

Passenger and freight road transport

CLIMATE & EFFICIENCY INVESTMENTS



Decarbonising passenger and freight road transport: A strategic imperative

By 2050, the global population will approach 10 billion¹, increasing the need for both passenger mobility and freight transport. Road transport already contributes a large share of global CO₂ emissions, yet it remains essential for moving people and goods and supporting economic activity. In 2023, transport accounted for 32% of the EU's final energy consumption, with road transport dominating at 73.4% and relying almost 90% on motor gasoline and diesel, while renewables made up only 6.7%, according to Eurostat.²

As demand for transportation grows, the key challenge is clear: **how can road transport reduce emissions while continuing to meet mobility needs?**

Both passenger and freight road transport have a key role to support the global transition to a low carbon future. By embracing new technologies and more efficient practices, the sector can continue to meet growing demand while reducing its environmental impact.

Passenger and freight road transport

Passenger and freight road transport includes the operation of buses, coaches, taxis, and trucks to move people and goods, involving continuous activity, high energy demand, and strict service and safety requirements.

From a greenhouse gas (GHG) perspective, the sector generates emissions across **Scope 1** (direct fuel use) and **Scope 2** (electricity for charging or operations), requiring an integrated decarbonization approach to align with net-zero ambitions.

Key emissions drivers in passenger and freight road transport

Scope 1 – Direct emissions

Scope 1 emissions in passenger and freight road transport primarily arise from direct fuel combustion in vehicles, including buses, coaches, taxis, and trucks. Additional emissions come from on-site operations such as depot equipment, and vehicle idling. Refrigerant leaks from cooling systems in refrigerated trucks and buses also contribute to direct emissions.

Scope 2 – Indirect emissions

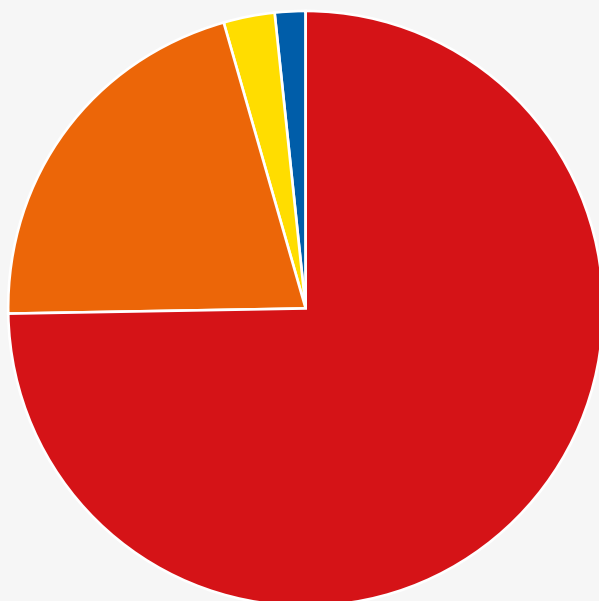
Scope 2 emissions in passenger and freight road transport are associated with purchased electricity used for vehicle charging, depot operations, lighting, office facilities, maintenance workshops, and refrigerated storage for temperature-sensitive goods. These energy inputs are critical to operational continuity, safety, and service quality.

¹ WDI - World's population will reach nearly 10 billion by 2050

² 131944.pdf



Key CO₂ emissions drivers Passenger and Freight Road Transport



Key emissions drivers³

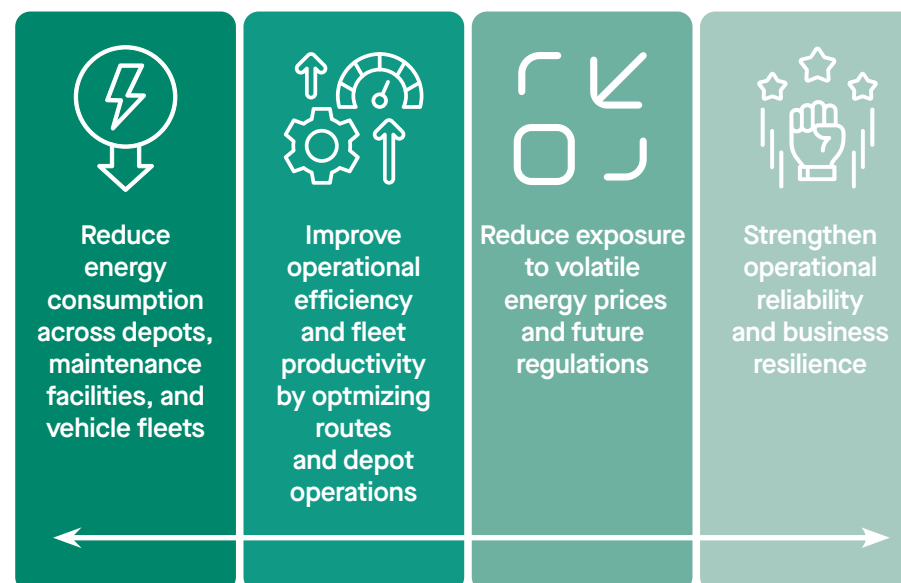
- Cars and vans 74.8%
- Heavy-duty vehicles 20.9%
- Public 2.8%
- Other 1.5%

