

Transport and Environment Reporting Mechanism (TERM)

## **Transport: increasing oil consumption and greenhouse gas emissions hamper EU progress towards environment and climate objectives**



Mobility plays a key role in the EU economy. However, the EU transport sector still relies heavily on fossil fuels and is responsible for one quarter of Europe's greenhouse gas (GHG) emissions — a share that keeps growing. In addition, the sector is a significant source of air pollution despite significant progress achieved since 1990, especially of particulate matter (PM) and nitrogen dioxide (NO<sub>2</sub>), as well as the main source of environmental noise in Europe. Current efforts to limit the sector's environmental and climate impacts in Europe are not sufficient to meet the EU's long-term climate and environmental policy objectives.

### Key messages

- GHG emissions from transport have increased every year since 2014. Estimates put them at 29 % above 1990 levels in 2018. Achieving climate neutrality will need a 90 % reduction in transport emissions by 2050.
- GHG emissions from aviation increased the most rapidly of the transport modes — by an average of over 3 % each year since 2013.
- In 2018, average CO<sub>2</sub> emissions of new passenger cars increased for the second consecutive year. Average CO<sub>2</sub> emissions of new vans started to follow a similar upward trend in 2018.
- Petrol cars are overtaking diesel ones in sales of new passenger cars, but the total consumption of diesel fuel keeps increasing.
- EU suppliers of fuel for road transport and non-road mobile machinery are making insufficient progress in reducing the life-cycle GHG emissions of this type of fuel.
- After a significant decrease between 2008 and 2015, GHG emissions from international shipping increased by 5 % in 2 years (2015-2017).
- The share of renewable energy used for transport in the EU rose from 7.4 % in 2017 to 8.1 % in 2018. This is well below the EU target of 10 % set for 2020.
- Air pollutant emissions from transport were significantly reduced between 1990 and 2017.
- More than 27 % of European citizens are exposed to transport noise levels of 55 dB or higher, including 15-20 % for road traffic noise alone.

This briefing is based on the EEA's Transport and Environment Reporting Mechanism (TERM) indicators, which have been used to monitor progress in integrating environmental objectives in transport since 2000. It tracks the short- and long-term environmental performance of the transport sector in the EU. It also assesses progress made towards key transport-related policy targets.

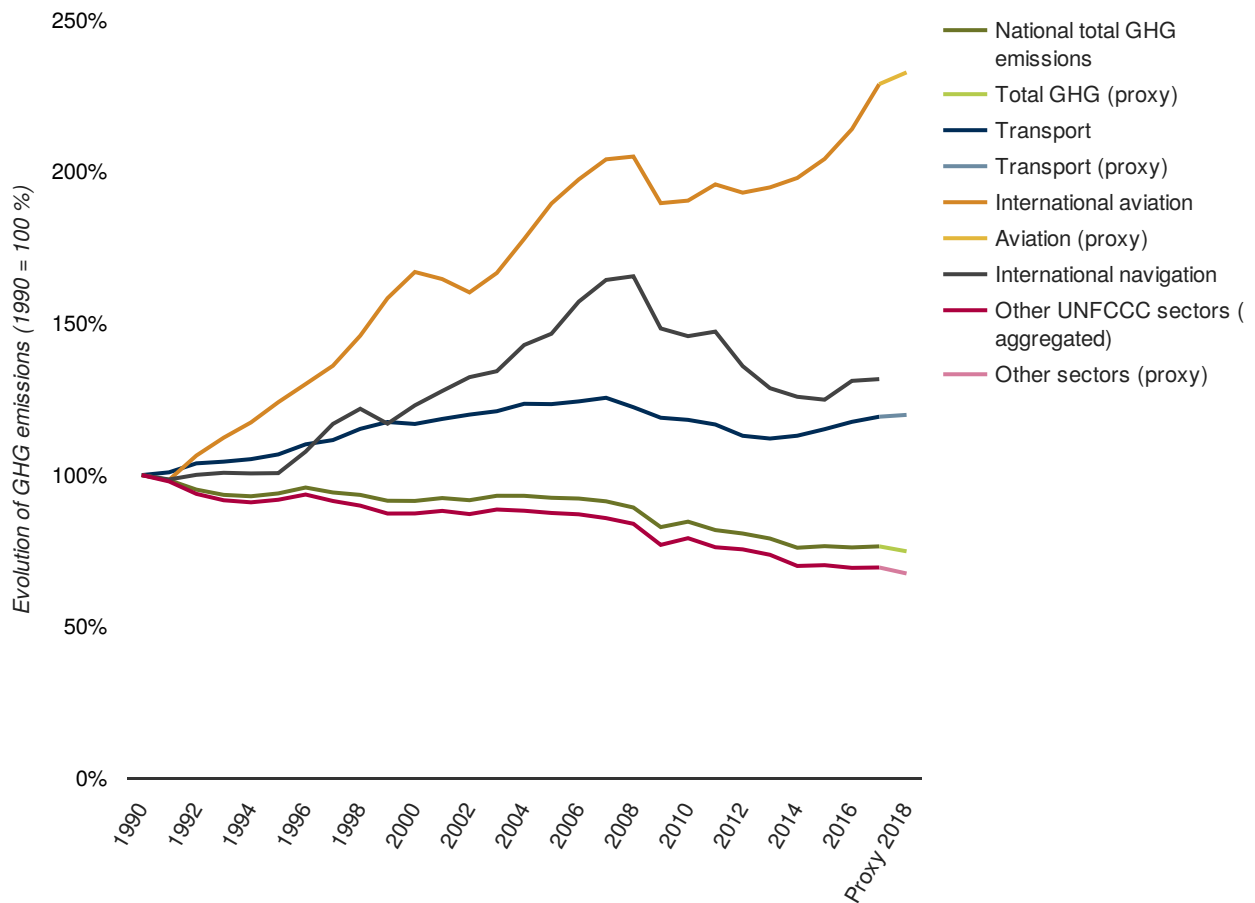
## Transport greenhouse gas emissions continue to increase as demand for mobility grows

