

Three keys to accelerate the decarbonization of heavy-duty vehicles in the EU



SEI brief

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This brief is based on the report “Accelerating to zero: Speeding up the decarbonization of heavy-duty vehicles in the EU” (Xylia et al. 2021). The study was commissioned by Scania.

Main insights:

- The heavy-duty vehicle sector has the potential to contribute more to emissions reductions within the European Union (EU) than currently envisioned in the EU’s “Fit for 55” package and 2030 climate target plan.
 - According to a new SEI analysis, **heavy-duty vehicle emissions could decrease by 24% by 2030**, compared to 2019, when three key measures are combined. The EU must pursue energy efficiency improvements, electrification, and increased biofuel deployment, simultaneously.
 - In order to achieve this estimated reduction potential, the EU must accelerate action on the three areas together **in the next 10 years**.
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Method:

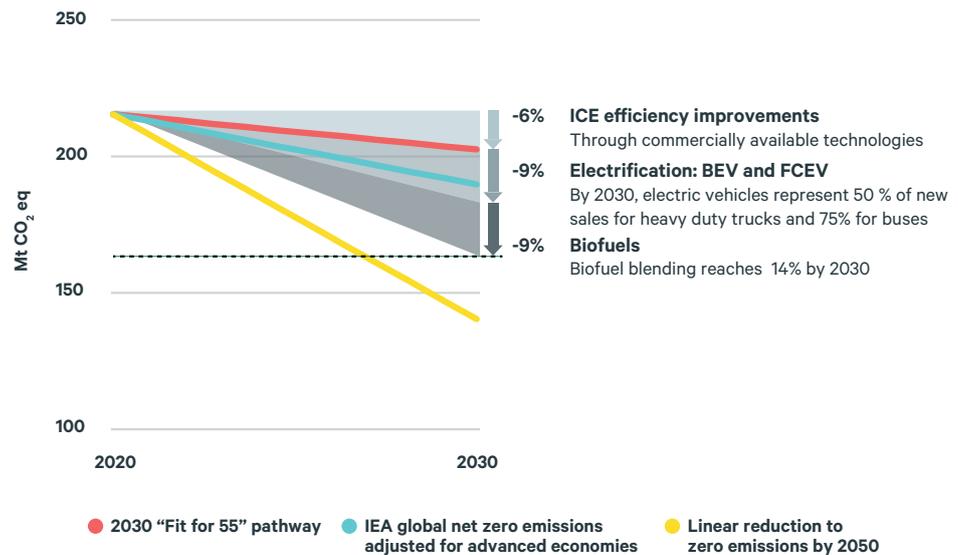
Since every accumulated ton of carbon in the atmosphere influences the climate, the pace matters at which we reach the end point of “net zero by 2050”. We therefore constructed three pathways that followed different trajectories to this same end point.

One trajectory is based on the EU Commission’s “Fit for 55” 2030 climate target plan impact assessment (European Commission, 2020). Another, based on the IEA’s “Net Zero by 2050” report (International Energy Agency, 2021), is adjusted for advanced economies such as the EU, and the third, on a linear trajectory to net zero. We compared these three pathways with our model estimations of potential emissions reductions, using different mixes of solutions for the three areas – energy efficiency improvements, biofuels, and electrification through introducing more battery electric vehicles and, to a smaller extent, fuel cell electric vehicles. Our results are visualized in Figure 1.

Conclusions:

- **The EU 2030 climate target plan is missing out on the potential reductions that heavy-duty vehicles could help achieve.** With the latest technological developments and infrastructure deployed at the right place and time, heavy-duty vehicles could contribute far more to reducing European emissions to meet the Paris Agreement climate limits. Previous SEI research has shown, for example, how adequate deployment of fast charging infrastructure can make electric truck deployment more feasible (Nykvist & Olsson, 2021).
- **No emissions reduction measure on its own is sufficient.** All options – energy efficiency improvement, electrification, and biofuels – need to be combined under most scenarios to consistently follow the pathways that lead to net zero fastest.

Figure 1. Estimated potential emissions reduction between 2019 and 2030 for heavy-duty trucks and buses in relation to indicative alternative pathways to net zero by 2050. Estimates from our model show that concerted and simultaneous action in three areas could drive down emissions by 24% by 2030, faster than the IEA and EU pathways.



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- **If one option underperforms, higher requirements are placed on the others to reach the net-zero targets.** For example, if the estimated emissions reduction from energy efficiency improvements is not realized in practice, and biofuel availability is limited, then electrification needs to be deployed even faster than assumed. Policymakers should be aware of the need to balance between options while striving for net zero.
- **Changes take time because vehicle stock renewal cycles are long.** Electrification, for example, will require some years for delivering significant effects, even with very optimistic development trends for new registrations. Electric vehicles by 2030 are assumed to represent 50% of all new registrations for heavy-duty trucks and 75% for buses, of which all city buses and half of all coaches would be electric. Under these assumptions, we estimate electric vehicles will represent approximately 10% of the total truck stock and approximately 20% of the total bus stock by 2030.
- **Biofuel deployment is a priority when discussing short-term actions with high impact.** One such action would be to introduce higher biofuel blending rates. Another would be extending deployment of “drop-in” biofuels used without modifications to internal combustion engines. How much biofuels end up being used will depend on their availability and sustainability, as well as supporting policy mechanisms.

The analysis shows that aligning short-term and long-term EU policy for the decarbonization of heavy-duty trucks is challenging. However, it also lays out the potential for more ambitious emissions reductions from this sector by 2030. Setting a faster pace now is necessary, not just setting targets to reach net zero by 2050.

References

European Commission. (2020). *2030 Climate Target Plan* [Text]. Climate Action - European Commission. https://ec.europa.eu/clima/policies/eu-climate-action/2030_ctp_en

Nykqvist, B., & Olsson, O. (2021). The feasibility of heavy battery electric trucks. *Joule*, 5(4), 901–913. <https://doi.org/10.1016/j.joule.2021.03.007>

International Energy Agency. (2021). *Net Zero by 2050—A Roadmap for the Global Energy Sector* (p. 224). IEA.

Xylia, M., Gong, J., Olsson, O. and Johnson, F. X. (2021). Accelerating to zero: Speeding up the decarbonization of heavy-duty vehicles in the EU. SEI report. <https://doi.org/10.51414/sei2021.025>