



Addendum: Addressing the heavy-duty climate problem

Why all new freight trucks and buses need to be zero-emission by 2035

July 2023

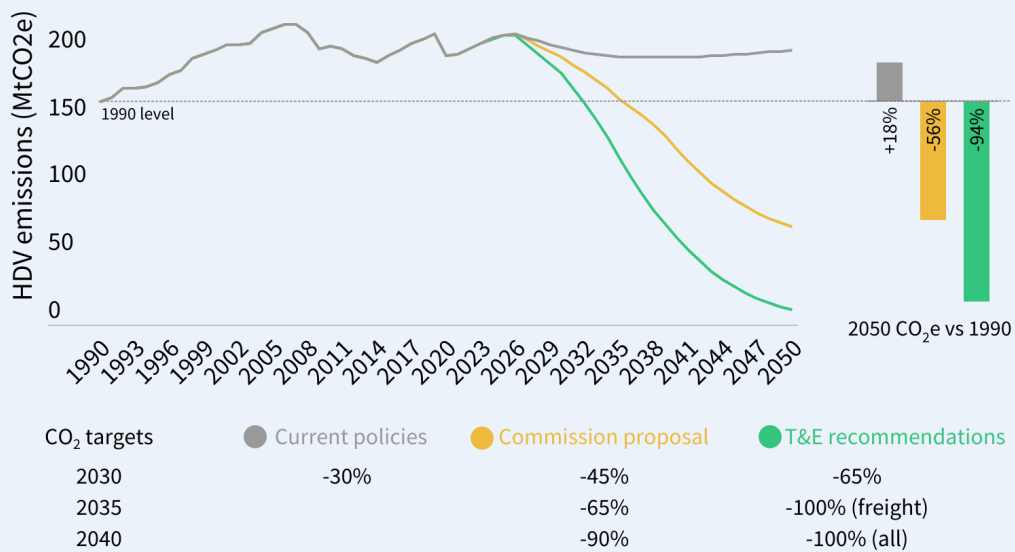
Summary

This addendum updates the 2022 publication “*Addressing the heavy-duty climate problem*” to the legislative design of the European Commission’s proposal on the review of the CO₂ standards for heavy-duty vehicles (HDVs), which was published in February 2023. The analysis shows the impact of the Commission proposal on the emissions trajectory towards 2030, 2040 and 2050, as well as on energy consumption (oil, electricity and hydrogen) and the EU’s carbon budget. It then compares the Commission proposal with current policies and more ambitious targets for the HDV CO₂ standards as proposed by T&E.

Emissions from trucks and buses have increased by 28% between 1990 and 2019. Considering current policies and without additional measures, HDVs are projected to eat up 60.9% of the EU’s remaining carbon budget for a 1.5°C world. By 2030, we would be faced with a 3.8% increase in oil consumption from HDVs due to continued activity increase of HDVs.

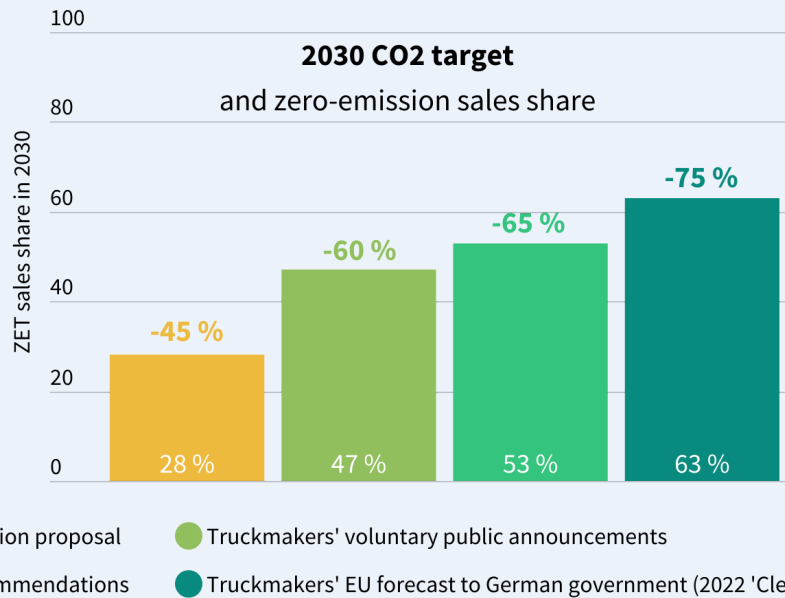
The Commission’s proposal aims to tackle Europe’s heavy-duty climate problem. However, this analysis finds that their proposed CO₂ targets for HDVs are far from sufficient to deliver on the EU’s climate targets. While the EU Climate Law commits to a fully decarbonised economy by 2050, the proposal would only deliver a -56% cut in emissions from HDVs by that date (compared to 1990). 40% of the diesel fleet would still be on the road after 2050, with these trucks being 7 to 8 years away from the EU’s average truck retirement age. On top of that, the Commission proposal is allowing a continued sale of new diesel trucks even after 2050 by failing to set a 100% zero-emission sales deadline, as well as by exempting almost 20% of HDV sales from the reduction targets of the regulation.

T&E’s recommended targets on the other hand would deliver a -94% CO₂ reduction by 2050, with the remaining diesel fleet very close to retirement age.



2030 target behind even voluntary industry commitments

Six of the EU's seven major truckmakers have made public announcements about the share of new sales being zero-emission by 2030. Aggregating those announcements, 47% of new EU truck sales (or 9% of the total fleet size) would be battery electric (BEV) or hydrogen fuel cell (FCEV) in 2030. In private conversations with the German government, the so-called 'Cleanroom talks', manufacturers have projected an even higher uptake of 63% zero-emission sales by 2030. T&E therefore recommends increasing the 2030 CO₂ target under the HDV CO₂ standards from the Commission proposal of -45% to -65%. This would be aligned with the industry's own voluntary commitments and projections.



Scope: EU27+UK (in line with truckmakers' announcements). Covers all vehicle groups, except for 'Cleanroom talks' where only sales >12t GVW were considered. Commission proposal exempts 20% of HDV sales.

Sources: T&E (2023), European Commission (2023), NOW GmbH (2023), analysis of truckmakers' announcements.

Infrastructure and energy consumption

Charging and refuelling infrastructure is often cited as the main obstacle for an obligation on truck manufacturers to ramp-up zero-emissions truck and bus sales more quickly. However, our analysis finds that the expected public infrastructure under the Alternative Fuels Infrastructure Regulation (AFIR) will provide enough infrastructure for a more ambitious -65% target in 2030.

A big advantage of zero-emission vehicles is also that they are far more energy efficient than diesel trucks. With HDV activity projected to increase by 34% between 2019 and 2050, the sector urgently needs to get off its oil addiction. Total energy consumption (across oil, electricity and hydrogen) could fall by 37% in the 2019-2050 timespan under T&E's recommended targets, while the Commission's proposal only achieves a -24% reduction.

