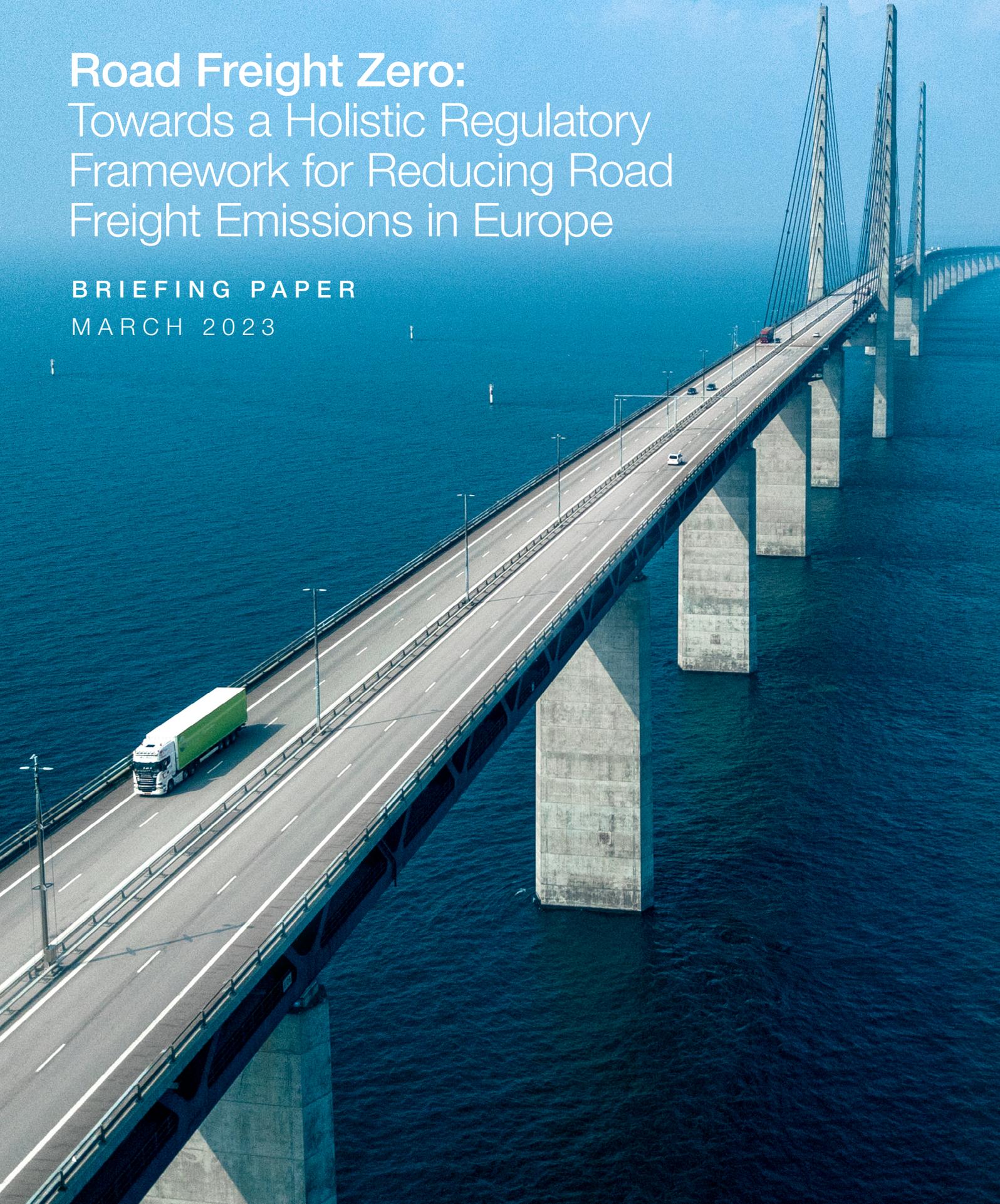




Road Freight Zero: Towards a Holistic Regulatory Framework for Reducing Road Freight Emissions in Europe

