

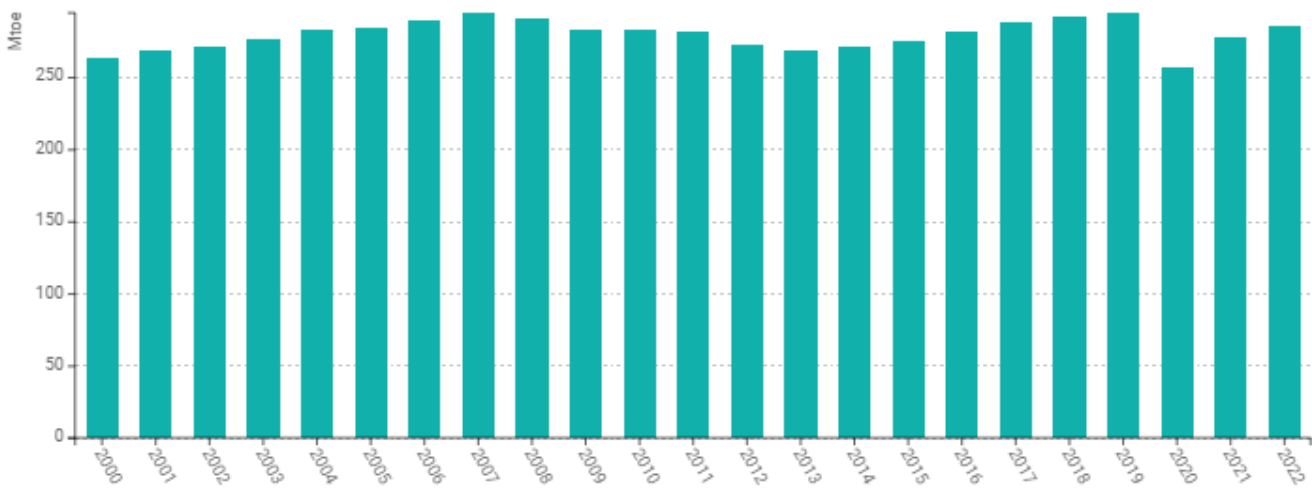
Sectoral Profile - Transport

Energy consumption

Overview

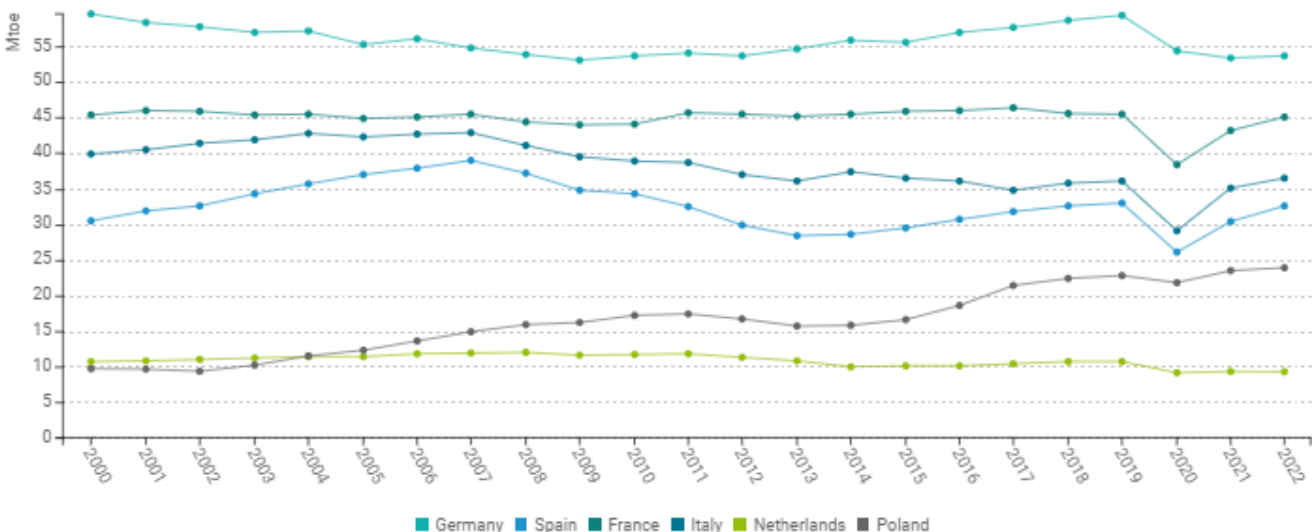
- The energy consumption of transport grew by 2.7% in 2022, reaching 285 Mtoe at EU level, after a progression by 8% in 2021. It follows a sharp decrease in 2020 (-13%) due to the impacts of COVID crisis. Previously, it grew from 2014 to 2019 with the economic growth rebound (+1.6%/year), which contrasts with the previous period impacted by the economic crisis (-1.6%/year from 2007 to 2013).
- In 2022, the energy consumption of transport of the EU was 3% below its pre-COVID level and 8% above its 2000 level.

Energy consumption trends in transport in the EU



- Energy consumption in transport was closed to its 2000 level in most countries, apart from eastern countries, where it has increased between 2% and 4%/year: around 2%/year in Czechia, Estonia, Croatia, Latvia and Slovenia, 3%/year in Bulgaria, Lithuania and Slovakia and 4%/year in Romania and Poland.

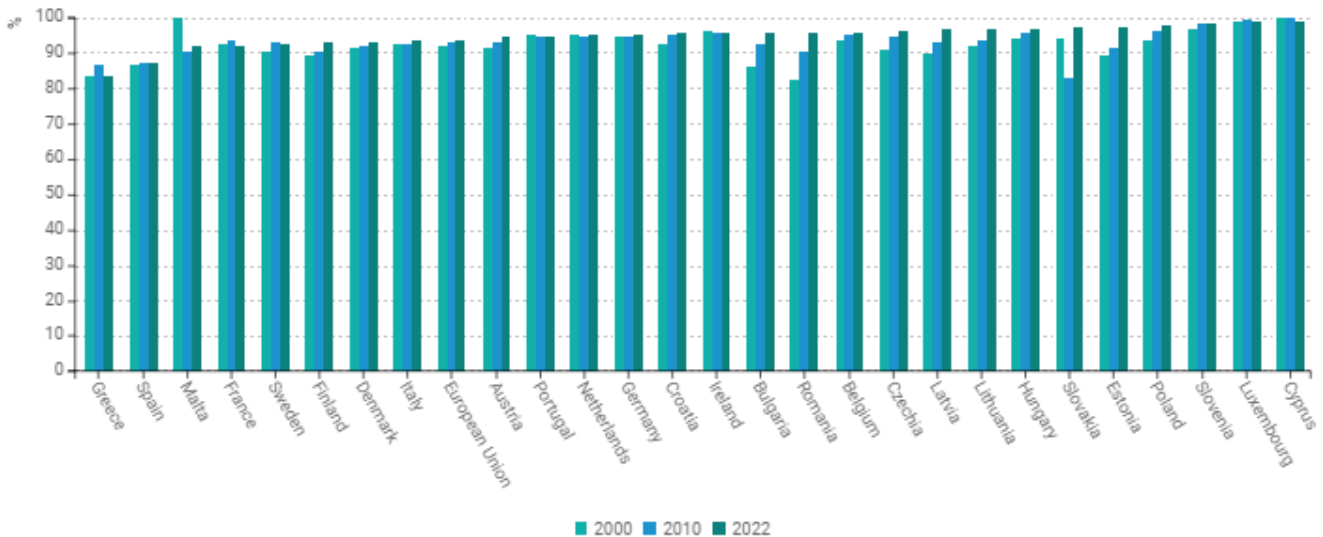
Energy consumption of transport in selected countries



Share of road in transport energy consumption

- Road transport absorbs 94% of the final energy consumption of transport in the EU in 2022 (range 83-99%).
- The share of road transport has increased since 2000 at EU level (+1.5 pp), and in 21 MS. Since 2010, the trend slightly accelerated at EU level (+0.9 pp), mainly due to Eastern countries, where the highest increases are found (more than 3 pp for Bulgaria, Lithuania, Latvia, Romania, Estonia and up to 14 pp for Slovakia).