GHG emissions from transport (including international aviation but excluding maritime shipping<sup>[1]</sup>) account for around one quarter of the EU's total GHG emissions. Transport is the only major European economic sector in which GHG emissions have increased. Preliminary data for

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2018 show that they were 29 % above 1990 levels. This increase is despite improvements in the efficiency of vehicles and is in line with increases in economic activity — measured by gross domestic product (GDP) — and increases in demand for passenger and freight transport (Figure 1).

**Figure 1. EU greenhouse gas emissions in the transport sector**



**Data sources:** a. EEA. National emissions reported to the UNFCCC and to the EU Greenhouse Gas Monitoring Mechanism  
 b. EEA. Approximated greenhouse gas emissions in 2018

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**Note:** UNFCCC, United Nations Framework Convention on Climate Change.

**Sources:** EEA (2019a, 2019b).

Demand for passenger and freight transport in the EU-28 saw a sustained period of growth until 2007-2008 for all modes. After the peak, in the period 2009-2012, demand for passenger transport

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remained broadly stable with only a slight overall reduction. In contrast, demand for freight transport decreased by up to 11 % (between 2008 and 2009) as a result of the economic recession. Ever since, demand for passenger and freight transport has been growing.

The modal split in passenger transport did not change much in the decade 2010-2019 in the EU-28. Passenger cars largely dominated (83 %) and accounted for most of the increase in inland passenger transport volumes, followed by aviation. The shares of rail transport and bus and coach services in the passenger modal split remained low (8 % and 9 %, respectively), and did not significantly change between 2005 and 2017 (+1 % and -1.4 %, respectively).

Find further information in the EEA indicator 'Greenhouse gas emissions from transport in Europe (TERM 002)'.

Road freight and waterborne transport (inland waterways and maritime) were responsible for over 85 % of total freight transport volumes, followed by rail (11 %) (EC, 2019b). During the period 2000-2017, among the other freight transport modes, freight transport by road increased the most (by 24 %). This was due to substantial growth in road freight in the EU-13, which tripled over the same period.

## CO<sub>2</sub> emissions from new passenger cars and vans are increasing

In 2018, specific emissions from newly registered passenger cars increased for the second consecutive year, reaching 120.4 gCO<sub>2</sub>/km. After a steady decline from 2010 to 2016, by almost 22 gCO<sub>2</sub>/km, average emissions from new passenger cars increased in 2017 by 0.4 gCO<sub>2</sub>/km. According to provisional data, the upward trend continued, with an additional increase of 2.0 gCO<sub>2</sub>/km, in 2018. The main factors contributing to the increase in emissions from new passenger cars in 2018 include the growing share of petrol cars in new registrations, in particular sport utility vehicles (SUVs).

Find further information in the EEA indicator 'Average CO<sub>2</sub> emissions from newly registered vehicles (TERM 017)'.