1. Introduction: why the update?

T&E's original briefing published in September 2022¹ quantified the outsized climate impact of trucks and buses and looked into the ambition level needed under the review of the HDV CO₂ standards to ensure the sector's compliance with Europe's climate goals. It included emissions trajectories until 2050 under different policy scenarios. Since the September 2022 publication, the European Commission has published a proposal for new HDV CO₂ standards.² The accompanying Impact Assessment (IA) included more details on the Commission's modelling.³ Compared to T&E's previous analysis, it uses slightly different weight categories to group trucks into market segments and only applies CO₂ targets to a part of new sales. This addendum aligns our analysis to the latest policy proposal and shows the new results.

T&E's former analysis differed from the European Commissions' eventual regulatory approach in two main aspects:

- The scope of regulated vehicles - the Commission proposal covers urban buses, coaches, medium (between 5 and 7.4 tonnes) and heavy (above 7.4 tonnes) lorries as well as some of those with special axle combinations. T&E's analysis on the other hand included all HDV sales, including vocational and non-certified vehicles such as small trucks.
- The criterion by which HDVs are split into vehicle sub-groups - previously we used weight ranges (small, medium and heavy) as a criterion, as well as the operational purpose in order to separate vocational vehicles. The Commission's IA on the other hand also considers trucks classified as having a 'special axle configuration' as a separate segment. Aligning our methodology with that of the Commission led to slightly different results.⁴

The Commission has also provided additional information on how trailers and semi-trailers have to contribute to the new fleet's emission reductions. According to the new regulation, trailers have to reduce their CO₂ emissions by 7.5% starting in 2030, while semi-trailers need to achieve a reduction of 15% (against a 2025/2026 baseline). Since these values are slightly above what was used in our previous report,⁵ CO₂ emissions and oil consumption in 2030 have changed, especially under the current policy scenario.

¹ Transport&Environment (2022). Addressing the heavy-duty problem. [Link](#).

² <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2023%3A88%3AFIN>

³ https://climate.ec.europa.eu/system/files/2023-02/policy_transport_hdv_20230214_impact_assessment_en_0.pdf

⁴ This is also the case where policy assumptions have not changed as some modelling input values have also been adjusted, such as for fuel consumption, payload and vehicle activity.

⁵ We were assuming a 7.5% improvement from 2030 and 10% from 2040 for both trailers and semi-trailers.

2. Presentation of the new policy scenarios

The Commission can legislate new sales through two different types of targets: A ZEV sales target requires manufacturers to sell a minimum share of new zero-emission vehicles, while a CO₂ reduction target mandates a reduction of the average CO₂ emissions across a manufacturer's new sales.

This addendum analyses three policy scenarios:

- **The current policies scenario** assumes the current HDV CO₂ standards continue to apply, meaning a -15% CO₂ reduction target in 2025 and a -30% target in 2030, applying only to currently regulated truck sales above 16 tonnes. The assumption under this scenario is that truck manufacturers limit their zero-emission vehicle sales to what is needed to comply with the regulation, in order to provide a clear and simple baseline for comparative analysis. Hence, the ZEV market share within the currently unregulated categories is assumed constant at current levels⁶ until 2050.
- **The Commission proposal** for the revision of the CO₂ standards, meaning a -15% CO₂ reduction target for trucks and coaches in 2025, -45% in 2030, -65% in 2035 and -90% in 2040. Urban buses have a 100% ZEV sales target in 2030. Trucks below 5 tons, vocational and non-regulated vehicles are not subject to any CO₂ reduction or ZEV sales target under the Commission's proposal (see below). In our model, this translates into future ZEV sales shares for such categories remaining constant at current levels.
- **T&E's recommendations**, meaning a -15% CO₂ reduction target for trucks and coaches in 2025, but higher targets than under the Commission's proposal from 2030: -65% in 2030 and -100% in 2035. The 100% ZEV sales target for urban buses is brought forward to 2027. In addition, T&E's scenario also includes separate targets for those categories which the Commission is exempting from the scope. Vocational vehicles become subject to a -35% CO₂ reduction target in 2030, -85% in 2035 and -100% in 2040. Non-certified lorries are proposed to receive the following targets: 30% ZEV sales in 2030, 80% in 2035 and 100% in 2040.

We assumed that the (semi-)trailer targets are always achieved in the three policy scenarios.

These scenarios were fed into T&E's European Union Transport Roadmap Model (EUTRM), which calculates the greenhouse gas emissions, energy and oil consumption as well as vehicle sales and fleet composition until 2050 for each scenario.

As mentioned above, the Commission proposal and T&E's recommendations do not just differ in regard to the target levels, but also in the range of vehicle categories that the regulation applies to. Today, the HDV CO₂ standards only set targets for the heavier trucks (those weighing above 16 tonnes), which account for an estimated 62% of total HDV sales and 65% of fleet emissions (see figure 1). The Commission is

⁶ Source: ACEA (2020-2022). They report 0.47% ZEV sales in the EU-27 as of 2021.

proposing to expand the regulatory scope to include all medium-sized trucks, the remaining heavy trucks, as well as urban buses and coaches. With the newly added categories, slightly over 80% of HDV sales and 88% of HDV emissions would be subject to the regulation. However, the Commission proposed to maintain the exemption of small trucks (weighing between 3.5-5 tonnes), as well as so-called ‘vocational’ and ‘non-certified’ vehicles. This means nearly 20% of new sales and 12% of fleet emissions would remain completely unregulated⁷.

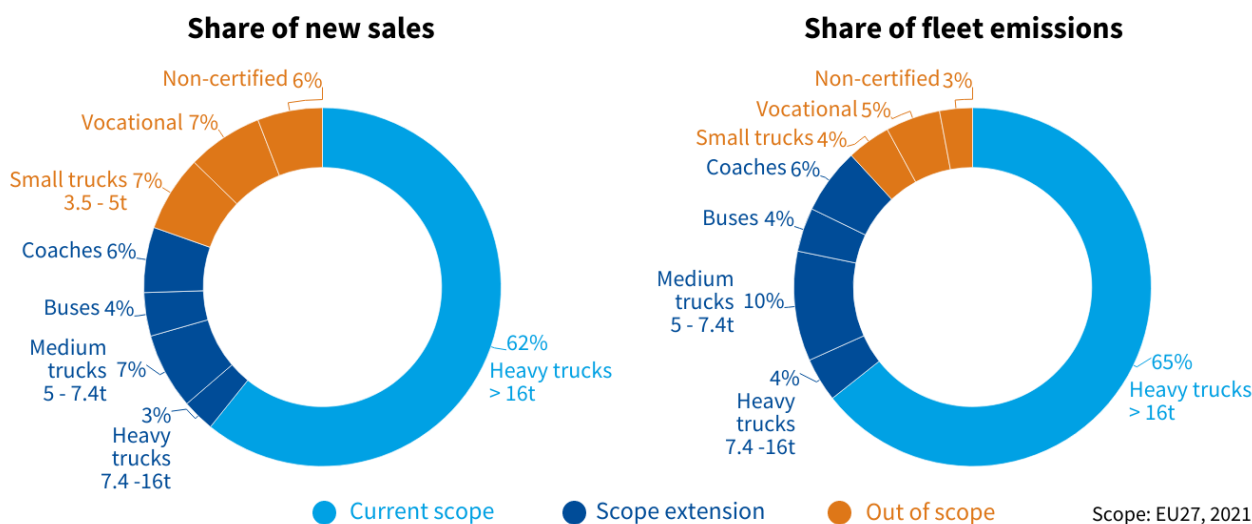


Figure 1: Commission proposal leaves 20% of new HDV sales unregulated

3. Uptake of zero-emission HDV sales under each scenario

For each scenario, figure 2 shows the annual share of ZEV until 2050⁸. Under T&E recommendations, more than half of new HDV sales would be zero-emission in 2030, climbing to 96% in 2035, and reaching 100% in 2040. The Commission proposal on the other hand would result in less than a third of 2030 new sales being zero-emission, reaching 48% in 2035 and 71% in 2040. One of the reasons for the uptake of ZEVs being lower under the Commission proposal is that the proposal excludes approximately 20% of new HDV sales.