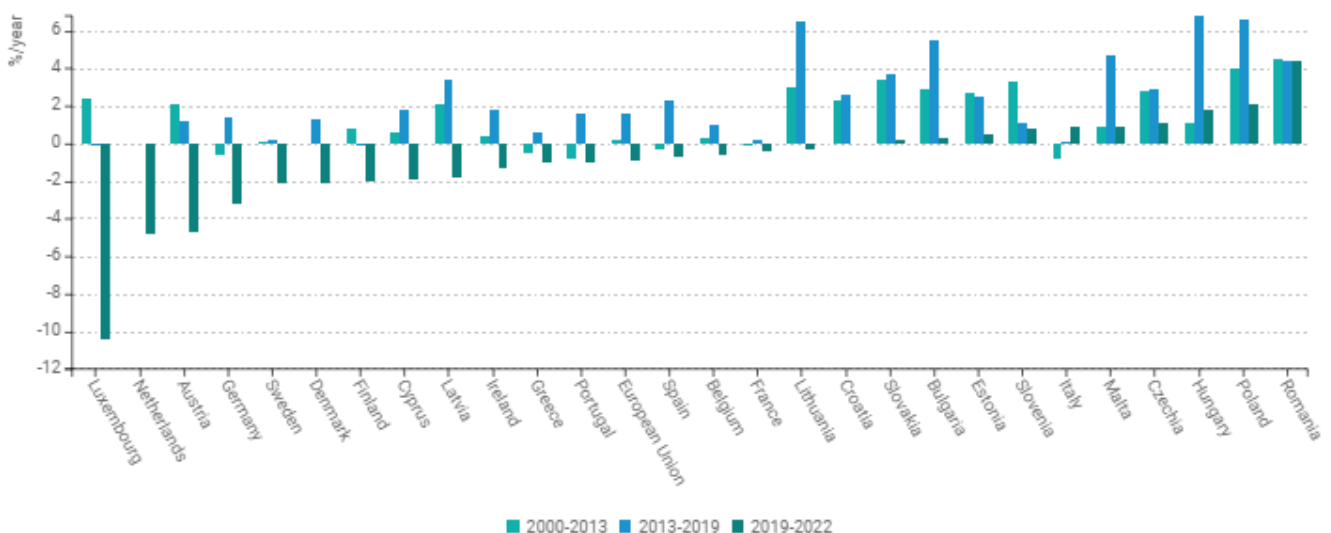
Share of road in transport energy consumption



Trends in road transport

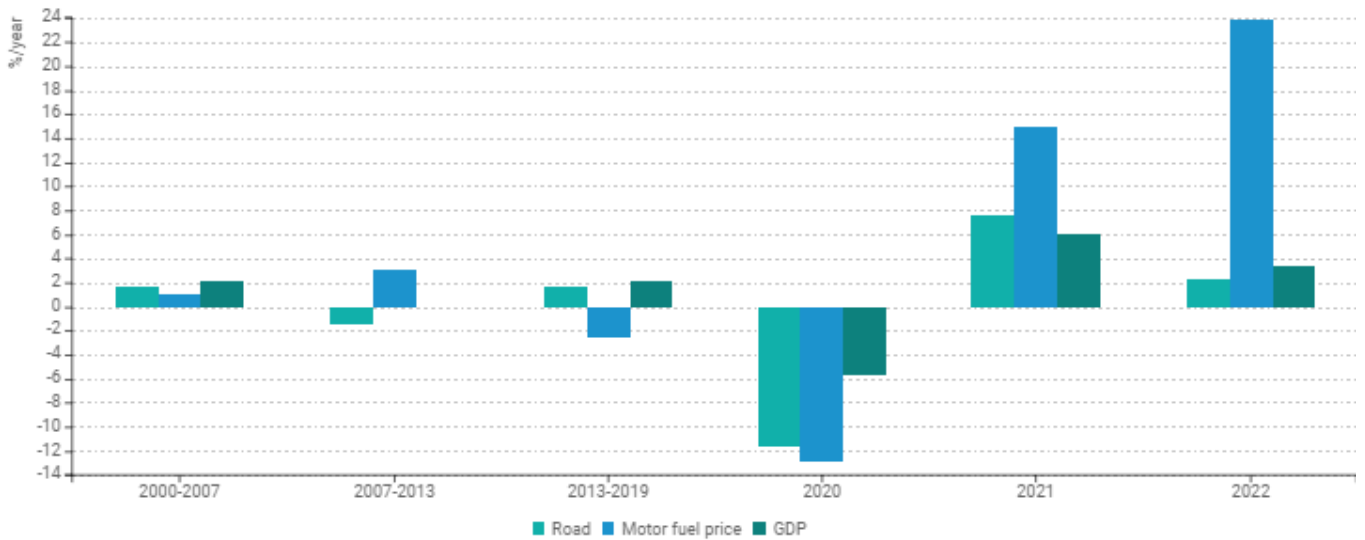
- The consumption of road transport has increased very rapidly in most EU countries since 2020 (+4.9%/year at EU level), after the strong reduction of 2020 due to COVID (-12.7%). It grew in 2022 (+2.3%), despite a strong rise in motor fuel prices in 2022 (+24%).
- Previously, it grew slowly at EU level between 2013 and 2019 (+1.6%/year), with disparities across countries: significant growth in most Eastern countries, stabilization or slow growth in most Western countries. This trend is mainly explained by the economic growth rebound (+2.1%/year increase of the GDP) and significant decrease of motor fuel prices (-2.6%/year).

Energy consumption trends in road transport



- Before that, consumption of road transport decreased between 2007 and 2013 (-1.5%/year), after a rapid progression between 2000 and 2007 (1.6%/year) despite increasing motor fuel prices.