In 2018, petrol passenger cars were the best-selling vehicles in the EU, constituting almost 60 % of sales (up from 53 % in 2017). Diesel cars made up 36 % of new passenger car registrations (95 % for new vans). Market penetration of zero- and low-emission vehicles, including electric cars, remained slow in 2018. With the 2021 target of 95 gCO<sub>2</sub>/km approaching, we need much faster deployment of cars with low

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emissions across Europe.

For the first time, average CO<sub>2</sub> emissions from new vans also increased. In 2018, according to provisional data, average emissions increased by 2 gCO<sub>2</sub>/km compared with 2017. This is the first increase since the regulation came into force in 2011, following a sharp decrease in 2017. However, during the period 2012-2018, average specific emissions decreased by 22 gCO<sub>2</sub>/km or 12 %.

To meet the 2021 target of 95 gCO<sub>2</sub>/km for passenger cars and the 2020 target of 147 gCO<sub>2</sub>/km for vans, average CO<sub>2</sub> emissions will need to decrease by a further 21 % for new passenger cars and around 7 % for vans.

## Greenhouse gas emissions from aviation are rising fast

Aviation has experienced significant growth in recent decades. GHG emissions have more than doubled since 1990 and were 29 % higher in 2017 than in 2000. Emissions from the sector have increased over each of the last 5 years (2013-2017), at an average rate of 3 % each year. In 2017, GHG emissions from aviation represented 3.9 % of EU GHG emissions.

Intra-EEA aviation is included in the Emissions Trading System (EU ETS). International flights are to be covered by the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), developed by the International Civil Aviation Organization (ICAO).

The objective of CORSIA is to stabilise net CO<sub>2</sub> emissions from international aviation at 2020 levels by requiring airlines to compensate for any increase in their emissions beyond 2020 levels. As stated in the European aviation environmental report (EASA et al., 2019), robust implementation will be key to ensure the effectiveness of CORSIA. Although the EU will participate in the scheme voluntarily before it becomes compulsory in 2027, the European Commission will also propose reducing the EU ETS allowances allocated for free to airlines (EC, 2019a).

## Monitoring, reporting and verification of greenhouse gas emissions from shipping — in progress

GHG emissions from shipping peaked in 2008, followed by a reduction of almost 25 % up to 2015, in large part due to economic recession and improvements in energy efficiency. Since 2015, these emissions have been gradually increasing, amounting to 146 MtCO<sub>2</sub> in 2017. This is still 20 % below 2008 levels.

A new system for monitoring, reporting and verification (MRV) of CO<sub>2</sub> emissions from maritime transport (established by Regulation (EU) 2015/757, the EU MRV Regulation) started in 2018, introducing obligations to report data on annual maritime CO<sub>2</sub> emissions and other relevant information.

Moreover, in April 2018 the International Maritime Organization (IMO) adopted an initial strategy to

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reduce GHG emissions from ships by at least 50 % by 2050 compared with GHG emissions in 2008, with efforts to phase them out completely. Under the IMO, monitoring of fuel oil consumption of ships, similar to that carried out by the EU via the MRV Regulation, began on 1 January 2019, with the aim of adopting a revised strategy in 2023 (IMO, 2019).

### Reducing oil consumption for transport remains challenging

Transport remains very dependent on oil: oil-derived fuels account for 95 % of energy consumption in transport. After reaching a peak in 2007, transport oil consumption (including maritime bunkers) decreased continuously until 2013, when it reached a level 12 % below that of 2007. This resulted from:

- improvements in energy efficiency
- the impacts of the economic recession and the consequent decline in demand for transport
- a period of high oil prices after 2010

Since 2014, oil consumption from transport has been on an upward trend at an average rate of 2.2 % each year. In 2017, it was 4 % below 2008 levels.

Within the sector, road transport accounts for the largest share of oil-derived fuels and was responsible for 71 % of total EU consumption in 2017. Despite a decrease since 2007, energy consumption from road transport in 2017 was still 28 % higher than in 1990. The fraction of diesel used in road transport continued to increase between 2000 and 2017, from 52 % to 72 % of total fuel sales in road transport. This confirms the increasing dieselisation of Europe's vehicle fleet over that period.

Find further information in the EEA indicator 'Final energy consumption in Europe by mode of transport (TERM 001)'.

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### **Only two Member States have already achieved a 10 % share of renewable energy in transport**

The Renewable Energy Directive (2009/28/EC) sets a target of a 10 % share of renewable energy in the transport sector's final energy consumption for each Member State by 2020. Only biofuels complying with the sustainability criteria set in the Renewable Energy Directive and the Fuel Quality Directive (2009/30/EC) are considered for this target.

