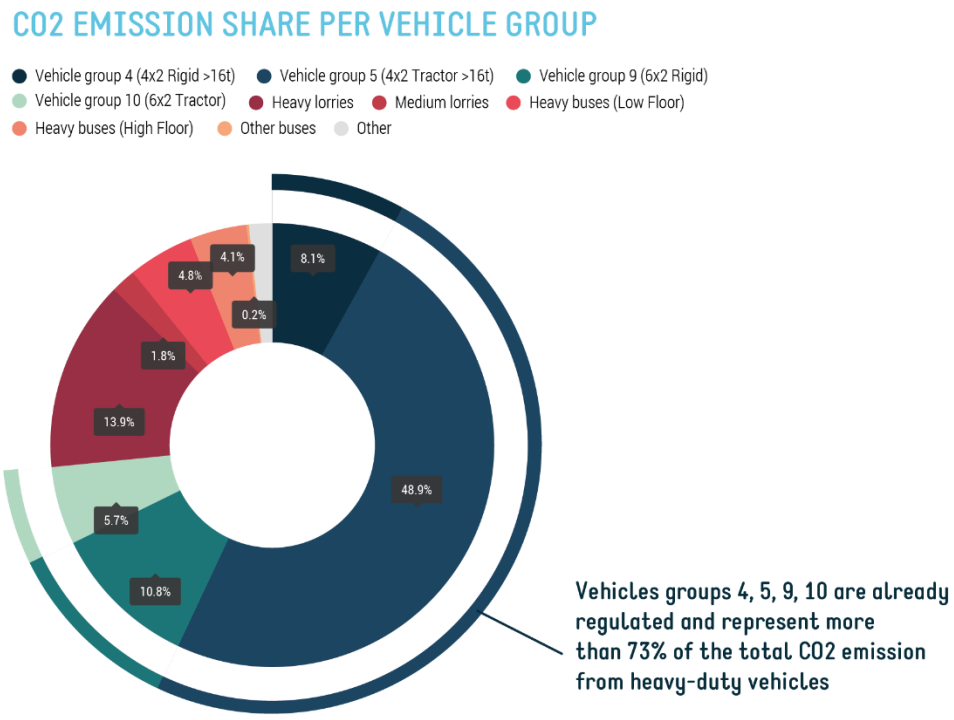
What are the CO2 standards for heavy-duty vehicles?

The EU regulation setting CO2 standards for heavy-duty vehicles ((EU) 2019/1242) obliges manufacturers to **reduce average fleet emissions of new heavy-duty vehicles (HDVs) within regulated vehicle groups by 15% (by 2025) and 30% (by 2030)**, **compared to a mid-2019 to mid-2020 baseline**. The CO2 emission standards build on the type-approval system through the HDV CO2 determination regulation ((EU) 2017/2400), which requires manufacturers to declare the CO2 emissions and fuel consumption of new vehicles based on the VECTO tool.

Which vehicles are covered by the current CO2 standards?

About 72% of all new heavy-duty vehicles currently have to declare and report their CO2 emissions, and almost three out of four new trucks are subject to the current CO2 reduction standards. **The proportion of vehicles that are currently regulated represents more than 73% of the total CO2 emissions from heavy-duty vehicles**, with almost half of all emissions coming from long-haul heavy-duty vehicles.

The review of the regulation will now extend the CO2 standards to a range of additional vehicle segments, including medium lorries, buses and coaches. **These represent about 25% of the CO2 emissions from heavy-duty vehicles.** With this extension of the scope of the CO2 standards regulation, more than 98% of the sector's CO2 emissions will be regulated. So-called 'vocational vehicles', such as concrete mixers, firefighting trucks and other special purpose vehicles, whose primary purpose is not to transport goods, represent only a small share of registrations and less than 2% of CO2 emissions.



What are the CO2 target levels?