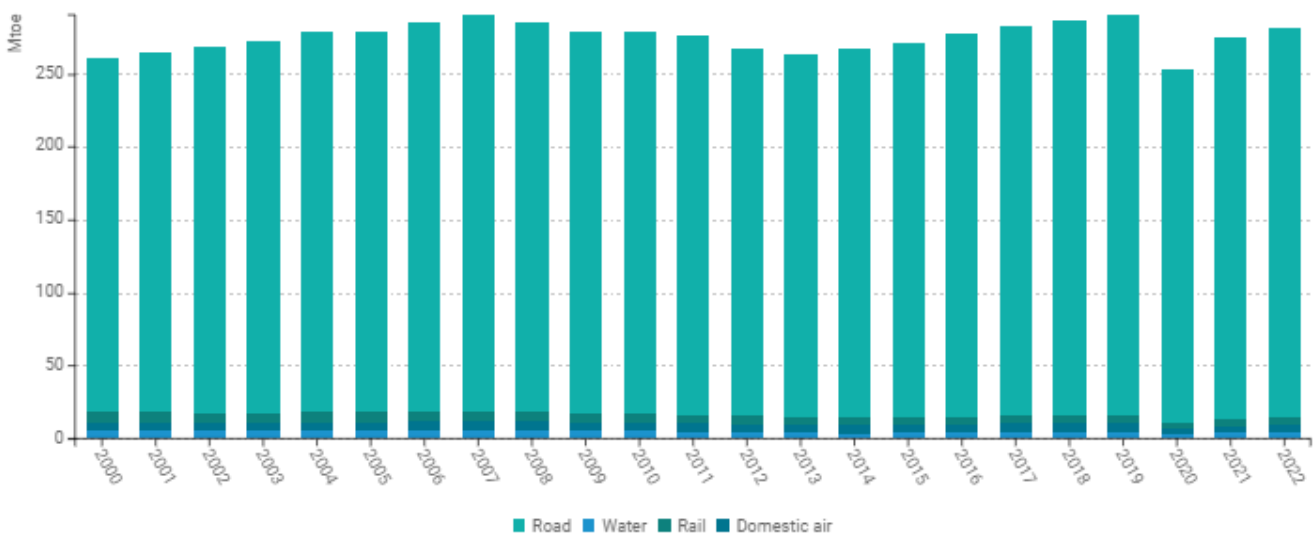
Energy consumption of road transport, fuel prices and GDP (EU)



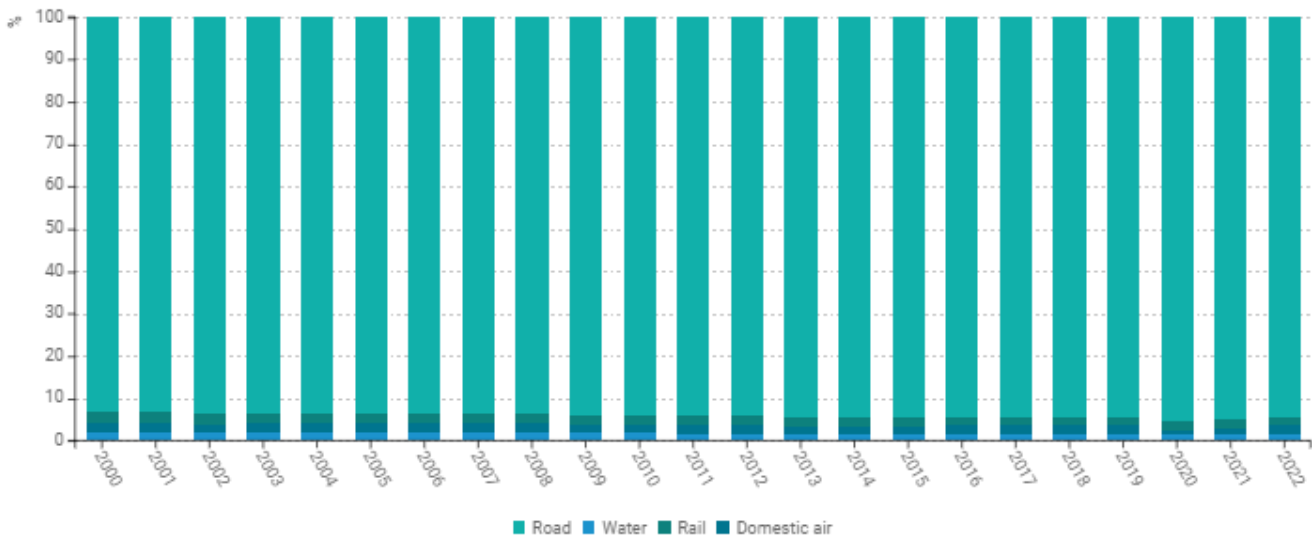
Consumption by mode

- While the share of road transport has increased since 2000 (+1.7 percentage points), the share of rail and water has decreased (from 2.8% in 2000 to 1.8% in 2022 for rail and from 2% in 2000 to 1.5% in 2022 for water transport).
- The share of domestic air transport is stable at around 2%, except in 2020, when it fell to 1.2% due to travel restrictions put in place to face COVID crisis.

Energy consumption by mode (EU)



Share of energy consumption by mode (EU)

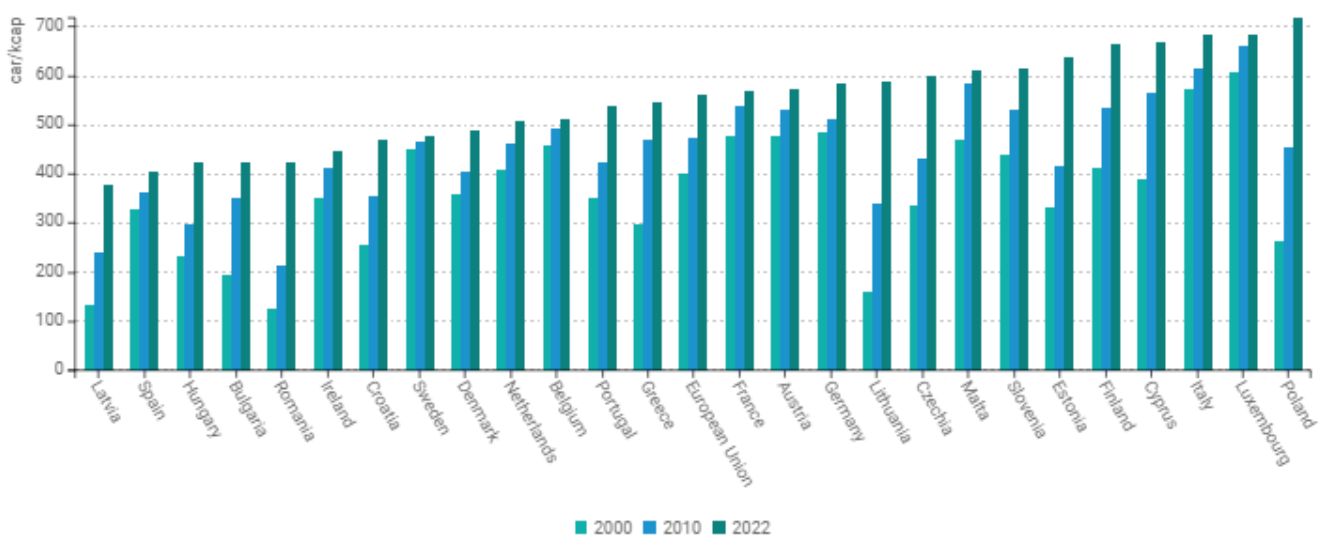


Cars

Number of cars per capita

- Very rapid growth of car ownership in Eastern Europe countries because of their lower equipment level, with 2 countries with a progression above 5%/year (Lithuania and Romania) and 5 others between 3% and 5%/year (Bulgaria, Estonia, Latvia, Poland and Slovakia). The trend has slowed down in Lithuania, Bulgaria, Latvia and Poland since 2010.
- Slower progression in other EU countries due to saturation, especially since 2010 in Sweden, Luxembourg, Belgium and Malta.