Find further information in the EEA indicator 'Use of renewable fuels in transport in Europe (TERM 031)'.

According to preliminary EEA estimates for 2018, the share of renewable energy use in transport grew from 7.4 % in 2017 to 8.1 % in 2018. At the EU level, the trend in share of renewable energy in transport remains below that required to reach the 2020 goal. The share of renewable energy in transport varied across countries: from 32 % (Sweden) to close to 0.4 % (Estonia). Finland and Sweden are the only two

Member States that have already reached the goal of a 10 % share of energy from renewable sources in transport.

Renewable energy in this sector comes overwhelmingly from biofuels (close to 90 %); electricity still plays a limited role. A higher share of renewable electricity use in the transport sector would reduce the pressure on biofuels to reach the EU's 10 % target (EEA, 2018).

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### Slow progress in the lifecycle greenhouse gas emissions of transport fuels'

The Fuel Quality Directive (FQD) set out reporting requirements for:

- the volume and type of fuels supplied for road transport and non-road mobile machinery
- their lifecycle GHG emissions, including those resulting from indirect land use change (ILUC) for biofuels

The FQD sets a target for fuel suppliers to reduce the lifecycle GHG emissions intensity of transport fuels by a minimum of 6 % by 2020 compared with 2010 levels.

Based on data from 22 Member States, the average GHG intensity of the fuels consumed in 2017 was only 3.4 % lower than in 2010. This is well below the intermediate reduction target of 4 %, which Member States may require suppliers to comply with to ensure that they meet the 2020 target. EU fuel suppliers are therefore not on track to achieve their objective of reducing the GHG intensity of transport fuels by 6 % by 2020, compared with 2010 (EEA, 2019c).

### Transport continues to be a significant source of air pollution

Between 2000 and 2017, the transport sector significantly reduced its emissions of certain air pollutants (Figure 2):

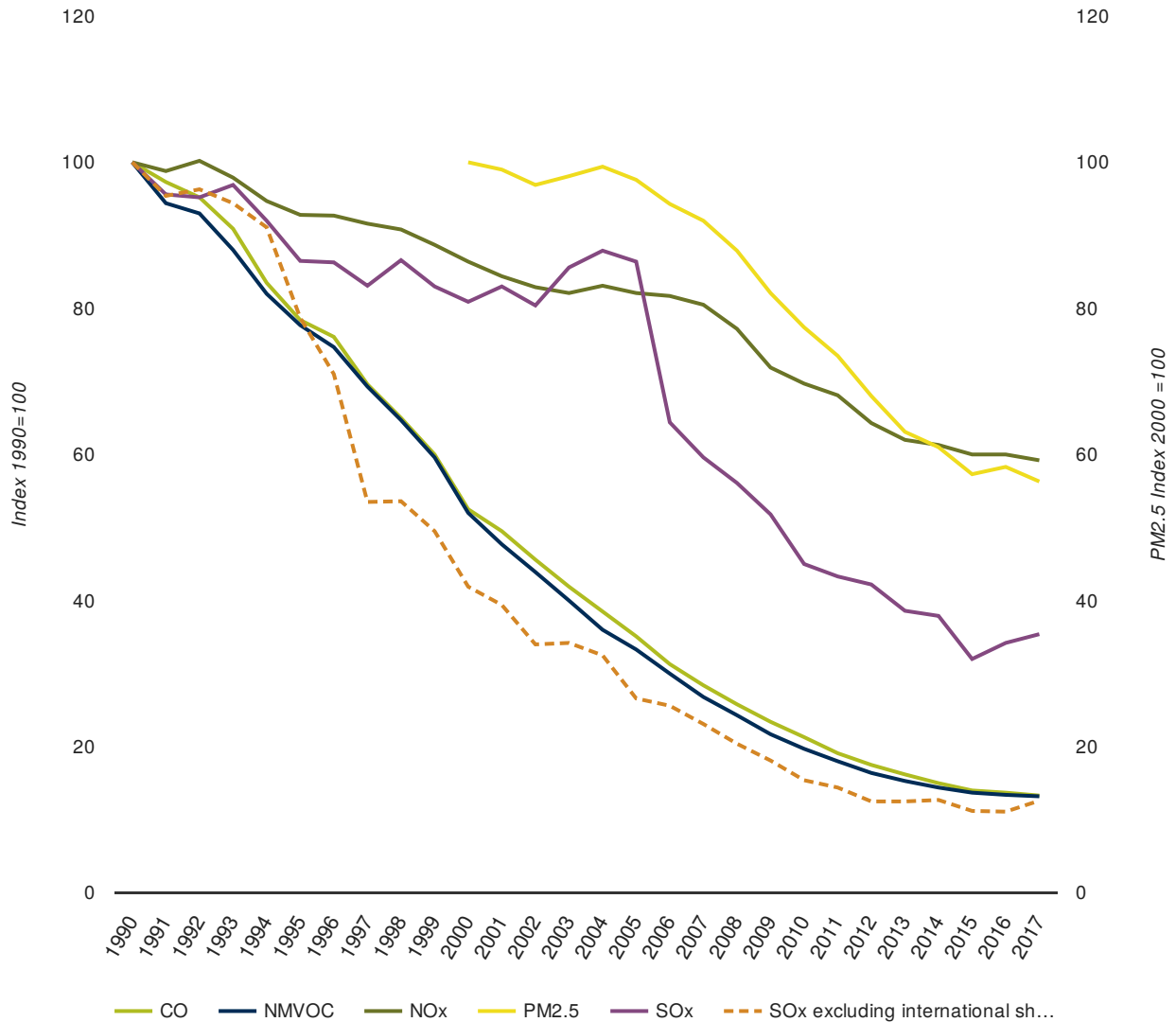
- carbon oxides (CO) and non-methane volatile organic compounds (NMVOCs) by 75 %
- sulphur oxides (SO<sub>x</sub>) by 56 %
- nitrogen oxides (NO<sub>x</sub>) by 31 %
- PM (PM with a diameter of 10 µm or less, PM<sub>10</sub>, by 35 % and with a diameter of 2.5 µm or less, PM<sub>2.5</sub>, by 44 %)

