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Europe's proposed heavy-duty CO_2 standards: Room for improvement

BACKGROUND

The European Commission recently proposed a revision to the CO_2 standards for heavy-duty vehicles. The current standards require a reduction in the emissions of most new trucks of 15% by 2025 and 30% by 2030, relative to 2019. The proposal would increase the 2030 target to 45%, while introducing a 65% target for 2035 and a 90% target for 2040. Urban buses would be required to be fully zero-emission by 2030, and trailers would require a 7.5%–15% reduction by the same year relative to 2025.

This fact sheet highlights where the stringency of the proposed CO_2 standards can still be improved to aid Europe in meeting its long-term climate commitments.

THE NEW TARGETS AVOID 1.8 BILLION TONS OF CO_2, BUT FALL SHORT OF WHAT'S NEEDED FOR CLIMATE NEUTRALITY

In the 30-year period from 1990 to 2020, emissions from the heavy-duty sector rose by 29%. In the following 30-year period from 2020 to 2050, the proposed CO_2 standards are projected to reduce emissions by 74% (or a 64% reduction relative to 1990). This equates to a cumulative emission reduction of 1.8 billion tons relative to the current standards, equivalent to roughly 8 years of current heavy-duty vehicle emissions.

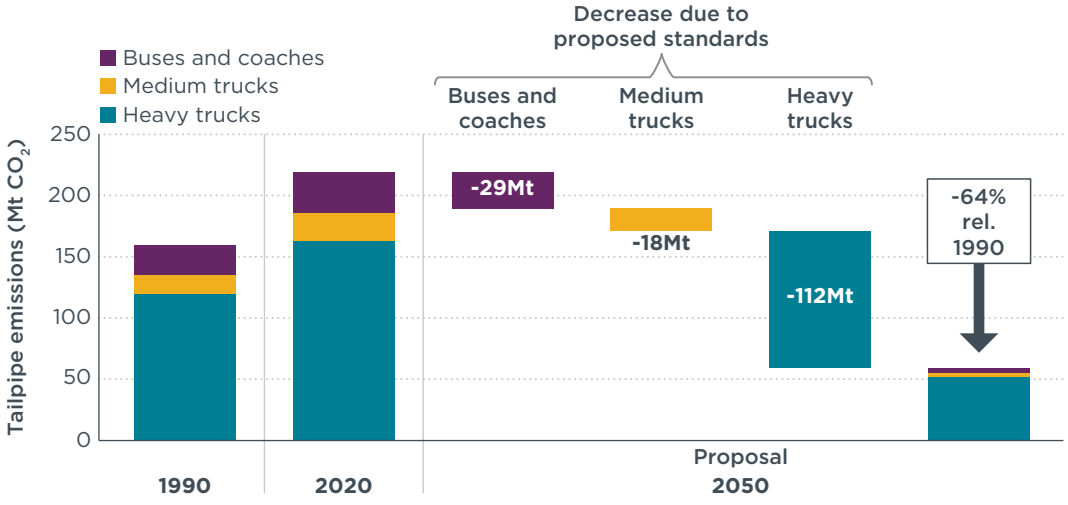

Figure 1. Emission reductions under the proposed CO_2 standards by 2050

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These emission reductions are significant but fall short of the reductions necessary to comply with Europe's long-term transport target: a 90% reduction across all transport sectors by 2050 relative to 1990. Stricter targets are needed to put the heavy-duty sector on track with Europe's climate commitments.

THE INCREASE OF VEHICLES COVERED LEAVES 9% OF HEAVY-DUTY VEHICLE EMISSIONS UNREGULATED

The current CO_2 standards apply to trucks which were responsible for 69% of heavy-duty vehicle CO_2 emissions and 59% of sales in 2020. The revision proposes to extend the scope of the standards to cover buses, coaches, trailers, and additional types of trucks. Combined, the proposed regulation would cover vehicles currently responsible for 91% of heavy-duty CO_2 emissions and 83% of sales.