⁷ T&E analysis is comparable to estimates in the Commission’s Impact Assessment in terms of emissions from new sales covered, while it does not include information on sales proportions.

⁸ A detailed explanation of the data and methodology used to convert CO₂ targets into ZEV sales uptake can be found in Annexes 2 and 3 of the original briefing. ZEV sales uptake is always slightly below the modelled CO₂ reduction targets, because manufacturers are expected to not only sell ZEVs to comply, but also use improved fuel efficiency for a smaller share of compliance.

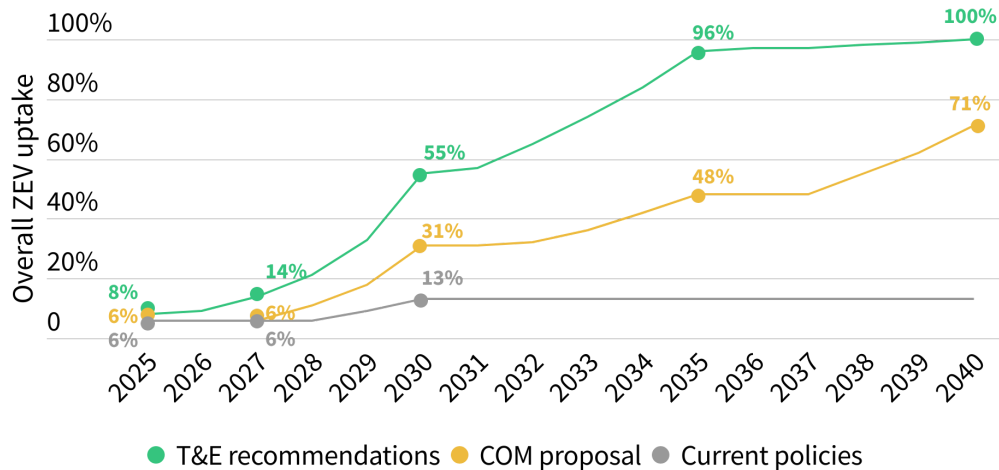


Figure 2: overall ZEV uptake⁹

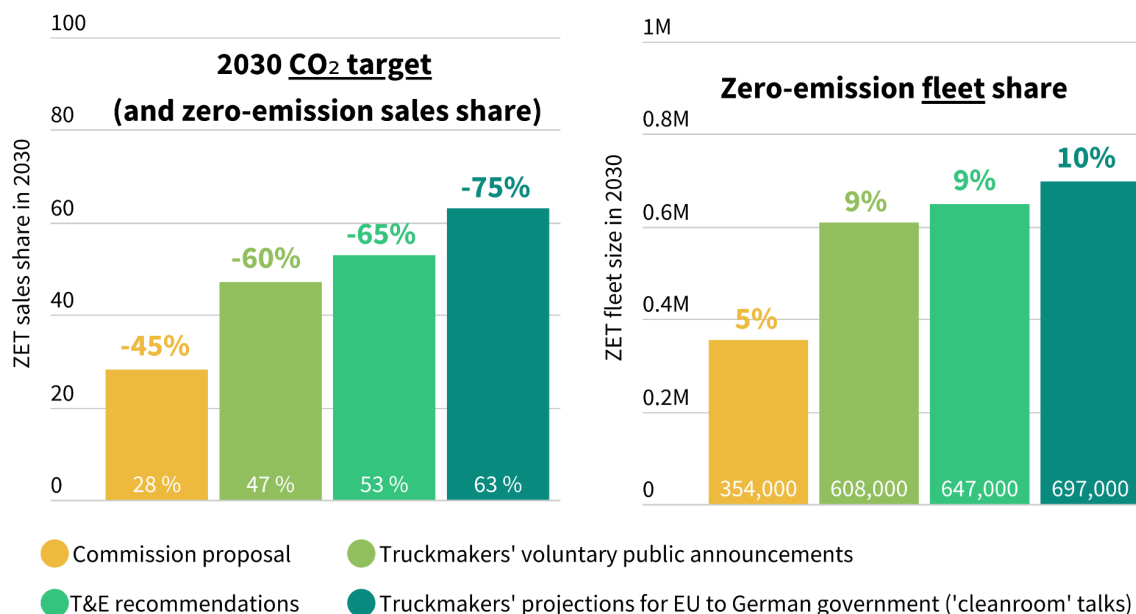
So how do the two policy scenarios compare to the speed at which truck manufacturers see their zero-emission sales increase? Six of the EU’s seven major truckmakers have made public announcements about the share of new sales they plan to turn zero-emission by 2030, ranging from a 44 - 70% zero-emission sales share.¹⁰ Based on these voluntary announcements, T&E calculates that there will be around 608,000 zero-emission trucks (ZETs) on the road by 2030. Recently published data based on official talks between German government authorities and European truck manufacturers show an even more rapid uptake of zero-emission trucks. These so-called ‘Cleanroom talks’ involved most manufacturers (95% of the European HDV market for vehicles weighing above 12 tonnes), the BMDV (the German Ministry for Digital and Transport), NOW GmbH (a federally-owned company working in the area of sustainable mobility) and a law firm commissioned to ensure compliance with antitrust law¹¹. According to the information provided by the manufacturers, around 75% of new heavy-duty registrations in Germany will be zero-emission by 2030, and 63% of EU sales. This would result in an estimated zero-emission fleet of 697,000 vehicles in Europe by the end of the decade.

Figure 3 compares these numbers with what the policy scenarios mentioned above would deliver. The Commission proposal would only bring 354,000 zero-emission trucks (ZET) to the road in 2030, or 42% less than what the manufacturers themselves have promised to deliver in their voluntary announcements. In contrast, under T&E recommendations 646,000 ZETs would be driving around in 2030, just 6% more than what truck makers have publicly announced to be able to deliver on, and 51,000 vehicles less than their sales projections shared with the German government.

⁹ Figure 2 shows the uptake for the entire fleet, while the share of zero-emission sales per vehicle category can be found in Annex 3 for each scenario.