Current CO2 standards require manufacturers to reduce the emissions of new trucks by 15% by 2025 and 30% by 2030 (compared to a mid-2019 to mid-2020 baseline). Reaching these targets will require at least every fifth new truck to be zero-emission by 2030. However, **market adoption relies heavily on a coherent policy framework** that includes the right charging and refuelling infrastructure, supportive and well-synchronised vehicle regulations, and a comprehensive carbon pricing mechanism. Without these enabling conditions in place, transport operators will not invest in zero-emission vehicles.

The review proposed by the European Commission on 14 February 2023, extends and increases the target levels even further to -45% in 2030, -65% in 2035 and -90% in 2040.

What determines the market uptake of zero-emission trucks and buses?

Commercial road transport is a **B2B market which is driven by demand**. Shippers and hauliers invest in vehicles based on profitability considerations for their operations. Building a solid business case which strongly supports the operation of zero-emission trucks and buses will lead to rapid market adoption of such vehicles and swift decarbonisation of road transport. Therefore, **decarbonising road transport requires more than setting higher CO2 targets for manufacturers**. Transport operators must be able to seamlessly recharge/refuel new vehicles, and be able to operate them more profitably than their conventionally powered trucks.

What does the ZEV market look like today?

The availability of zero-emission trucks and buses is increasing rapidly. **All manufacturers have either already started or are about to start series production of their new zero-emission trucks**. Production of battery electric vehicles will begin first, and hydrogen-powered trucks will follow soon after. Dozens of different battery-electric truck models are available today in various configurations that can be adapted to individual specifications.

Although the actual market uptake is highly dependent on a coherent policy framework of enabling conditions, registrations of zero-emission vehicles (BEV, FCEV) have accelerated from 692 (in 2019) to 1,239 (in 2020) and >2,500 in 2022.

How much infrastructure will be needed?

The current CO2 standards set a 30% reduction by 2030, requiring an EU-wide fleet of **at least 230,000 battery-electric (BEV)** and **at least 50,000 hydrogen-powered vehicles** to be **in operation by 2030**. Around 180,000 of these will have to be long-haul trucks which rely on publicly accessible megawatt charging (MCS >800 kW).

ACEA estimates that an individual charging point will initially be used by five to six HDVs per day on average. The utilisation rate will increase rapidly with a swift market adoption of battery-electric vehicles, thus improving the viability and profitability of the charging points. Based on these assumptions, ACEA estimates that the BEV fleet will require at least 34,000–42,000 publicly accessible charging points by 2030, of which at least 20,000–25,000 along the TEN-T network must be MCS chargers (>800 kW). Should the CO2 reduction targets be increased further, for example to 40% by 2030, the number of BEV HDVs on European roads will need to increase to at least 320,000 vehicles by 2030. In this scenario, the number of charging points necessary to service the fleet will have to increase to 48,000–59,000, of which 28,000–35,000 will need to be MCS chargers. In addition, the number of hydrogen fuel-cell electric vehicles will have to increase from around 50,000 to at least 70,000, which will require at least 2,000 refuelling stations, instead of 1,500 (at 2t/d capacity; the number could possibly be reduced by higher capacity stations (6 t/d)).

Setting even higher CO2 targets will require even more publicly accessible charging points, plus greater numbers of hydrogen refuelling stations with higher capacities (eg 6t/d instead of 2t/d).

The commercial vehicle industry is playing a role in kick-starting the roll-out of publicly available truck chargers, for example through a recently established joint venture (Milence), which aims to provide 1,700 high-performance (MCS) charging points within five years. However, even with this major kick-start investment, a **significant infrastructure gap** will remain for the foreseeable future.

CO2 TARGETS: ZERO-EMISSION VEHICLES AND INFRASTRUCTURE NEEDED

CO2 targets			-30%	-40%	-50%
Zero-emission vehicles needed in operation on EU roads (minimum)			280,000	390,000	465,000
	Battery electric vehicles (BEVs)		230,000	320,000	380,000
	Fuel-cell electric vehicles (FCEVs)		50,000	70,000	85,000
Infrastructure					
	Charging points	Total	34,000–42,000	48,000–59,000	53,000–65,000
		of which MCS chargers (>800 kW)	20,000–25,000	28,000–35,000	31,000–39,000
	H2 refueling stations	6 tons/day, or	500	650	700
		2 tons/day	1,500	2,000	2,200

Are there penalties if CO2 targets are missed?