Number of cars per capita

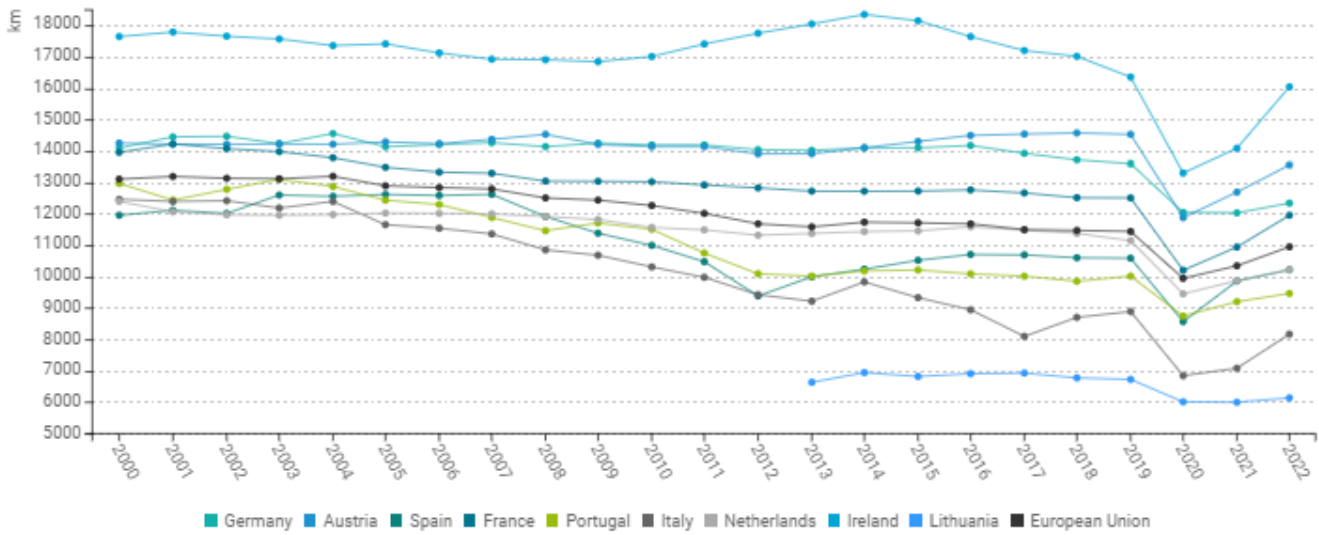


Change in distance travelled by car

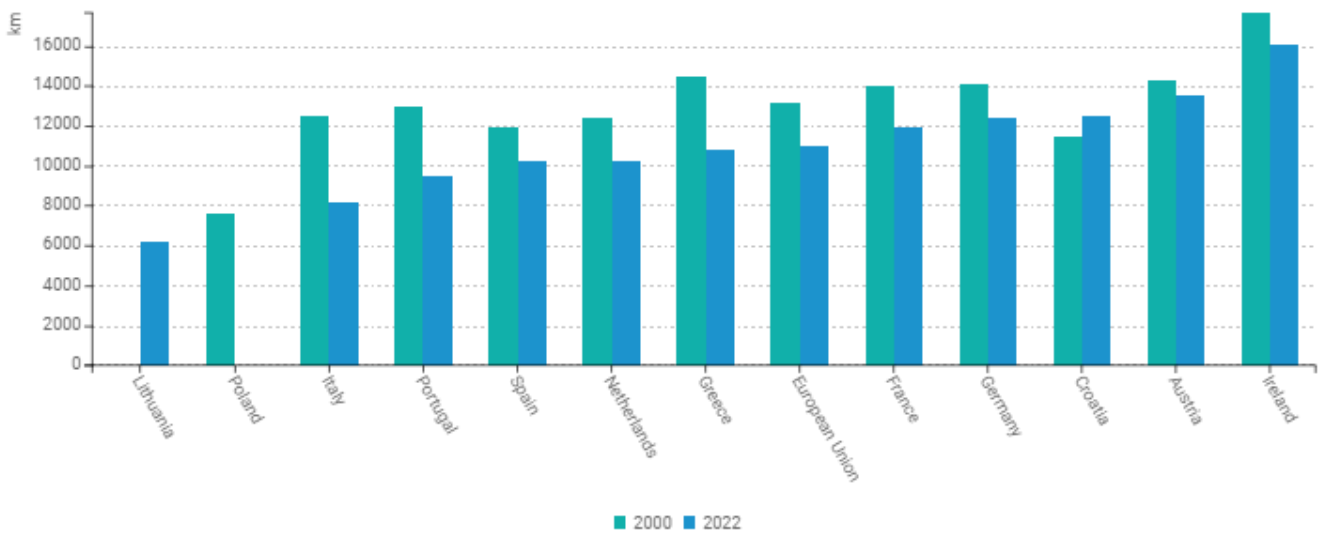
- The average distance travelled by car recovered to its historical level in 2021 and 2022 (+5%/year), after a sharp decrease in 2020 in most countries (-13% at EU level). In 2022, it was still under its 2019 level (-4% for the EU).

- Previously, the distance travelled by car decreased between 2000 and 2019 in most countries (around -1,700 km/year at EU level) with a very sharp reduction above 20% in Italy, Greece and Portugal; it had however increased in Slovenia, Poland and Croatia. In Poland, this growth is mainly due to the post-crisis recovery since 2013 (+4%/year).
- Large discrepancy of the average annual distance travelled by car between countries: from a maximum around 16,000 km/year for Ireland in 2022 to around 6,000 km/year in Lithuania, and on average 10,900 km/year for the EU.
- The distance travelled is around 2,200 km lower at EU level in 2022 than in 2000, with the largest reduction observed in Italy (around 4,300 km).