¹⁰ Volvo has communicated the highest voluntary ambition for 2030: a 70% sales share for zero-emission trucks. Daimler announced an up to 60% ZET sales share. Scania, Renault Trucks and IVECO communicated a 50% ZET share and MAN a 44% ZET sales share. It is assumed that DAF, the only truckmakers who has not made a voluntary commitment for 2030 sales, limits itself to complying with the existing legal requirements under current policies.

¹¹ NOW GmbH (2023). Market development of climate-friendly technologies in heavy-duty road freight transport in Germany and Europe. [Link](#).



Scope: EU27+UK (in line with truckmakers' announcements). Covers all vehicle groups, except for 'Cleanroom talks' where only sales >12t GVW were considered. Commission proposal exempts 20% of HDV sales.
Sources: T&E (2023), European Commission (2023), NOW GmbH (2023), analysis of truckmakers' announcements.

Figure 3: ZET sales share and number of ZETs on the road in 2030

Note that figure 3 above only looks at trucks, leaving out zero-emission buses and coaches. This is because the manufacturer's voluntary targets only encompass their truck plans. For the same reason, the analysis considers both the EU and UK market, as that is the geographical scope of the announcements.

4. Contribution to the EU's climate targets

4.1. Achieving zero emissions in 2050

At first sight, the Commission's proposal to reduce emissions of new sales by 90% by 2040 seems very close to a full decarbonisation of the sector. However, as illustrated by figure 4 below, our analysis finds that the proposal would only reduce emissions from HDVs by 56% by 2050 (compared to 1990 levels). This is due to the rather low ambition level for 2030 and 2035, as well as the exclusion of 20% of new HDV sales from any kind of targets. The Commission proposal thereby leaves a huge gap that is unlikely to be compensated for by other sectors, failing not only the EU's ambition of reaching climate neutrality by 2050, but also Europe's chance to retain its industrial leadership of the commercial vehicle sector.

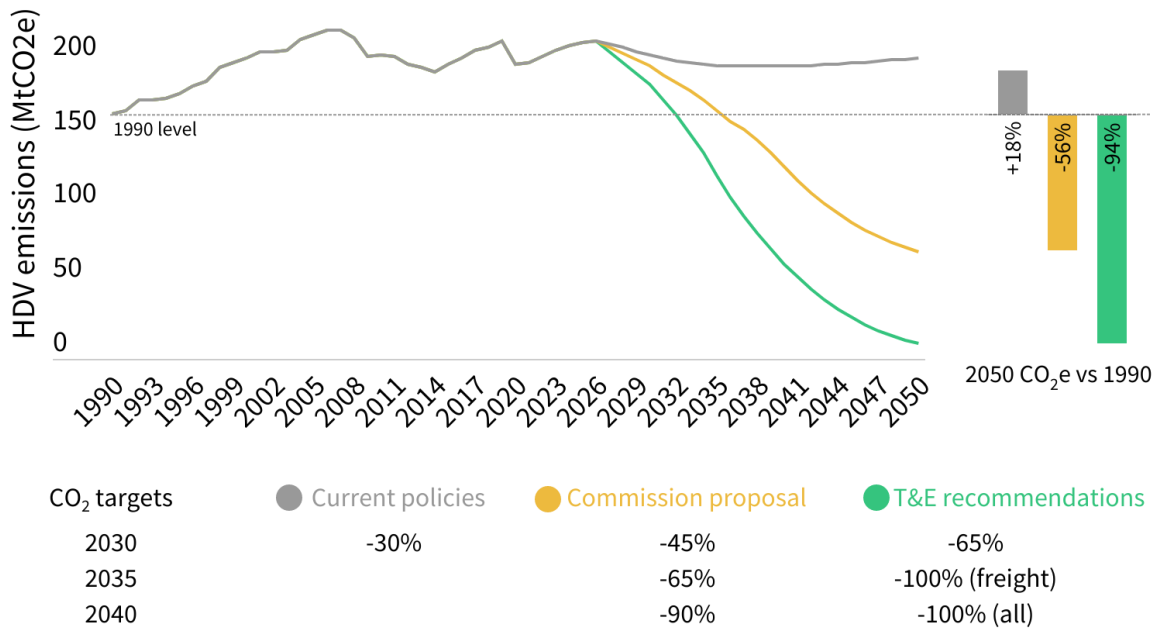


Figure 4: Commission proposal only delivers 56% cut in emissions by 2050

T&E’s proposal on the other hand achieves much higher emission savings. Under the recommended standards, the sector’s emissions would be reduced by 94% in 2050 (compared to 1990). Compared to the Commission proposal, an additional 1,120 Mt of CO₂ would be saved by 2050. This is roughly equal to the yearly emissions from the power sector in the 27 EU countries and the UK¹².

Another crucial criterion to assess the long term climate impact of the different policy scenarios is the size of the legacy diesel fleet in 2050. Under T&E’s recommendations, 840,000 diesel vehicles would still be in circulation in 2050, which is slightly more than 10% of the fleet. These remaining diesel vehicles would however be slightly older than the average retirement age of HDVs in Europe (21 years instead of 20). The mileage share and thus emissions from these vehicles would be very small as it can be expected that newer more fuel efficient and zero-emission vehicles will operate at higher mileages than the older parts of the legacy fleet. It is therefore reasonable to assume that these older diesel vehicles will be retired early because of their higher cost of operation. On the other hand, the Commission proposal, which fails to set a 100% zero-emission target, means that a very significant share of the vehicles (3.2 million, or 40% of the expected fleet) would remain diesel-powered in 2050. This results in the sector only achieving a 56% emissions reduction in 2050 as described above. Diesel sales would also continue after 2040 due to the -90% reduction target and the continued exemption of some vehicle types.

¹² UNFCCC (2022). National Inventory Submissions 2022. [Link](#). The reference year is 2019, as 2020 emissions are heavily influenced by the COVID-19 pandemics and do not represent a useful baseline.