If manufacturers miss their CO2 target, **heavy penalties apply**. The level is currently set at €4,250 per g CO2/tkm in 2025 and €6,800 per gCO2/tkm in 2030. Should a manufacturer with a 20% market share (~50k vehicles pa) miss its target by just 1g, the penalty would amount to over €360 million. The review proposed in February 2023 proposes to maintain the level of penalties at €4,250 per g CO2/tkm.

It is noteworthy that **only vehicle manufacturers are subject to such penalties**. No penalties of a similar level would apply to other stakeholders in the transport and logistics value chain, even those sectors that are crucial for providing key enabling conditions, such as charging/refuelling infrastructure.

Why should the CO2 regulation not set a 100% target or ban the sale of ICE vehicles?

Despite manufacturers' focus on zero-emission vehicles, **the internal combustion engine (ICE) will continue to play a long-term role in a small but important range of heavy-duty applications.** For those applications that will continue to rely on internal combustion engines, the use of fossil fuels should be swiftly phased out (and ultimately banned) in an appropriate regulation framework.

Setting an early ICE phase-out without ensuring that transport operators have confidence in a sufficiently dense network of truck-suitable charging and refuelling infrastructure could in fact be detrimental to reducing CO2 emissions, as it risks triggering 'pre-buy' or 'extended low-buy' effects. Transport operators could rush to invest in the last available ICE-powered vehicles, or extend their operation to avoid the cliff edge. This would be hugely detrimental for both the decarbonisation trajectory and the industry.

It has also been argued that new ICE vehicles will have to be phased out by 2035 because of the high average age of heavy-duty vehicles of >14 years. This interpretation is misleading and incorrect. In practice, the vast majority of long-haul vehicles with the highest CO2

emissions share only spend 4–6 years in service with their first operator. The average age of the entire fleet of some of the largest fleet owners in Europe is just 2.5 years[1].

What are ‘vocational vehicles’?

Although they are based on the same chassis and platforms, so-called ‘vocational vehicles’ differ substantially from heavy-duty vehicles used for the delivery of goods. They are often tailor-made as construction lorries, garbage lorries, concrete mixers or similar, and represent less than 2% of the fleet of each manufacturer.

Due to their technical characteristics and relatively small annual mileage, they are responsible for a very limited amount of the sector’s CO2 emissions (<2%). Additionally, measures for reducing CO2 emissions and energy consumption from vocational vehicles are not as cost-effective as for heavy-duty vehicles used for the delivery of goods.

What is the situation for buses and coaches?

From 1 January 2024, manufacturers will have to declare the CO2 emissions of new heavy buses. These vehicles became subject to CO2 emission standards under the proposed review of the regulation.

Because of favourable enabling conditions, the **market for zero-emission urban buses is already relatively mature**. Electrically-chargeable vehicles (battery electric and plug-in hybrid) together represent 10.6% of new bus sales in the EU, but they only account for 1.4% of all buses on the road today. All alternatively-powered vehicles combined represented over 30% of the EU bus market in 2021, with diesel-powered buses holding some 70% of the total market.

The most important favourable enabling conditions for urban buses are:

- The vehicles are almost exclusively publicly procured, which means that cities and public transport operators decide on the investments.
- The requirements for charging and refuelling infrastructure are usually limited to depots.
- Unlike many other use cases for heavy-duty vehicles, urban buses usually operate scheduled services with predictable routes.

[1] For example, Girteka, one of the largest fleet operators in Europe with more than 9,000 trucks in operation, states that the average age of its entire fleet is just 2.5 years. https://www.linkedin.com/pulse/how-far-away-future-zero-emission-trucking-girteka