Change in distance travelled by car



Change in distance travelled by car for selected countries

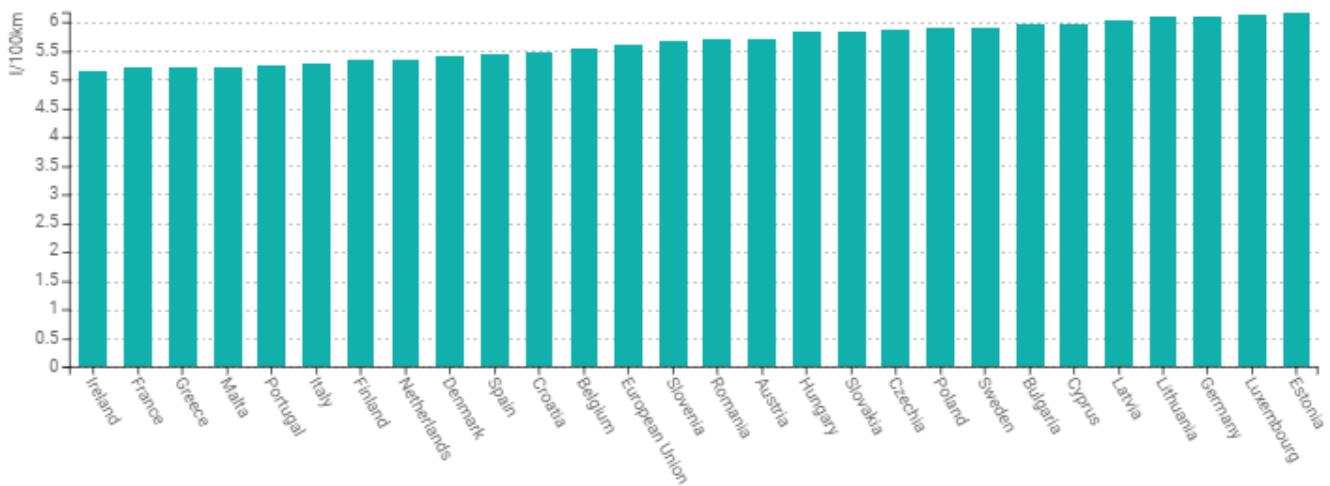


Specific consumption

Specific consumption of new thermal cars by country

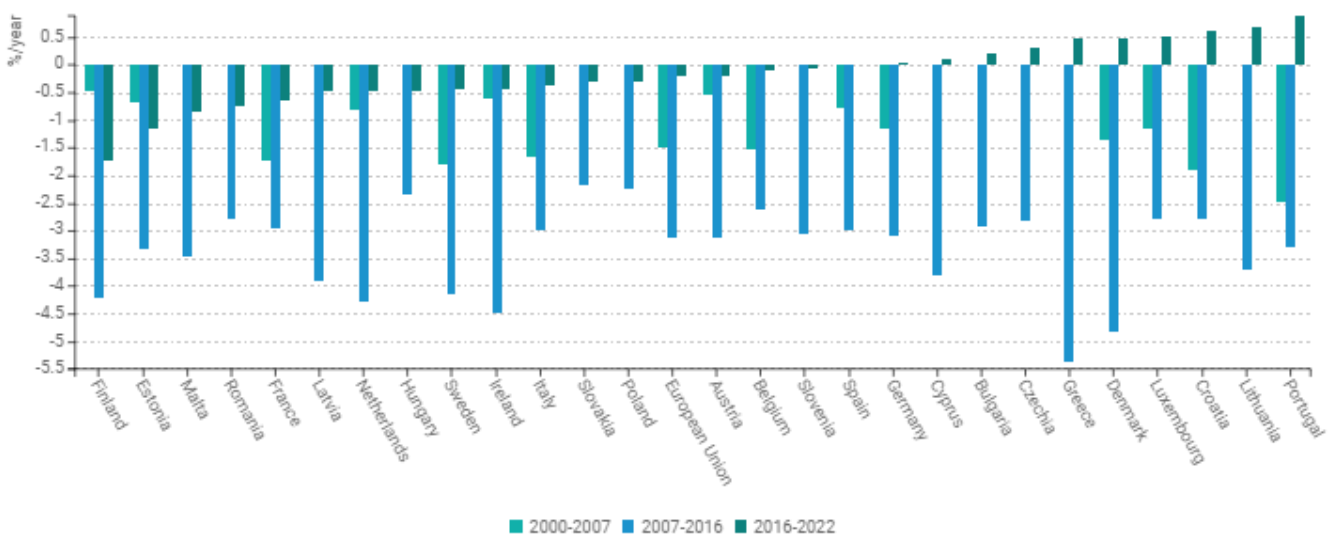
- The average specific consumption of new thermal cars was between 5 and 6 l/100km in almost all EU countries in 2022, with Ireland, France, Greece and Malta in the lower range (around 5.2 l/100km) and Estonia, Luxembourg and Germany in the higher range (above 6.1 l/100km).
- At EU level, new thermal cars consumed 2.8 l/100km less in 2022 than in 2000 (5.6 l/100km compared to 8.4 l/100km).

Specific consumption of new thermal cars (2022)



- The reduction of the specific consumption of new cars was the strongest between 2007 and 2016 (3.1%/year compared to 1.5% between 2000 and 2007 at EU level), as a result of EU regulations (labeling and standards), national fiscal incentives and rising fuel prices.

Trends in specific consumption of new thermal cars

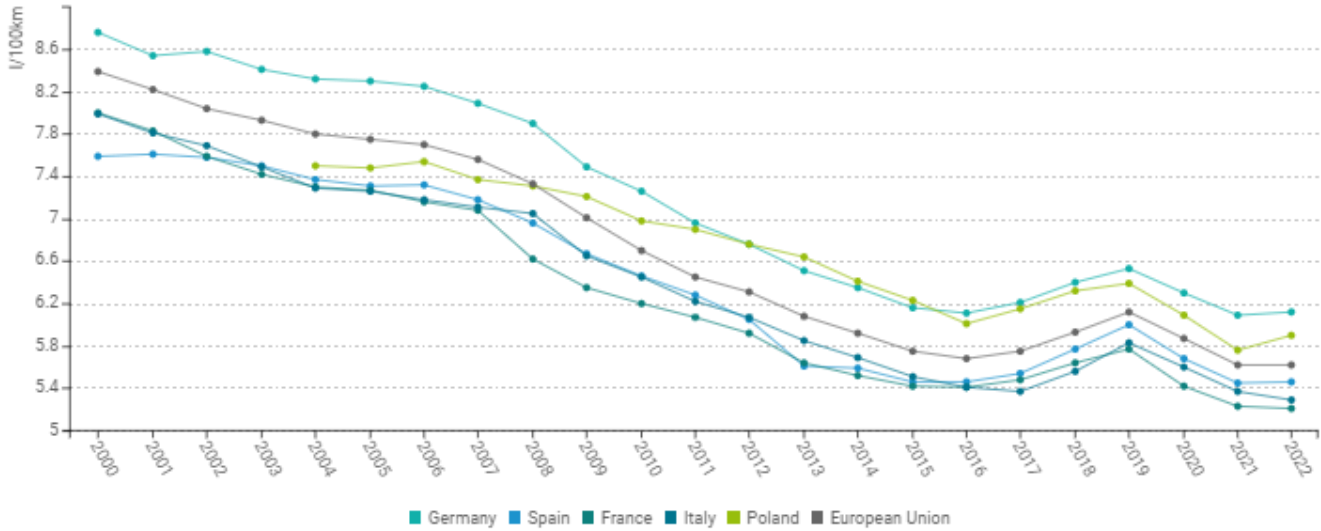


- However, since 2016, the trend has changed: it grew by 2.5%/year on average from 2016 to 2019 and then decreased sharply by 4.2%/year from 2019 to 2021. It remained stable in 2022, resulting in a stable specific consumption over

2016-2022 at EU level. It can be explained by a larger share of SUVs in new cars sales (almost 50% of sales in 2022, with higher specific consumptions) and also a higher share of gasoline cars, which specific consumption is higher than diesel cars.

- 8 countries have seen a growth in specific consumption of new thermal cars since 2016, despite last years decrease.