BRIEFING PAPER
MARCH 2023



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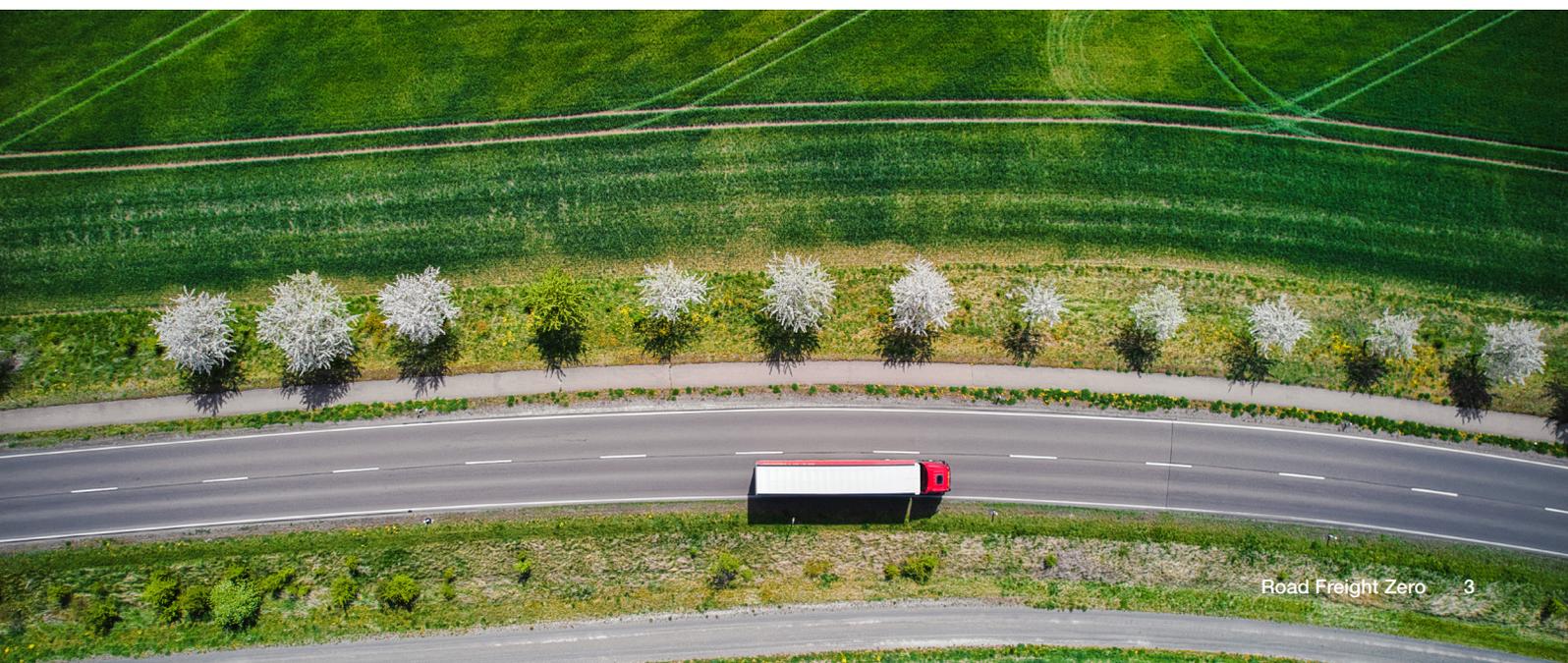
Road Freight Zero (RFZ) is a multistakeholder, cross-value-chain coalition of first-mover champions working together to fast-track zero-emission, heavy-duty trucking towards a 1.5° trajectory by 2030. The project is led by the Platform for Shaping the Future of Mobility at the World Economic Forum, a non-profit foundation that is independent, impartial and not tied to any special interests.

Over the past two years, Road Freight Zero has held a series of multistakeholder workshops and produced outputs¹ that identify the main challenges and enablers of the zero-emission road freight transition, as well as recommendations for accelerating the pace.

As the European Commission has recently proposed its revision of the CO₂ standards for trucks, trailers and buses,² this paper synthesizes learnings from across the Road Freight Zero community with a policy lens, sharing a perspective on the holistic regulatory framework considered necessary to achieve more ambitious CO₂ reduction targets for trucks.