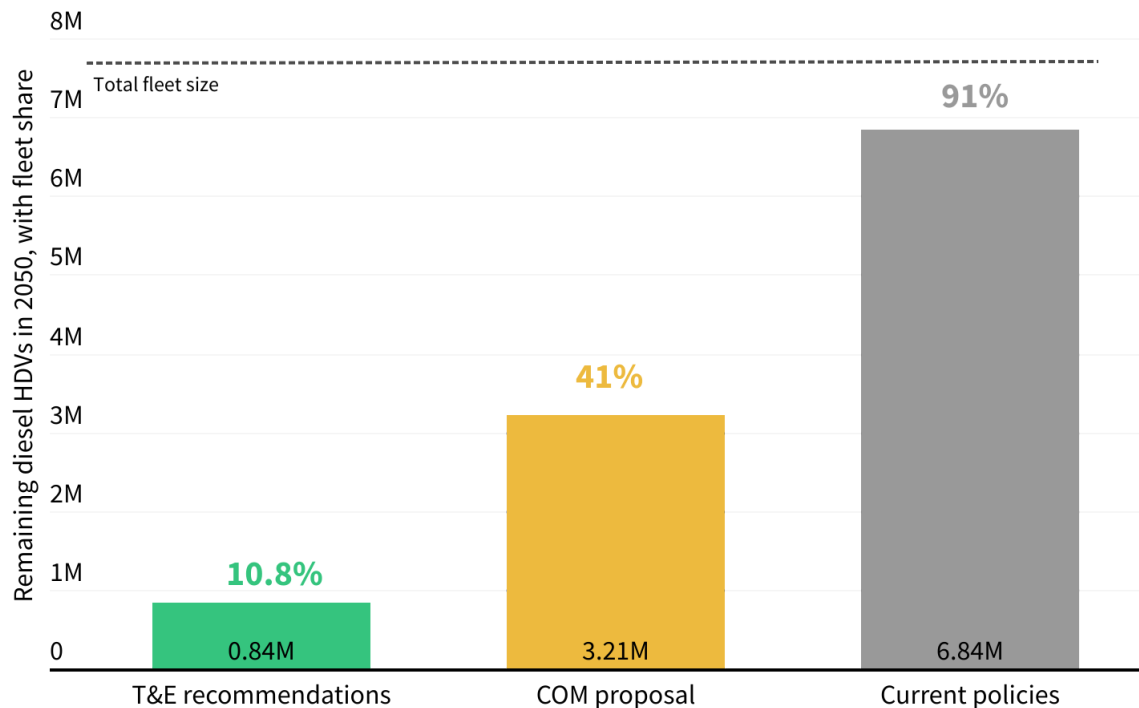


Figure 5: remaining diesel fleet vs total fleet size in 2050.

4.2 Savings in 2030

By 2030, none of the three scenarios is able to achieve any emission reduction compared to 1990. This is essentially due to the lack of an ambitious regulatory framework so far, which has allowed HDV emissions to rise by 28% in the 1990-2019 period. Under current policies, HDVs would continue to stay largely above the 1990 level (+26% by 2030). Due to its limited additional near term ambition and the lack of intermediate targets between 2025 and 2030, the Commission proposal would hardly break that trend. T&E's scenario does the best job in starting to turn the tanker, limiting the increase to 12% by 2030 compared to 1990 (-14% compared to 2019). But it is still far from the -55% target set out in the European Green Deal for the overall economy, meaning other sectors will need to cover for HDVs' underperformance¹³.

¹³ European Commission (2020). 2030 Climate Target Plan. [Link](#)

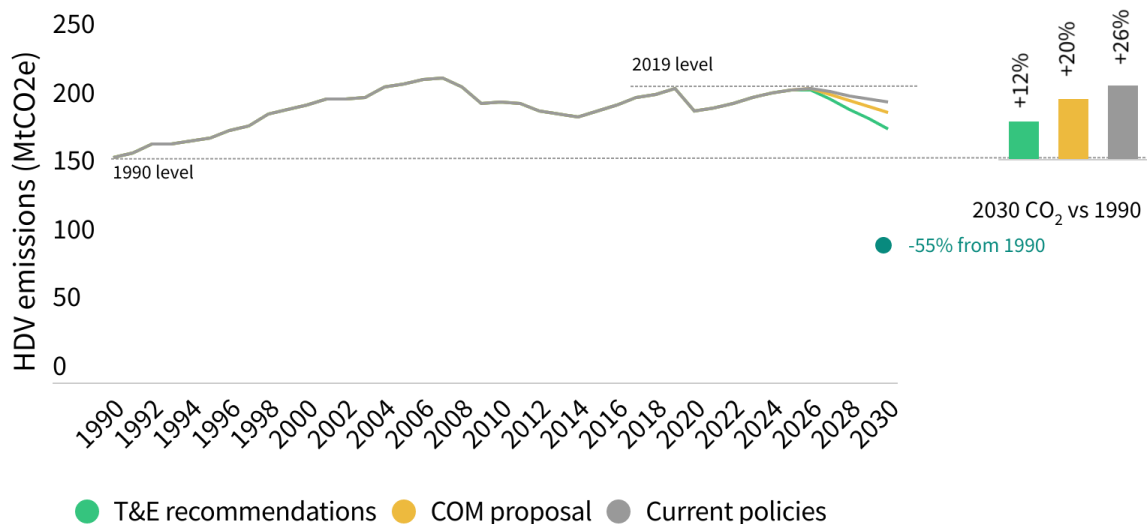


Figure 6: emission trajectories until 2030.

Although the idea that the HDV sector can contribute fairly to the 2030 target is clearly out of reach, it is still crucial to start curbing emissions as quickly as possible in order not to waste the effort made by other sectors. Compared to the business as usual case, T&E’s scenario emits 19 Mt CO₂e less in 2030, while the proposed regulation saves up to 7 Mt CO₂e. These are equivalent to the yearly emissions of, respectively, 9.8 million and 3.7 million cars¹⁴. T&E’s scenario would thus more than double the emissions savings from the HDV CO₂ standards compared to the Commission’s proposal.

Section 4.2 of the original paper explains in detail the disproportionately high impact that trucks and buses have in depleting the European carbon budget¹⁵. Figure 7 shows the updated values, reinforcing the urgency for a tightening of the emission standards.

¹⁴ Based on average annual emissions of 1.97 tCO₂ per car. Estimate calculated from total EU car fleet CO₂ emissions of 480.42 MtCO₂ in 2019. UNFCCC (2022). National Inventory Submissions 2022. [Link](#). The EU fleet size is 243.5 million cars in 2019. ACEA (2022). Vehicles in Use. [Link](#). Data for 2020 is available but not used, as car-related travel dropped in 2020 due to the COVID-19 pandemic, which distorted the relation between vehicle stock and emissions.

¹⁵ The reference budget is the one to have a 67% chance of limiting global warming to 1.5°C above pre-industrial levels, not correcting for historical emissions. Source: IEA. (2022). Global CO₂ emissions rebounded to their highest level in history in 2021. [Link](#)