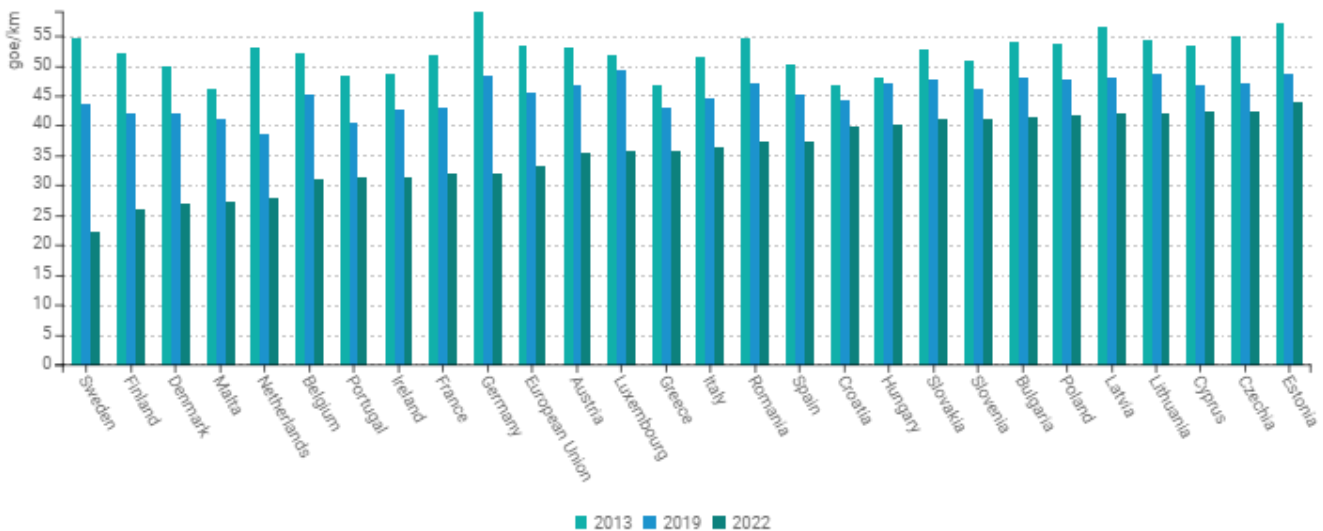
Long term specific consumption trends of new thermal cars



Specific consumption of new cars (incl. electric and hybrid) by country

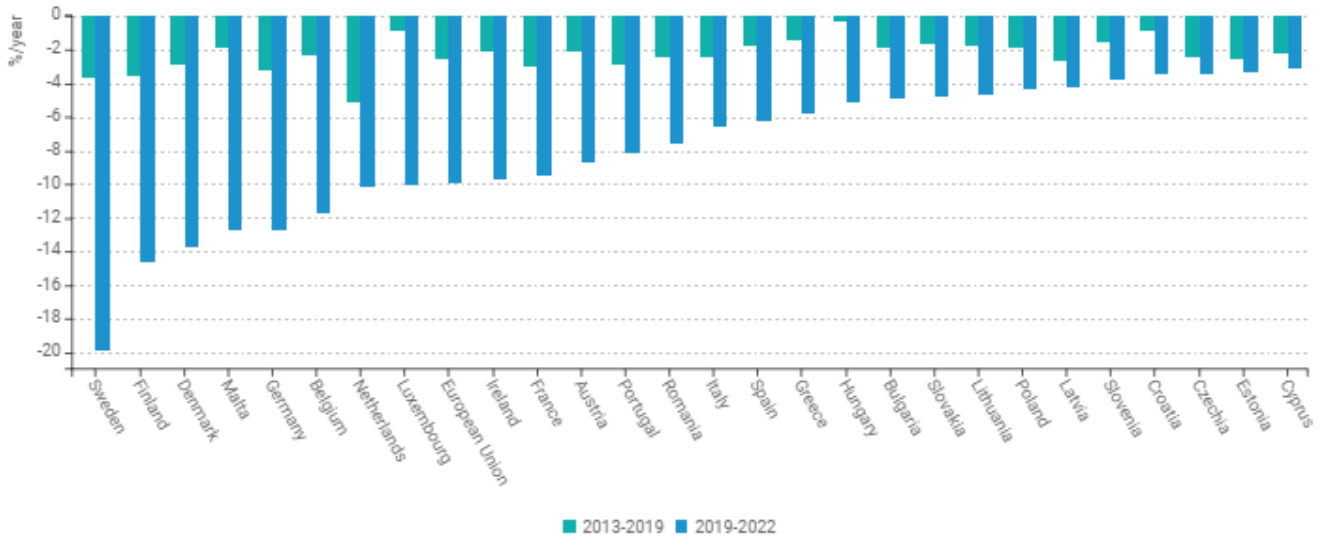
- The average specific consumption of new cars (incl. electric and hybrid) has decreased by 5%/year at EU level since 2013 to 33 goe/km.
- There are significant discrepancies between EU countries in 2022, with a maximum of 44 goe/km in Estonia, which is twice that of Sweden. Northern countries (Sweden, Finland, Denmark) are most represented in the lower range (less than 30 goe/km) due to a higher penetration of electric cars, while most of Eastern countries are in the higher range (above 40 goe/km).

Specific consumption of new cars (incl. electric and hybrid cars)



- The decline in specific consumption of new cars has accelerated significantly since 2019. At EU level, the decrease was four times faster after 2019 than before (-10%/year since 2019, compared to -2.6%/year over 2013-2019).

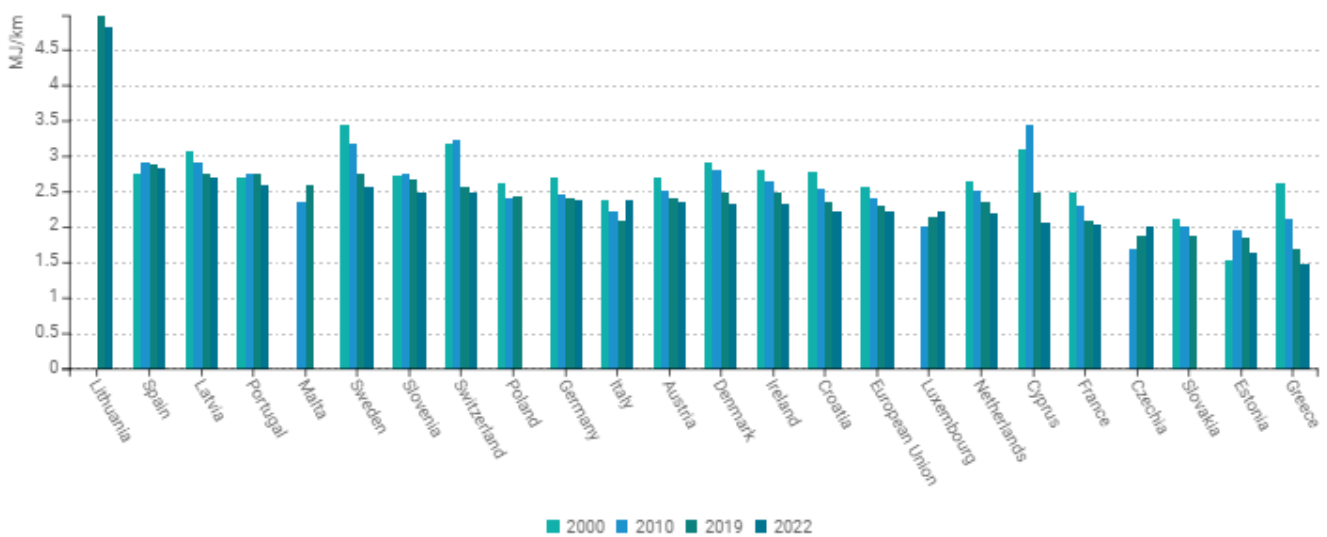
Trends in specific consumption of new cars (incl. electric and hybrid cars)



Energy consumption of cars per km

- Decreasing trends in energy consumption of cars per km since 2000 in most countries (-0.6%/year on average at EU level). In Estonia, Spain, Portugal, Slovenia and Cyprus, the increasing trend has reversed since 2010.
- In Italy and Luxembourg, there has been an increase since 2010.