Road Freight Zero has identified eight policy enablers that could create the appropriate conditions to more effectively roll out zero-emission fleets and infrastructure across the European Union, on a par with the commitments made by value-chain actors:

1. Subsidize early zero-emission truck (ZET) purchases to jump-start market adoption, further increase investments and efficiencies and eventually bring costs down
2. Provide incentives for the use of vehicles in high gross combination weight (GCW) classes and with a high certified electric range
3. Implement a five-year rolling plan for a carbon dioxide (CO₂) credit and debit system
4. Establish an emissions trading system for road transport and implement road-charging systems differentiated by CO₂ emissions
5. Mitigate the impact of zero-emission technologies and drivetrains on payload and on vehicles' maximum allowed dimensions
6. Harmonize permit/building procedures among Member States
7. Map appropriate locations for site development with sufficient space, grid capacity and charging demand
8. Support the investment costs of grid connections and the piloting of Megawatt Charging Systems (MCS) in main markets to test the reliability of such technology for fleet operators



Creating the right enabling environment to ensure the adoption of ambitious emission reduction targets

The EU proposes to cut HDV emissions by **90%** by 2040

Road transport is the largest contributor to transport emissions in the European Union, with heavy-duty vehicles generating around a quarter of EU road transport emissions.³ It is estimated that several hundred thousand zero-emission trucks (ZETs) will have to be in operation by 2030 to set the road transport sector on the pathway to compatibility with the Paris Agreement.⁴ Acknowledging the urgency to accelerate the shift to zero-emission mobility and the foreseen lower ownership costs,⁵ more than 120 of the world's leading companies have committed to transition their fleets to electric vehicles and install charging stations for staff and customers by 2030.⁶ Similarly, it is recognized by all of the major truck manufacturers in the EU that achieving carbon neutrality by 2050 will require all new commercial vehicles sold to be fossil-free by 2040.⁷

Today, dozens of battery-electric vehicles (BEVs) are already available in various configurations and many more are expected over the coming years.⁸ Despite the positive technology momentum and the commitments of the value chain, the current deployment trajectory for ZETs is not considered sufficient to limit global warming to 1.5°C above pre-industrial levels. Some companies, such as Volvo Group, Daimler Truck and Scania Group, have notably set a target of selling 50–60% of ZETs by 2030, should the right enabling conditions be in place. However, the technological transition cannot rely solely on the private sector due to the lack of recharging and refuelling infrastructure for ZETs and the gaps in vehicle and infrastructure financing for fleet owners.⁹

To accelerate the production of such vehicles and ensure a greater economy of scale, the European Commission proposed on 14 February 2023 a legislative revision that aims to cover more than 98% of the sector's CO₂ emissions.¹⁰ Under the proposal, CO₂ reduction targets for heavy-duty vehicles (HDVs) will be increased to -43% in 2030, -64% in 2035 and -90% in 2040. Over the coming months, the Council of the European Union and the European Parliament will together have to determine whether these standards are achievable by the industry and ambitious enough to reach the objectives of the Paris Agreement.

To secure ambitious targets at least on a par with the commitments of the industry and in line with the recent projections,¹¹ it is important for the co-legislators to adopt a comprehensive, holistic approach that considers not only the legislative enablers associated with current and future initiatives but also the full range of factors influencing the transition to zero-emission fleets, including infrastructure availability and the total cost of ownership (TCO) parameters. The current revision by the European Union of its climate, energy and transport-related legislation¹² is an opportunity to mitigate uncertainties during the transitional period and facilitate the shift towards greater use of zero-emission vehicles. In this regard, the following sections of this paper provide an overview of potential legislative enablers that could facilitate the adoption of ambitious targets by the co-legislators.

Flexibility mechanisms and regulatory incentives to accelerate ZET uptake

Recent reports have highlighted the importance of providing flexibility mechanisms in complying with emission standards to incentivize the early adoption of CO₂-saving technologies. One such mechanism is the credit and debit system established by Regulation (EU) 2019/1242,¹³ which assigns credits to manufacturers producing low-emission vehicles and debits to those producing high-emission vehicles. Replacing the current fixed expiration dates in the debit and credit system by a five-year rolling plan would provide flexibility for manufacturers without reducing the ambition level or the CO₂ emission reductions that can be achieved.