Source: Eurostat (131943.pdf)

Why decarbonisation matters

Improving energy efficiency and reducing on-site emissions can help transport operators lower operating costs, mitigate fuel and electricity price volatility, and comply with evolving environmental regulations. Key energy-intensive operations include vehicle fuel consumption, depot and workshop electricity use, lighting, HVAC, and refrigerated transport. By adopting fuel-efficient and low- or zero-emission vehicles, optimising routes and fleet operations, and integrating renewable energy solutions, companies can reduce emissions, enhance operational efficiency, and strengthen their competitive position.

By reducing Scope 1 and 2 emissions, passenger and freight road transport companies can:



Decarbonisation Roadmap

Passenger and freight road transport				
Investment measure	Energy cost savings (%)	Payback period (years)	CO ₂ reduction potential	Benefits
Battery electric vehicles (BEVs)	50%	5 - 6	✓	Electric vehicles offer higher energy efficiency through advanced battery systems and regenerative braking, reducing overall energy consumption during operation. They offer a clean solution for transporting products, reducing fuel costs, and improving operational sustainability.
Plug-in hybrid vehicles (PHEVs)	20% - 50%	7 - 8	●	A plug in hybrid vehicle is a transportation system that combines an internal combustion engine with an electric motor and a rechargeable battery pack, allowing it to operate using both electricity and conventional fuel. By enabling all electric driving for short distances and hybrid mode for longer trips, it significantly improves overall energy efficiency and reduces fuel consumption. This dual power approach supports sustainability by lowering emissions, decreasing reliance on fossil fuels, and offering a practical transition pathway toward cleaner mobility.
Electric vehicle chargers	No estimates	No estimates	No estimates	Electric vehicle chargers enable an efficient and reliable energy supply for EVs, supporting daily operations with fast, safe, and user friendly charging solutions. By facilitating wider EV adoption, they reduce dependence on fossil fuels and lower operational emissions. Their integration into transport and commercial fleets strengthens sustainability performance by enabling cleaner mobility across all sectors.
Electric coaches	50%	11 - 12	✓	Using large battery systems and regenerative braking, electric coaches deliver high energy efficiency and reduce energy use on long routes. They provide a clean, low emission solution for passenger transport, lowering fuel costs and improving operational sustainability. By eliminating tailpipe emissions, they support net zero goals and help reduce the overall carbon footprint of intercity travel.
Electric buses	50%	11 - 12	✓	Electric buses provide high energy efficiency through advanced batteries and regenerative braking, reducing energy use in urban operations. They offer a clean, zero emission solution for city transport, lowering fuel costs and improving fleet sustainability. By eliminating tailpipe emissions, electric buses help reduce the carbon footprint of public transportation.
Li-ion batteries	Case-specific	4 - 8	Case-specific	Lithium-ion (Li-ion) batteries store and release electricity, maximising on-site renewable electricity, reducing peak grid use, and improving efficiency by balancing supply and demand. By enabling more renewable energy and reducing fossil-fuel-based transportation, they contribute to sustainable transportation.
PV self-consumption	Up to 100% based on the system capacity and electricity demand	6 - 7	✓	A PV (photovoltaic) system converts sunlight into electricity for on-site use. It provides clean, renewable energy to power transportation. This supports decarbonisation objectives by reducing the use of fossil-fuel-based vehicles, lowering carbon emissions, and enhancing overall sustainable operations. Pairing a PV system with battery storage enables transportation companies to rely on renewable electricity while reducing exposure to electricity price volatility.

CO₂ reduction potential ● Very low ● Low ● Medium ✓ High