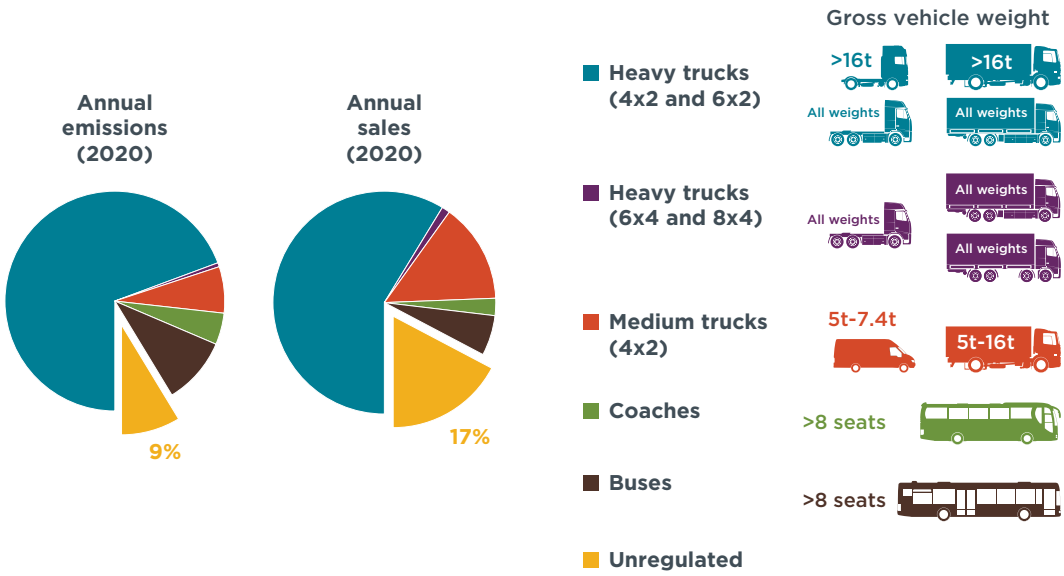

Figure 2. Vehicle types covered by the CO_2 standards by emissions and sales. The share of unregulated vehicles is highlight in yellow.

Of the emissions from currently unregulated vehicles, roughly half are from vocational vehicles, which are broadly defined as those not used for the delivery of goods. These include refuse trucks, tipper trucks, and construction vehicles. The administrative framework necessary to extend the scope of the standards to cover vocational vehicles already exists, as they are already required to monitor and report their CO_2 emissions. Including vocational vehicles in the standards would increase the coverage of the standards from 91% to 96% of heavy-duty CO_2 emissions and from 83% to 89% of sales. It may also close a loophole whereby a vehicle is reported as vocational, thus avoiding coverage under the CO_2 standards, but later retrofitted to act as a delivery vehicle.

THE LONG CREDIT LIFETIME OFFERS SUPERFLUOUS FLEXIBILITY

The credit and debt system in the current CO_2 standards allows a manufacturer to earn credits by over complying with their standards and use these credits to offset any debts accrued due to non-compliance. The standards' proposal extends the credit and debt mechanism to 2040, and by doing so has increased the lifetime of credits considerably.

Under the proposal, any credits earned from 2025 onward can be used through 2040, giving a lifetime of up to 15 years. By contrast, the Phase 2 Greenhouse Gas standards for heavy-duty vehicles in the United States grants a credit lifetime of 5 years.

If a target is easily achieved, a significant number of early credits may be banked for use in the later stages of the standards. This is a particular risk for buses, where the share of zero-emission vehicles has been rising rapidly in recent years. If buses continue to follow this trend, we estimate that enough credits will be earned between 2025 and 2030 to allow bus manufacturers to reach a 90% share in 2030 (lower than their 100% target) and use the credits earned to pay off the debts for non-compliance through 2040. Shortening the credit lifetime would alleviate such a risk.