Following the same objective, incentives can significantly contribute to establishing a clear TCO benefit for ZET fleets and securing a sustainable decarbonization path. Several EU Member States already offer purchase incentives for electric trucks. Germany notably provides an 80% subsidy on the price difference between an electric and a conventional truck, while France pays up to €50,000 of the difference. Although the current vehicle subsidies will spark the market for urban and regional trucks, they will expire too soon to enhance the competitiveness of long-haul electric trucks. While truck manufacturers are investing

heavily today, this uncertainty regarding the duration of incentives could make it difficult to commit to significant multiyear investments in ZET production at an earlier stage.¹⁴ Encouraging EU Member States to pursue incentives for vehicle purchases in the form of upfront subsidies, tax incentives or financing instruments such as loan guarantees could significantly stimulate demand for ZETs.

To accelerate the ramp-up of ZETs particularly in the long-haul segment, incentives could be established for high gross combination weight (GCW) classes and vehicles with a high certified electric range. This could be based on the Vehicle Energy Consumption calculation Tool (VECTO)¹⁵ and be applicable to both battery- and hydrogen-

powered zero-emission vehicles. Subsidizing early ZET purchases could jump-start market adoption, further increase investments and efficiencies, eventually bring down costs and give the technology a durable advantage over diesel trucks.

Other measures such as introducing energy-efficiency standards for trailers would accelerate the scale-up of cost-effective technologies on the market. The proposed establishment of an emissions trading system for road transport¹⁶ and the implementation of road charging systems¹⁷ differentiated by CO₂ emissions would also be vital in creating incentives for transport operators to invest in ZETs and accelerate fleet renewal investments with a focus on the latest technologies.



Addressing payload and dimension limitations for sustainable transport operations

The potential impact of new zero-emission technologies and drivetrains on the payload and maximum dimensions of HDVs is worth considering in the context of the upcoming revision of the Weights and Dimensions Directive.¹⁸ Previous amendments to the directive have granted additional weight allowances of up to 2 tonnes for ZEVs. However, the weight balance for heavier vehicles cannot be fully optimized to keep transport capacity at the current level. Increasing axle weights by up to 1 tonne, increasing allowances for weight by at least 4 tonnes and length by up to 1.5 m should be considered to better accommodate the new powertrain technologies. This would remove the limitations and payload/range disadvantages

the new powertrain technologies face at the current state of technology development. According to the RFZ's retail partners, up to 8–10% of the payload could be affected, making operational management extremely complex. However, these allowances would have to be reassessed, particularly in the period beyond 2030 when the technology is expected to become significantly lighter.

Allowing European Modular System (EMS) vehicles to operate in the EU, at least among consenting Member States, could also be considered as part of the revision of the Weights and Dimensions Directive as it could help further improve transport efficiency and thus reduce emissions.

Swift and coordinated deployment of green infrastructure

The EU institutions will shortly adopt an initiative aimed at ensuring the availability and usability of a dense, widespread network of alternative fuels infrastructure throughout the EU – the Alternative Fuels Infrastructure Regulation (AFIR).¹⁹ In addition to adopting ambitious targets for the minimum capacity and maximum distance between recharging and refuelling points, there are advantages to setting harmonized requirements across Europe in terms of the planning, permitting and procuring of publicly accessible chargers and hydrogen refuelling points. Harmonized requirements could reduce uncertainties related to permitting and construction and ensure that the charging infrastructure is deployed in appropriate locations with sufficient grid capacity and space for heavy-duty vehicles. In addition, the current inflexibility in amending or withdrawing ongoing permit applications impedes the capacity to allocate resources to projects that can be completed swiftly.