This was despite the gradual increase in passenger and freight volumes. Policy measures at EU level have been taken to address transport-related air pollution. Regulating emissions by setting emission standards (e.g. Euro 1-6) or by establishing requirements for fuel quality are good examples of such action at EU level.



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**Figure 2. Trends in emissions of air pollutants from transport**



**Data sources:** a. EEA. National emissions reported to the Convention on Long-range Transboundary Air Pollution (LRTAP Convention)  
 b. EEA – Indicator TERM003

[Explore chart interactively](#)



Source: EEA (2019d).

Despite these encouraging trends, transport remains responsible for 55 % of all NO<sub>x</sub> emissions and significantly contributes to total emissions of the other air pollutants. Road transport, in particular, continues to make a significant contribution to emissions of NO<sub>x</sub> (35 %). The

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contribution of road transport to harmful NO<sub>2</sub> concentrations, especially in urban areas, is considerably higher, because emissions occur close to the ground and mainly in densely populated areas.

Although emissions from road transport are mostly exhaust emissions arising from fuel combustion, non-exhaust releases contribute to both NMVOCs (from fuel evaporation) and primary PM (from tyre and brake wear and road abrasion). Emissions of PM<sub>2.5</sub> from road transport have declined by more than half since 2000. However, the relative importance of non-exhaust emissions has increased since the introduction of vehicle particulate abatement technologies reduced exhaust emissions.

Find further information in the EEA indicator 'Emissions of air pollutants from transport (TERM 003)'.

## Many Europeans are exposed to high levels of transport noise

113 million people in Europe (the 33 EEA countries excluding Turkey) are exposed to day-evening-night noise levels of 55 dB or higher due to road traffic. Railway noise affects 22 million people, aircraft noise 4 million and industry less than 1 million. Similarly, road traffic is by far the biggest source of environmental noise during night time, followed by railway, air and industrial noise.

Find further information in the EEA indicator 'Exposure of Europe's population to environmental noise (TERM 005)'.


Considering only road traffic noise, these figures indicate that at least 20 % of Europeans are exposed to high levels of noise during the day-evening-night period and more than 15 % during the night-time period, which can result in adverse health effects. These values are likely to be underestimated given that the Environmental Noise Directive (2002/49/EC) does not cover all urban areas or roads across Europe.

There is also a considerable number of people exposed to rail, aircraft and industry noise. However, it is difficult to estimate the total numbers exposed to high levels of noise across all sources, as certain individuals may be exposed to a combination of noise sources, and thus a simple summation would lead to double counting.

### Footnotes and References

[1] GHG emissions from international aviation and from international maritime shipping are not included in official national total GHG emissions but are reported separately as memo items. However, the calculation of transport GHG emissions presented here includes emissions from international aviation, as those are covered by the EU domestic targets for reducing GHG emissions by 2020 and 2030.

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