Energy consumption of cars per km

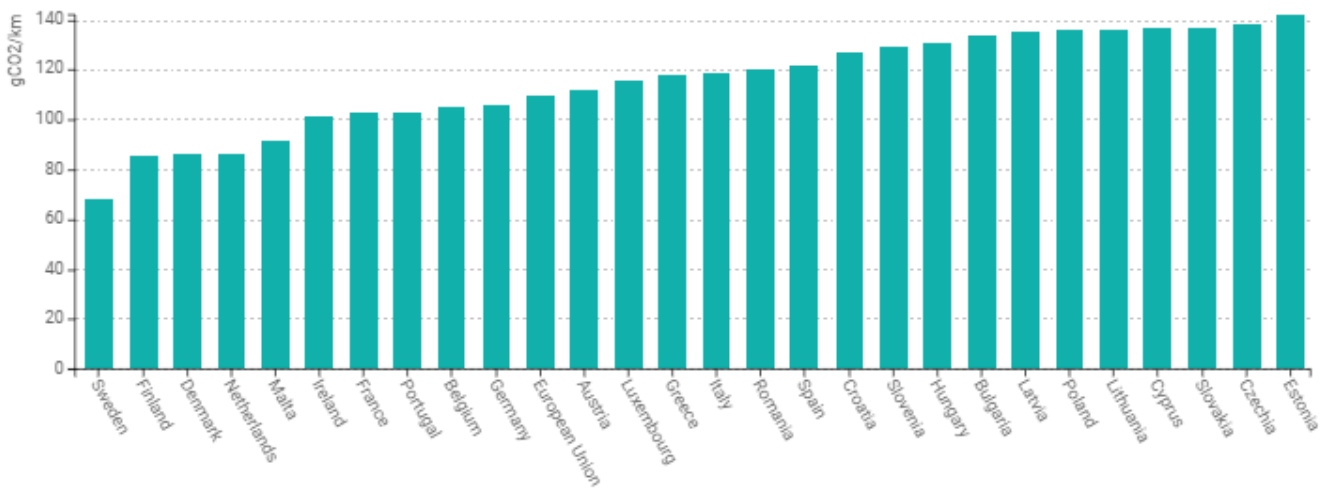


Specific CO2 emissions

Specific CO2 emissions of new cars

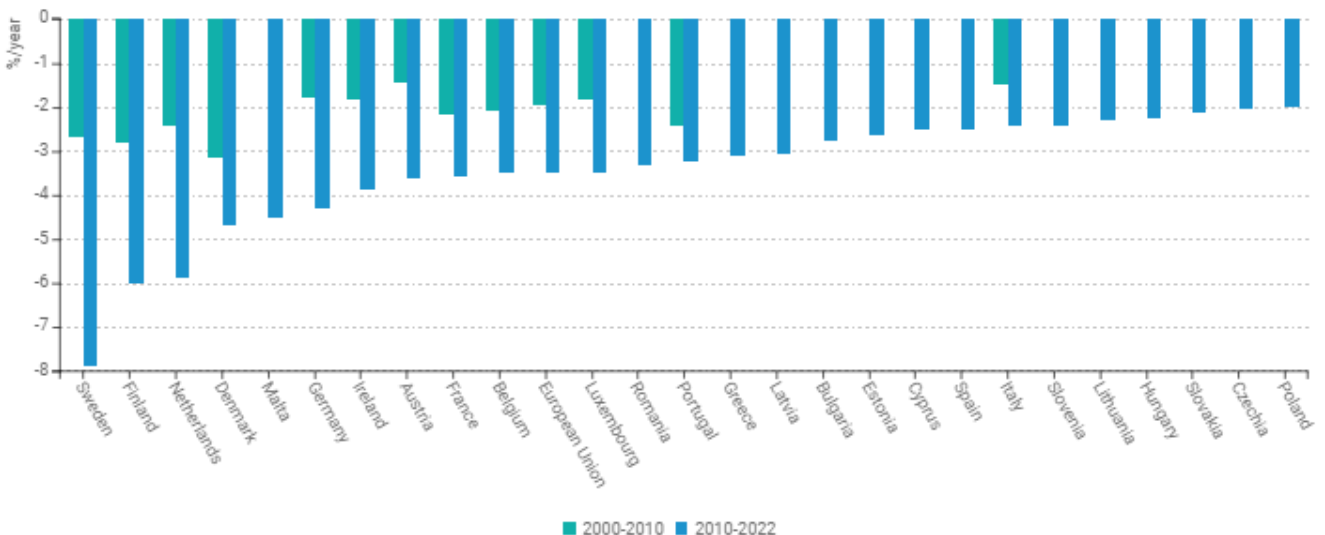
- Large discrepancy in the specific emissions of new cars among countries: a 45% gap between the two extreme groups of countries: from less than 93.6 gCO₂/km, the 2025 mandatory limit (Sweden, Finland, Denmark, Netherlands and Malta) to more than 135 gCO₂/km (Lithuania, Cyprus, Slovakia, Czechia and Estonia).
- 110 gCO₂/km for EU average in 2022.
- 10 EU countries below 110 gCO₂/km: Sweden, Finland, Denmark, the Netherlands, Malta, Ireland, France, Portugal, Belgium and Germany.

Specific CO2 emissions of new cars (2022)



- Rapid progress since 2010 in all countries, especially in Sweden, the Netherlands, Finland, Netherlands, Denmark, Malta and Germany (above 4%/year). Progress due to the implementation of national policies and standards for car manufacturers and a higher share of electric cars, especially in the last years.