To optimize the allocation of resources towards such projects, the construction permit procedure should be aligned with grid-connection timelines, which typically take one year from the submission of the application. Local authorities could issue permits in areas where capacity and connections can be established within a reasonable time frame. Member States could also be mandated to identify suitable locations for site development, with adequate grid capacity and space for heavy-duty vehicles. Moreover, future charging demand could be modelled and made publicly available by Member States to facilitate effective planning. To support these efforts, it would also be beneficial to explore ways to distribute the high upfront costs for the customer requesting the upgrade of the charging infrastructure.²⁰

The time required for recharging battery electric HDVs also limits their adoption in long-haul commercial operations. The Megawatt Charging System (MCS) will reduce charging time as it is designed to have a maximum charging rate of 3.75 megawatts, which translates to 3,000 amps at 1,250 volts direct current (DC). The EU could support the investment costs of grid connections and launch MCS pilots in main markets to probe the reliability of such technology for fleet operators.

Subsidizing public fast-charging infrastructure costs could be particularly important for long-haul trucks, where these costs can account for more than 20% of the total cost of ownership.²¹ Moreover, the deployment of fast-charging and hydrogen refuelling infrastructure should be eased into multimodal hubs as they could benefit all modes of transport and non-road mobile machinery. The upcoming revision of the Combined Transport of Goods Directive²² could be an opportunity to create incentives for Member States to support investment in green combined transport infrastructure and facilities.

Road Freight Zero's partners from the whole value chain consider that the adoption of such policy enablers would be important in overcoming the chicken-and-egg situation whereby investment in charging and refuelling infrastructure is dependent on the uptake of ZETs and vice versa. Its partners are committed to pursuing efforts to decarbonize their operations and freight flows, and contributing to the dialogue with financiers and policy-makers, in order to enhance the enabling conditions for accelerating the transition.

Please visit the [Road Freight Zero website](#) for further details, including how to join us.