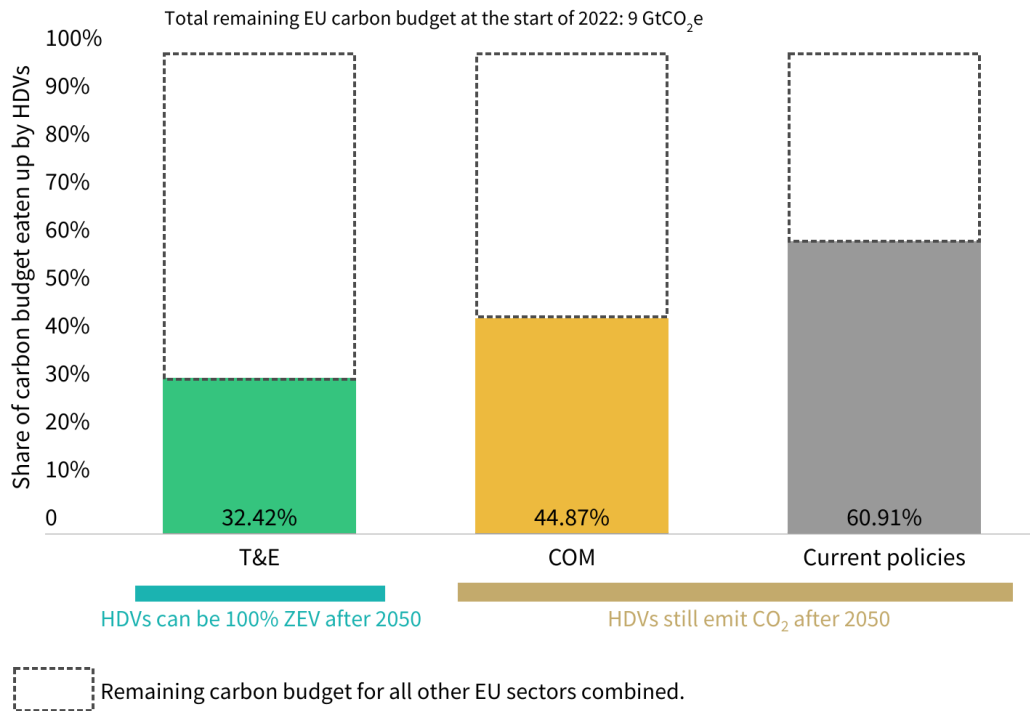


Figure 7: cumulative emission savings until 2050, with the respective share of the carbon budget¹⁶.

4.3 Sensitivity analysis: achieving net zero already in 2040

In a recent speech accompanying the release of the latest report by the Intergovernmental Panel on Climate Change (IPCC), United Nations Secretary-General António Guterres called on the EU to bring its climate neutrality target forward to 2040 (instead of 2050)¹⁷. Under the European Climate Law, the Commission is required to propose a 2040 climate target for Europe by next spring at the latest. Therefore, it is worth looking at what CO₂ reduction can be achieved at that date by the HDV scenarios presented in this study.

The difference between T&E’s recommendations and the Commission proposal in achieving substantial climate benefits is clear when looking at the CO₂ emissions projected for the year 2040. According to the EUTRM projections, T&E’s scenario is expected to achieve a 61% reduction (compared to CO₂ levels in 1990) by that year, while the Commission proposal would only result in a 21% cut. The quicker uptake of zero-emission sales, driven by a -65% CO₂ target already in 2030 (as opposed to -45% in the Commission proposal), is key in setting the reduction trajectory on to the right path for climate neutrality. While until 2030 emissions under both scenarios evolve quite similarly, the massive amount of ZEVs entering the European fleet leads to a decoupling of the two trajectories in the 2030s.

¹⁶ The difference with the values in the September 2022 publication is given by the updated values for the carbon budget, gone from 15 Gt to 9 Gt CO₂.

¹⁷ <https://www.politico.eu/article/climate-change-report-un-antonio-guterres-demand-eu-us-new-target/>

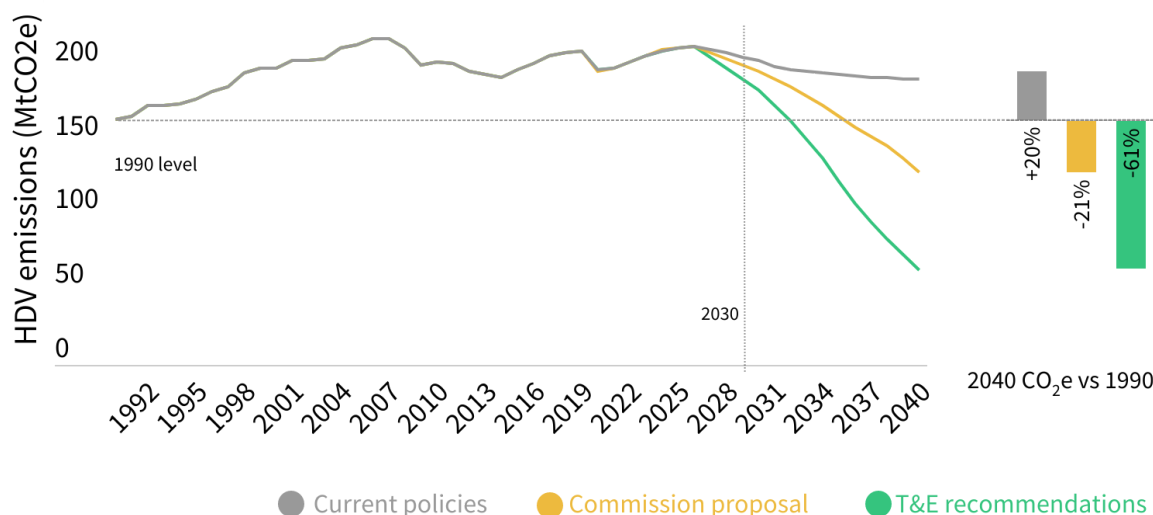


Figure 8: emission trajectories, 2020-2040.

This is even clearer when looking at cumulative emission savings in the 2030-2040 period (figure 8). Under T&E’s recommendations, these amount to 463 Mt CO₂ or more than France’s total annual emissions in 2019¹⁸. These savings are crucial for achieving the EU's climate targets.

5. Energy and oil consumption

5.1 Oil demand reduction

In 2021, trucks and buses in the EU consumed 63.3 million tonnes of oil equivalent (Mtoe) of diesel. While HDVs only represent 2% of vehicles on the road, they are responsible for 42% of the EU’s total oil consumption from road transport. In a do-nothing-scenario, diesel consumption from HDVs would rise by 3.8% by 2030 (+2.4 Mtoe). The difference with the ‘current policies’ scenario in the previous briefing (+6 Mtoe) comes from the higher fuel efficiency improvement from the trailers and semi-trailers standards.

The Commission’s proposal fails to alleviate Europe’s heavy-duty oil addiction. Oil consumption in 2030 would be as high as 2021 levels. If the ambition level of the HDV CO₂ standards were to be increased in line with T&E’s recommendations on the other hand, oil consumption would decrease by 3.9 Mtoe (-6.2%) by 2030, which is a step in the right direction and would allow us to already become less dependant on foreign oil imports.

¹⁸ UNFCCC (2022). National Inventory Submissions 2022. [Link](#).

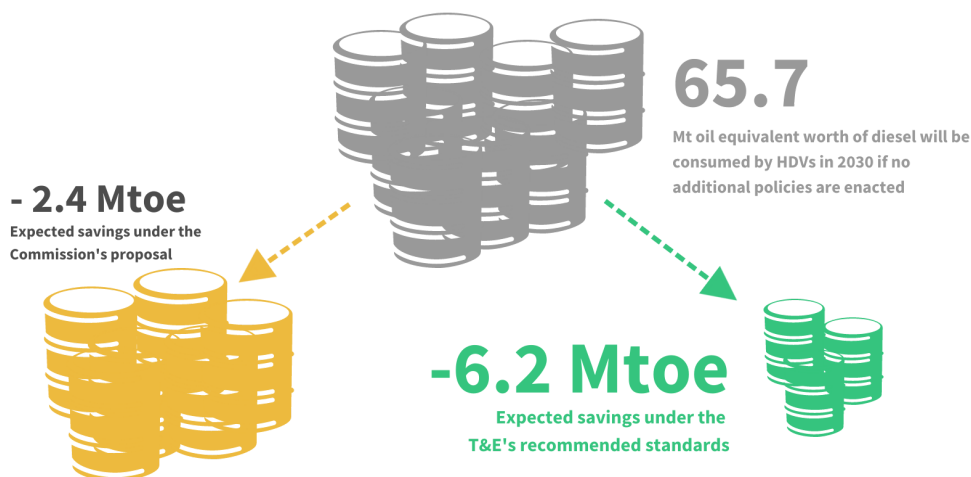


Figure 9: oil savings comparison between the Commission's proposal and T&E's recommendations

5.2 Electricity and hydrogen consumption

While oil consumption will decrease due to an increasing uptake of zero-emission trucks, electricity and hydrogen consumption will consequently grow. To assess the growth of both, we need to assume the split of the zero-emission vehicle fleet between battery electric and hydrogen fuel cell vehicles. The split assumed below is based on market forecasts and total cost of ownership (TCO) considerations. Annex 2 provides more detail on the methodology.