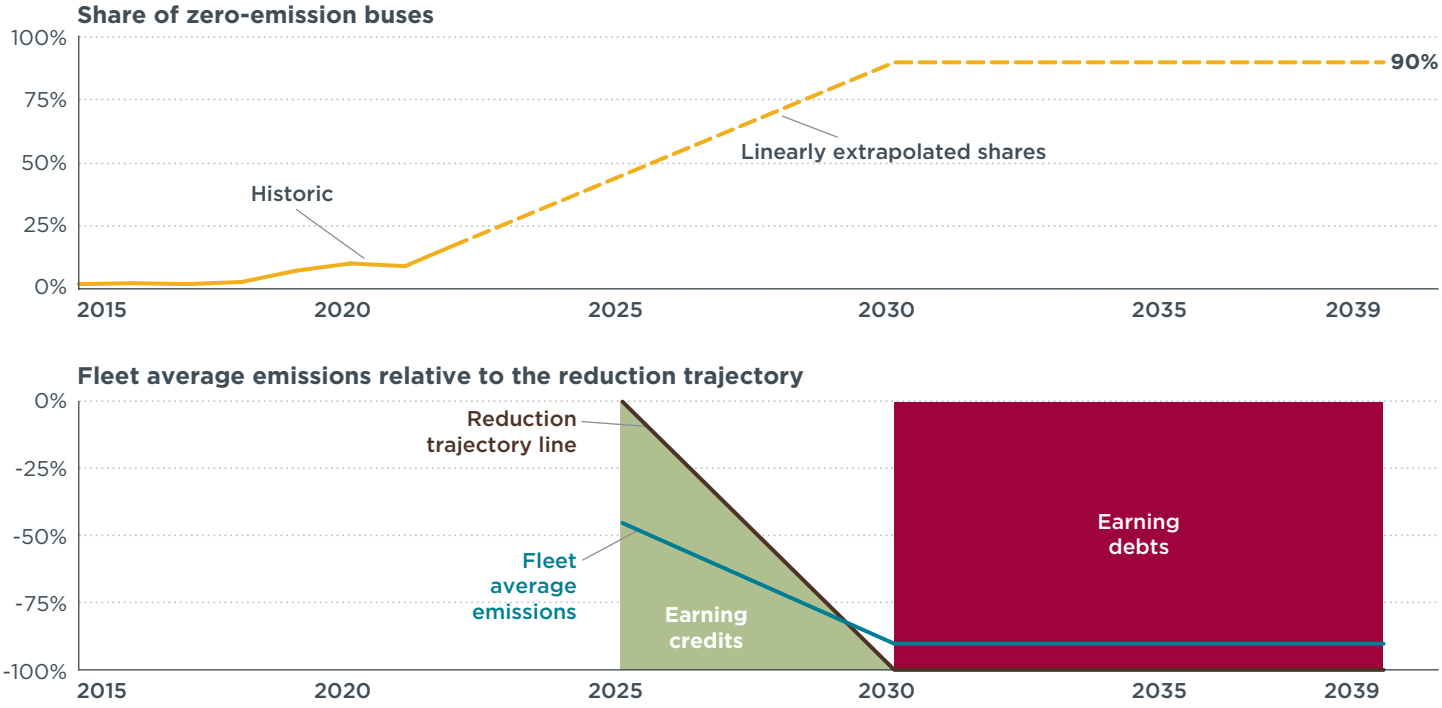

Figure 3. Extrapolated future shares of zero-emission buses (top) and the number of credits/debts they would earn (bottom). The credits earned from 2025 to 2030 is sufficient to cover the debts accrued from 2030 through 2039 from achieving a 90% share in 2030.

A NEW DEFINITION FOR ZERO-EMISSION TRUCKS ADDS UNCERTAINTY TO THE DECARBONIZATION PATHWAYS

In the proposal, a truck is defined as zero-emission if it has emissions less than 5 gCO_2/tkm for trucks, which is about 9% of a standard tractor trailer's emissions. The threshold for buses and coaches is also 5 gCO_2 per passenger kilometer, which is about 25% of a standard bus's emissions and 30% of a coach's emissions. The current definition allows for a vehicle with emissions of less than 1 gCO_2/kWh, equal to roughly 0.2% of a standard tractor trailer's emissions, to be classified as zero-emission.

The original threshold of 1 gCO_2/kWh enabled the categorization of monofuel hydrogen combustion engines as zero emission, allowing for a small amount of CO_2 generated through the emissions control system and used to reduce nitrogen oxide emissions.

The increase in the threshold would allow for the use dual-fuel combustion engines operating with a mix of hydrogen and diesel, which require a diesel fuel pilot injection to initiate the ignition process. A fast adoption of this technology would increase

heavy-duty cumulative emissions by up to 130 million tons compared to if only actual zero-emission vehicles were used for compliance. Revising the emissions to 1gCO_2/tkm is the simplest regulatory approach, allowing for both mono-fuel and efficient dual-fuel hydrogen combustion engines to be categorized as zero emissions.

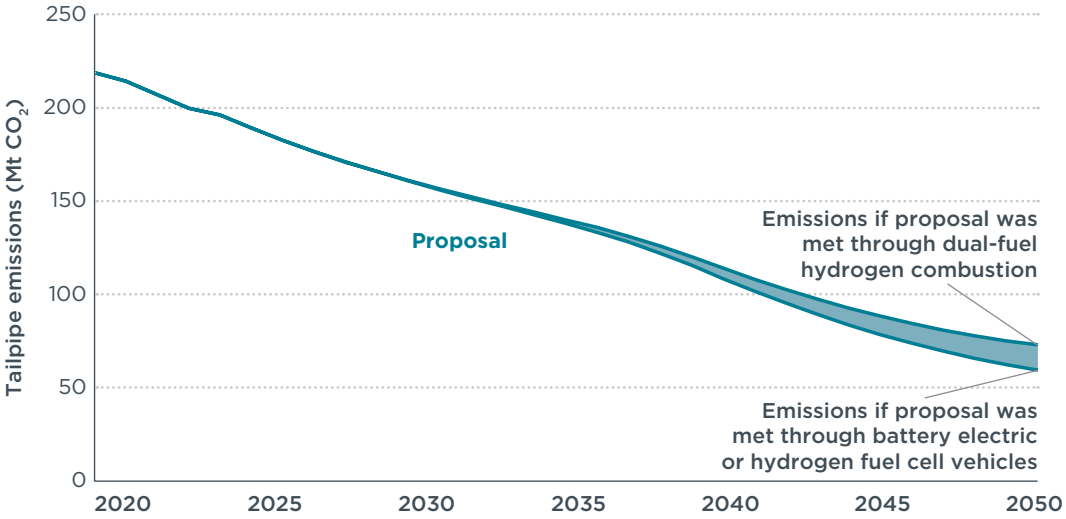

Figure 4. Range of emissions possible under the proposed definition of zero-emission vehicles at 5 gCO_2/tkm

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