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Endnotes

1. Mission Possible Partnership, “Making Zero-Emissions Trucking Possible: An Industry-Backed 1.5°C-Aligned Transition Strategy”, July 2022: <https://www.energy-transitions.org/publications/making-zero-emissions-trucking-possible/>. See also McKinsey & Company and the World Economic Forum, “Road Freight Zero: Pathways to Faster Adoption of Zero-Emission Trucks”, 21 October 2021: <https://www.weforum.org/reports/road-freight-zero-pathways-to-faster-adoption-of-zero-emission-trucks/>.
2. European Commission, “Proposal for a Directive of the European Parliament and of the Council Amending Directive 2003/87/EC Establishing a System for Greenhouse Gas Emission Allowance Trading Within the Union, Decision (EU) 2015/1814 Concerning the Establishment and Operation of a Market Stability Reserve for the Union Greenhouse Gas Emission Trading Scheme and Regulation (EU) 2015/757”, 14 July 2021, COM(2021) 551: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0551>.
3. European Environment Agency, “Monitoring of CO₂ Emissions from Heavy-Duty Vehicles”, EEA data, 1 June 2021: <https://www.eea.europa.eu/data-and-maps/data/CO2-emission-hdv>.
4. McKinsey & Company and the World Economic Forum, “Road Freight Zero: Pathways to Faster Adoption of Zero-Emission Trucks”, 21 October 2021: <https://www.weforum.org/reports/road-freight-zero-pathways-to-faster-adoption-of-zero-emission-trucks/>.
5. Ibid.
6. EV100 is an initiative of the Climate Group that brings together companies committed to accelerating the transition to electric vehicles (EVs): <https://www.theclimategroup.org/ev100-members>.
7. European Automobile Manufacturers Association and Potsdam Institute for Climate Impact Research (ACEA-PIK) Declaration, “The Transition to Zero-Emission Road Freight Transport”, December 2020: <https://www.acea.auto/files/acea-pik-joint-statement-the-transition-to-zero-emission-road-freight-trans.pdf>.
8. European Automobile Manufacturers’ Association (ACEA), “Zero and Low-Emission Heavy-Duty Vehicles” [infographic]: https://www.acea.auto/files/Getting_ZeroEmissionTrucks_on_the_road.pdf.
9. Mission Possible Partnership, “Making Zero-Emissions Trucking Possible: An Industry-Backed 1.5°C-Aligned Transition Strategy”, 2022: <https://www.energy-transitions.org/publications/making-zero-emissions-trucking-possible/>. See also McKinsey & Company and the World Economic Forum, “Road Freight Zero: Pathways to Faster Adoption of Zero-Emission Trucks”, 21 October 2021: <https://www.weforum.org/reports/road-freight-zero-pathways-to-faster-adoption-of-zero-emission-trucks/>.
10. European Commission, “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”, 14 February 2023, COM(2023) 88: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52023PC0088>.
11. According to a recent report from NOW GmbH, around 60% of new registrations in heavy road freight transport are to be emission-free in 2030. See NOW GmbH, “Marktentwicklung klimafreundlicher Technologien im schweren Straßengüterverkehr” (in German), 2023: <https://www.klimafreundliche-nutzfahrzeuge.de/wp-content/uploads/2023/02/Marktentwicklung-klimafreundlicher-Technologien-im-schweren-Strassengueterverkehr.pdf>.
12. European Commission, “Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions ‘Fit for 55’: Delivering the EU’s 2030 Climate Target on the Way to Climate Neutrality”, 14 July 2021, COM(2021) 550: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0550&qid=1677780766839>.
13. European Union, “Regulation (EU) 2019/1242 of the European Parliament and of the Council of 20 June 2019 Setting CO₂ Emission Performance Standards for New Heavy-Duty Vehicles and Amending Regulations (EC) No 595/2009 and (EU) 2018/956 of the European Parliament and of the Council and Council Directive 96/53/EC”, 25 July 2019, OJ L 198, pp. 202–240: <https://eur-lex.europa.eu/eli/reg/2019/1242/oj>.
14. Mission Possible Partnership, Addendum to “Making Zero-Emissions Trucking Possible: An Industry-Backed 1.5°C-Aligned Transition Strategy”, November 2022: <https://missionpossiblepartnership.org/wp-content/uploads/2022/11/MPP-Trucking-Addendum.pdf>.
15. European Commission, “Vehicle Energy Consumption calculation TOol – VECTO”: https://climate.ec.europa.eu/eu-action/transport-emissions/road-transport-reducing-co2-emissions-vehicles/vehicle-energy-consumption-calculation-tool-vec-to_en.
16. European Commission, “Proposal for a Directive of the European Parliament and of the Council Amending Directive 2003/87/EC Establishing a System for Greenhouse Gas Emission Allowance Trading Within the Union, Decision (EU) 2015/1814 Concerning the Establishment and Operation of a Market Stability Reserve for the Union Greenhouse Gas Emission Trading Scheme and Regulation (EU) 2015/757”, 14 July 2021, COM(2021) 551: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0551>.
17. European Union, “Directive 1999/62/EC of the European Parliament and of the Council of 17 June 1999 on the Charging of Vehicles for the Use of Road Infrastructures”, 20 July 1999, OJ L 187, p. 42: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:01999L0062-20220324>.

18. European Union, “Council Directive 96/53/EC of 25 July 1996 Laying Down for Certain Road Vehicles Circulating within the Community the Maximum Authorized Dimensions in National and International Traffic and the Maximum Authorized Weights in International Traffic”, 17 September 1996, OJ L 235 p. 59: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A01996L0053-20190814>.
19. European Commission, “Proposal for a Regulation of the European Parliament on the Deployment of Alternative Fuels Infrastructure, and Repealing Directive 2014/94/EU of the European Parliament and of the Council”, 14 July 2021, COM(2021) 559: <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A52021PC0559>.
20. Some countries outside the EU, such as China and the UK, have notably opted for a shallow-fee approach, where distribution system operators (DSOs) cover the cost of grid reinforcement, with the possibility of benefiting from public funds, thus spreading the cost across all customers.
21. Mission Possible Partnership, Addendum to “Making Zero-Emissions Trucking Possible: An Industry-Backed 1.5°C-Aligned Transition Strategy”, November 2022: <https://missionpossiblepartnership.org/wp-content/uploads/2022/11/MPP-Trucking-Addendum.pdf>.
22. European Union, “Council Directive 92/106/EEC of 7 December 1992 on the Establishment of Common Rules for Certain Types of Combined Transport of Goods between Member States”, 17 December 1992, OJ L 368, p. 38: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A01992L0106-20130701>.



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