Under T&E's recommended targets, the battery electric truck and bus fleet will require 57.31 TWh of energy by 2030, while 16.86 TWh will be needed for fuel cell electric vehicles¹⁹. In a recent study²⁰, T&E found that the EU's new Alternative Fuel Infrastructure Regulation (AFIR) would provide sufficient public charging and refuelling capacity to cover this level of demand in 2030 based on a -65% CO₂ reduction target²¹. On the other hand, we found that a slower ZEV roll-out will likely mean some level of underutilisation of the infrastructure which member states are now legally obliged to build by 2030, which would undermine the business case of charge point operators and likely require continued public subsidies.

5.3. Electrification is the king of energy efficiency

A significant advantage of electrification is its high level of energy efficiency. Despite HDV activity expected to significantly increase in the 2019-2050 period (+34%), overall well-to-wheel (WTW) energy consumption (including diesel, electricity and hydrogen) would plummet by 37% under T&E's

¹⁹ Total well-to-wheel energy consumption for the whole HDV fleet.

²⁰ Transport&Environment (2023). Fully charged for 2030. [Link](#).

²¹ Under a higher -65% 2030 target, AFIR would cover 97% of the tank-to-wheel electricity demand from the 2030 ZEV fleet (14.25 TWh), as well as 98% of the hydrogen demand (344,000t of green H₂). These figures assume that 30% of BEVs and 100% of FCEVs will recharge or refuel at public infrastructure. Urban buses are not counted as they are expected to only charge at private depots.

recommended targets. By contrast, overall energy consumption would only drop by 24% under the Commission’s proposed targets, while even increasing if no additional policies were enacted (+5%).

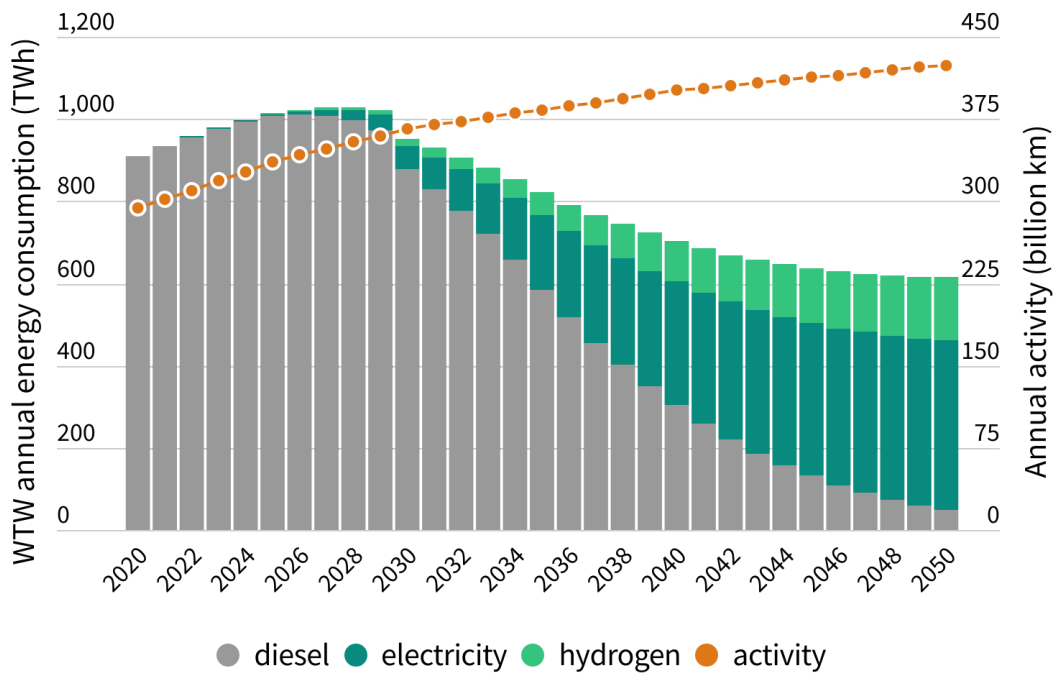


Figure 10: total energy consumption reduction compared to growing activity, T&E scenario.

6. Conclusion

New analysis, old conclusion: T&E’s scenario has the potential to achieve full decarbonisation of the HDV sector by 2050, whereas achieving this goal under the Commission’s proposal would require a lot of additional measures. T&E’s recommended targets achieve quick emissions and oil savings while offering a techno-economically feasible long-term path to full decarbonisation. This would also allow Europe to compete in the global race for industrial leadership, with ambitious policies just implemented in the U.S. and an aggressive uptake of zero-emission HDVs taking place in China.

| | T&E recommendations | Commission proposal |
|--|-------------------------------|-------------------------------|
| CO ₂ emissions reduction in 2050 (relative to 1990) | -94% | -56% |
| Remaining diesel vehicles in 2050 | | |
| – Number (fleet share) | 0.8 million (10.4%) | 3.2 million (40%) |
| – Average age in years | 21y | 12.5y |
| Change in CO ₂ emissions in 2030 (relative to 1990) | +12% | +20% |
| Annual CO ₂ savings in 2030 expressed in cars off the road (relative to current policies) | 9.8 million cars off the road | 3.7 million cars off the road |
| Oil consumption in 2030 (relative to 2021) | -6.2% | +0.1% |

Figure 11: the Commission's proposal against T&E's recommendations, summary

Therefore, T&E suggests aligning the review of the HDV CO₂ standards with T&E's recommendations:

- increasing the CO₂ reduction targets for trucks, buses and coaches from -45% to -65% for 2030 and from -65% to -100% for 2035;
- Bring the 100% ZEV target for urban buses forward from 2030 to 2027;
- including vocational vehicles under the CO₂ standards, applying targets of -35% in 2030, -85% in 2035 and -100% in 2040 for these vehicles;
- introducing a ZEV sales target for all other non-certified trucks (such as the small trucks below 5t driving around in our cities): 30% in 2030, 80% in 2035 and 100% in 2040.

T&E's position paper on the HDV CO₂ standards provides a more detailed account of the European Commission's proposal, along with our recommendations for improving it²².

²² Transport&Environment (2023). Truck CO₂: Europe's chance to lead. [Link](#).

