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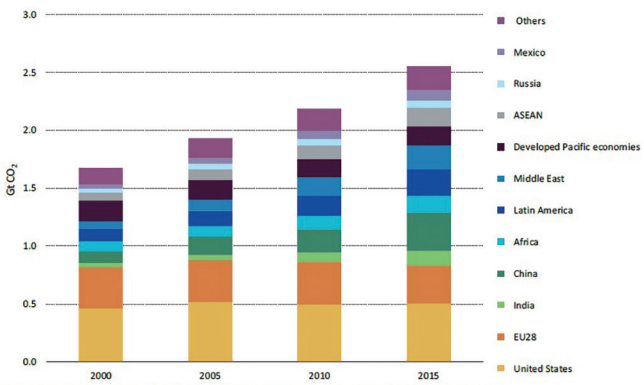
Road-Freight and Fuel Economy: IEA analysis

Improving the efficiency of road-freight transport is critical to reducing the growth in energy consumption, carbon emissions and air pollution. The growth in oil demand from trucks has outpaced all other sectors since 2000 and contributed 40% to global oil demand growth, a similar contribution as cars. Road freight vehicles alone accounted for about 80% of the global net increase in diesel demand since 2000. The International Energy Agency's 'The Future of Trucks: Implications for energy and the environment' report explores possible these trends and policy responses.

Oil demand from road freight vehicles accounts for around one-fifth of global oil demand – equivalent to the current oil production of the United States and Canada combined. Oil demand from road freight vehicles is roughly equal to that of the entire industry sector and is outstripped only by passenger cars, which account for around one-quarter of total oil demand. As a result, road freight today accounts for more than 35% of transport-related carbon dioxide (CO_2) emissions, and around 7% of total energy-related CO_2 emissions.

If no action is taken, oil demand from road freight is projected to grow by 5 million barrels per day by 2050, or around 40% of the projected increase in global oil demand in that period. This growth is expected to lead to a significant increase in carbon dioxide emissions of nearly 900 million tonnes through 2050, or about the same level of emissions growth as from coal use in the power and the entire industry sector combined.

Tailpipe CO_2 emissions from road freight transport by region, 2000-15

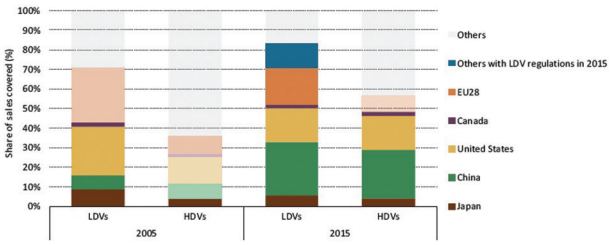


Note: EU28 = European Union. Developed Pacific economies = Australia, Japan, Korea and New Zealand.
Source: IEA (2017a), Mobility Model, June 2017 version, database and simulation model, www.iea.org/etp/etpmodel/transport/

Standards

To date, four countries have enacted and implemented standards to reduce carbon emissions from and/or to improve the efficiency of road freight HDVs. Japan introduced standards in 2005 and Canada, China and the United States introduced them in 2011. Together these markets make up more than half of total truck sales. Other countries and regions are in the process of evaluating standards, including the European Union, India, Mexico and Korea. In contrast, around 40 countries have established some form of light-duty vehicle fuel economy policies.

Share of light- and heavy-duty vehicle sales subject to fuel economy regulations



Note: The HDV sales shares shown in the figure includes buses. The share of all HDV sales covered by fuel economy standards (including trucks and buses) was 51%.
Sources: ICCT and DieselNet (2016); IEA (2017a), Mobility Model, June 2017 version, database and simulation model, www.iea.org/etp/etpmodel/transport/

Possible scenarios

In the IEA's Reference Scenario, global road freight activity is expected to increase by a factor of 2.4, driven by robust GDP growth, bringing up oil demand. Emerging and developing countries in Asia, in particular the China and India, account for about 90% of the net increase in road freight oil demand over the projection period, equivalent to around 30% of total oil demand growth from all sectors. Efficiency improvements are driven by Canada, China, Japan and the United States. CO_2 emissions grow to 3.4 gigatonnes (Gt) of CO_2 in 2050, one-third above today's level.

Modern Truck Scenario: Potential efficiency improvements

The Modern Truck Scenario sets out a plausible, yet ambitious, vision to modernise road freight transport. It capitalises on the opportunities for systemic improvements in operations and logistics across all aspects of road freight, vehicle efficiency improvements and support for the use of alternative fuels. In the Modern Truck Scenario, Energy efficiency and alternative fuels, including electrification, lead to a reduction in energy intensity, relative to the Reference Scenario, of 34% in 2050.

For the existing stock of trucks, aerodynamic retrofits can also reduce the drag coefficient and lead to reductions in road load; and low rolling resistance tyres can translate into immediate improvements in fuel economy. New trucks can use additional technologies that cut idling, use lightweight materials and take advantage of improvements to truck engines, transmissions and drivetrains. Achieving stronger cuts in fuel use, carbon dioxide and pollutant emissions requires the use of hybrids and zero emission trucks.

Tightening fuel economy standards and expanding their geographic coverage can accelerate fuel economy improvements. Standards can be supported by differentiated vehicle taxation to incentivise the purchase and operation of efficient trucks. Care must be taken to ensure that test procedures reflect real-world operations and that simulation tools rely on accurate component testing.

Reference: The Future of Trucks Implications for energy and the environment, IEA https://www.iea.org/publications/freepublications/publication/TheFutureofTrucksImplicationsforEnergyandtheEnvironment.pdf

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