Further information

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Annex 1: How HDV categories have changed

The European Commission's proposal "*amending Regulation (EU) 2019/1242 as regards strengthening the CO₂ emission performance standards for new heavy-duty vehicles*"²³ is based on the VECTO²⁴ regulation, which classifies trucks and buses into sub-groups based on their characteristics, such as weight, axle configuration and intended use, and certifies their CO₂ emissions accordingly. Within this system, the sub-groups in VECTO are then grouped into larger 'categories' based on commonalities between the sub-groups. For example, vehicles that are designed for vocational use are grouped together in one category, while urban buses are grouped in a different one.

The Commission's proposal is based on these larger categories, with targets applied uniformly across all sub-groups within a given category. After the proposal was published, T&E adapted its model, maintaining the granularity of the sub-groups in order to obtain comparable results to those of the Commission. Table A1 gives a detailed description of how the grouping has changed.

²³ European Commission (2023). Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Regulation (EU) 2019/1242 as regards strengthening the CO₂ emission performance standards for new heavy-duty vehicles and integrating reporting obligations, and repealing Regulation (EU) 2018/956. [Link](#).

²⁴

https://climate.ec.europa.eu/eu-action/transport-emissions/road-transport-reducing-co2-emissions-vehicles/vehicle-energy-consumption-calculation-tool-vecto_en

| VECTO sub-group | Old EUTRM category | Old type of target (T&E recommendations) | New EUTRM category | New type of target (COM proposal) |
|-----------------------------|---------------------------|---|---------------------------|--|
| 0 | small | ZEV target | Small (<5t) | None |
| 53, 54 | small | ZEV target | Medium (5-7.4t) | CO ₂ target |
| 1s, 1, 2, 3 | medium | CO ₂ target | Heavy (7.4-16t) | CO ₂ target |
| 4-UD, 4-RD, 4-LH | heavy | CO ₂ target | Heavy (>16t) | CO ₂ target |
| 5-RD, 5-LH | heavy | CO ₂ target | Heavy (>16t) | CO ₂ target |
| 9-RD, 9-LH | heavy | CO ₂ target | Heavy (>16t) | CO ₂ target |
| 10-RD, 10-LH | heavy | CO ₂ target | Heavy (>16t) | CO ₂ target |
| 4v, 5v, 9v, 10v | vocational | ZEV target | Vocational | None |
| 11, 12, 16 | vocational | ZEV target | Special axle combinations | None |
| 6, 7, 8, 13, 14, 15, 17, 19 | vocational | ZEV target | Non-certified | None |
| 31, 33, 35, 39 | bus | ZEV target | Bus | ZEV target |
| 32, 34 | coach | ZEV target | Coach | CO ₂ target |

Table A1: from VECTO to EUTRM categories, detailed

Compared to the original report, the number of vehicle categories has increased, and the distribution of the VECTO sub-groups is slightly different. Moreover, some vehicles previously grouped with the regulated ones are now out of the scope, hence they have been separated. On the other hand, bus and coach categories stayed the same. More details on the regulation can be found in T&E's position paper.²⁵

Annex 2: BEV-FCEV split

As mentioned in section 5.2, assumptions were made on the zero-emission sales split between battery electric vehicles (BEVs) and fuel-cell electric vehicles (FCEVs), depending on the vehicle category. Table A2 provides the details per HDV category. The aggregated split for the entire fleet is around 90% BEV and 10% FCEV. These numbers are comparable to the recently published sales forecasts by the so-called

²⁵ See footnote 22.

'Cleanroom talks' mentioned in section 3 which project a zero-emission truck sales share of 63% in 2030 in the EU (above 12 tonnes) of which 89% are expected to be BEVs and 11% FCEVs.

| EUTRM category | % BEV | % FCEV |
|-----------------------------|--------------|---------------|
| Bus | 100 | 0 |
| Coach | 50 | 50 |
| Heavy (>16t) | 90 | 10 |
| Heavy (7.5-16t) | 100 | 0 |
| Medium | 100 | 0 |
| Small | 100 | 0 |
| Vocational | 80 | 20 |
| Special axle configurations | 80 | 20 |
| Other vehicles | 80 | 20 |

Table A2: BEV-FCEV split, detailed.

Annex 3: The policy scenarios in detail

The following tables illustrate the specific ZEV uptake per vehicle category under each policy scenario. Manufacturers have two options to achieve CO₂ targets: sell zero-emission vehicles or improve vehicle fuel efficiency.

As some efficiency improvements in the diesel fleet are expected to happen, the resulting ZEV sales share is assumed to be a combination of the two options. For the currently regulated categories (heavy trucks >16t), fuel efficiency is assumed to improve by 1.3% annually until 2030, while for all other vehicle segments fuel consumption is assumed to decrease by 0.5% annually. After 2030, it is assumed to remain constant. For urban buses and the other categories subject to a ZEV sales target rather than a CO₂ reduction target, the ZEV uptake is equal to the ZEV target. In both cases, vehicle manufacturers are assumed not to overachieve on their targets.

Annex 3 of the original briefing provides a detailed explanation of how the conversion between CO₂ standards and ZEV targets occurs, as well as the literature references for the assumed efficiency improvements.

| EUTRM category | ZEV sales share | | |
|----------------------------|------------------------|------|------|
| | 2030 | 2035 | 2040 |
| Bus | 100% (reached in 2027) | 100% | 100% |
| Coach | 64% | 100% | 100% |
| Heavy (>16t) | 58% | 100% | 100% |
| Heavy (7.5-16t) | 63% | 100% | 100% |
| Medium | 63% | 100% | 100% |
| Small | 30% | 80% | 100% |
| Vocational | 32% | 84% | 100% |
| Special axle configuration | 30% | 80% | 100% |
| Other vehicles | 30% | 80% | 100% |

Table A3: ZEV shares in target years, T&E recommendations

| EUTRM category | ZEV sale share | | |
|----------------------------|----------------|------|------|
| | 2030 | 2035 | 2040 |
| Bus | 100% | 100% | 100% |
| Coach | 42% | 63% | 89% |
| Heavy (>16t) | 34% | 57% | 87% |
| Heavy (7.5-16t) | 41% | 62% | 89% |
| Medium | 41% | 62% | 89% |
| Small | <1% | <1% | <1% |
| Vocational | <1% | <1% | <1% |
| Special axle configuration | <1% | <1% | <1% |
| Other vehicles | <1% | <1% | <1% |

Table A4: ZEV shares in target years, Commission proposal

| EUTRM category | ZEV sale share | | |
|----------------------------|----------------|------|------|
| | 2030 | 2035 | 2040 |
| Bus | 31% | 31% | 31% |
| Coach | 3% | 3% | 3% |
| Heavy (>16t) | 19% | 19% | 19% |
| Heavy (7.5-16t) | <1% | <1% | <1% |
| Medium | <1% | <1% | <1% |
| Small | <1% | <1% | <1% |
| Vocational | <1% | <1% | <1% |
| Special axle configuration | <1% | <1% | <1% |
| Other vehicles | <1% | <1% | <1% |

Table A5: ZEV shares in target years, current policies