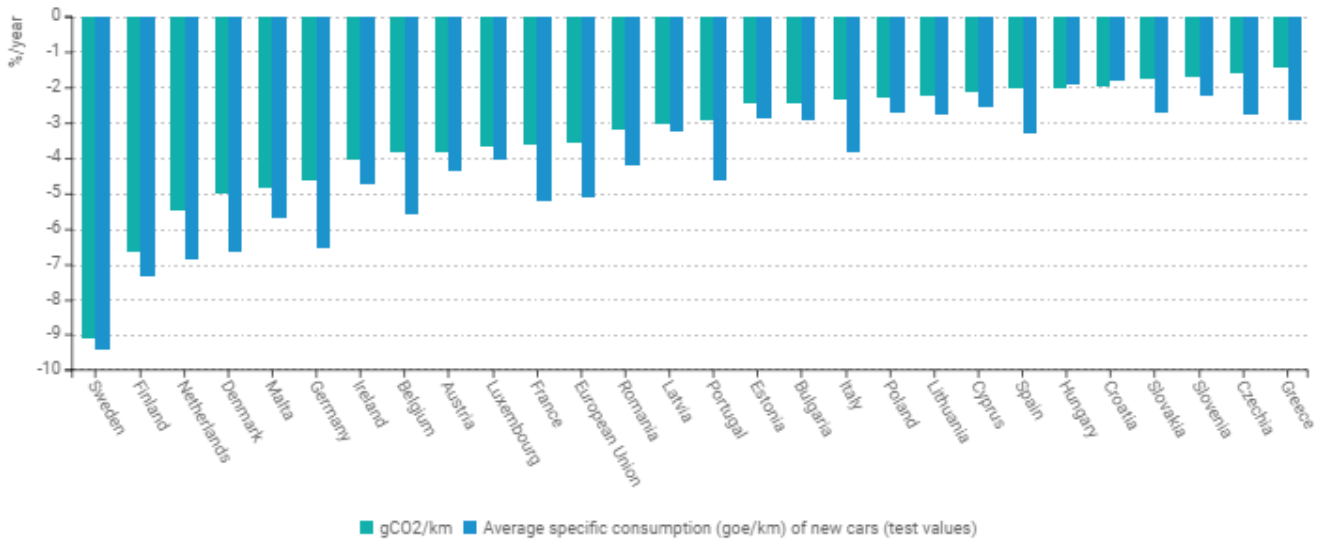
Trends in the specific emissions of new cars



Specific emissions vs consumption of new cars

Trends in specific energy consumption of new thermal cars in l/100 km and specific CO2 emissions in gCO2/km (WLTP) are close for most countries. In some countries (especially in North of EU), specific emissions are decreasing fastest compared to specific consumption of new thermal cars due to the spread of electric cars.

Specific emission vs consumption of new cars (2013-2022)

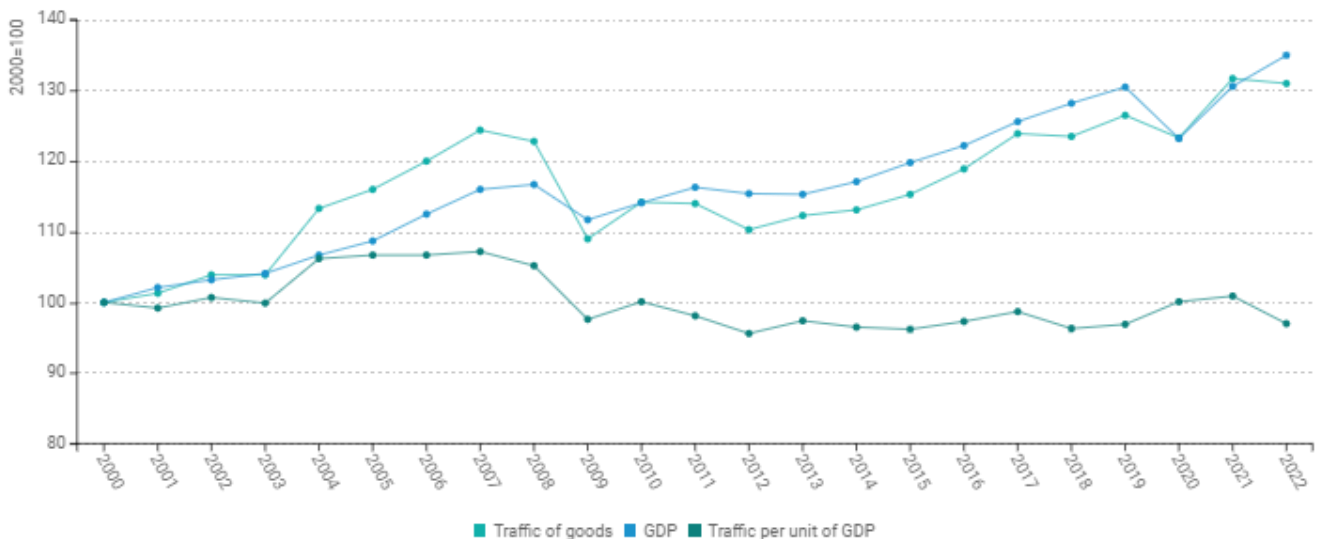


Transport of goods

Trends in freight traffic

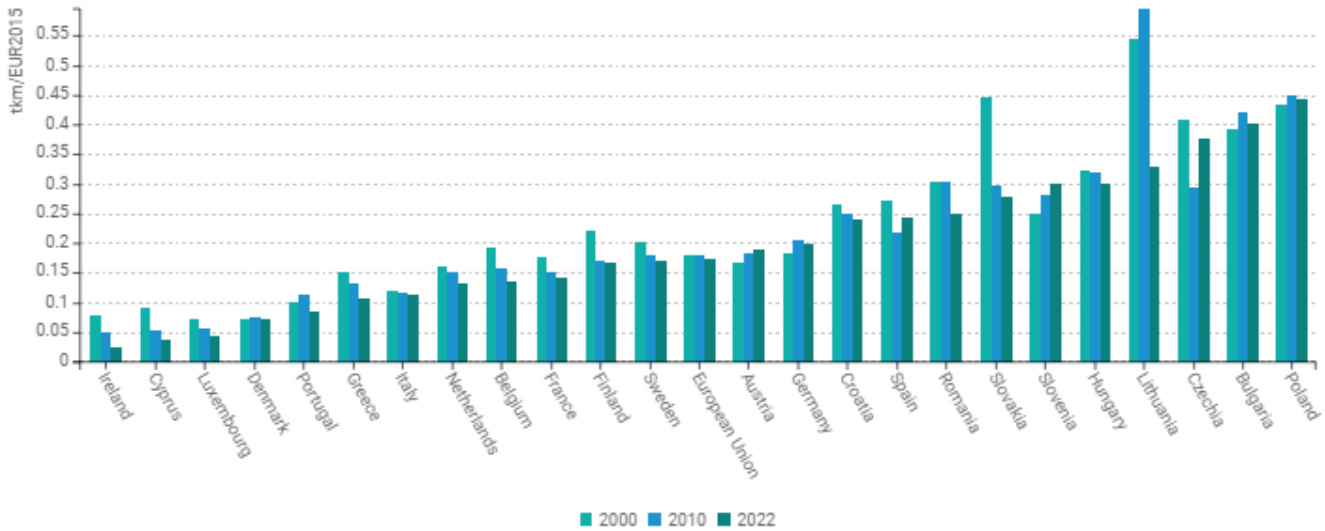
- Increasing traffic of goods since 2012 (1.7%/year), with a good correlation with GDP.
- Slight decrease in 2020 (-2.5%), followed by a strong rebound in 2021 (+6.8%).
- There was a sharp decrease of freight traffic between 2007 and 2009 during the financial crisis (-6.4%/year).
- At EU level, the traffic intensity (traffic per unit of GDP) has slightly increased from 2016 to 2021 (+0.7%/year), and decreased by 3.8% in 2022. It remained roughly stable over 2012-2016 and decreased over 2007-2012 (-2.3%/year).

Trends in freight traffic and GDP (EU)



- In the majority of the EU MS (19), a reduction in traffic intensity has been observed since 2000, with Estonia, Ireland and Cyprus showing a reduction of more than 4%/year.
- In 3 EU MS, there is a steady increase since 2000 of the traffic intensity, while in 9 other countries there has been an increase before the crisis and a decrease after.

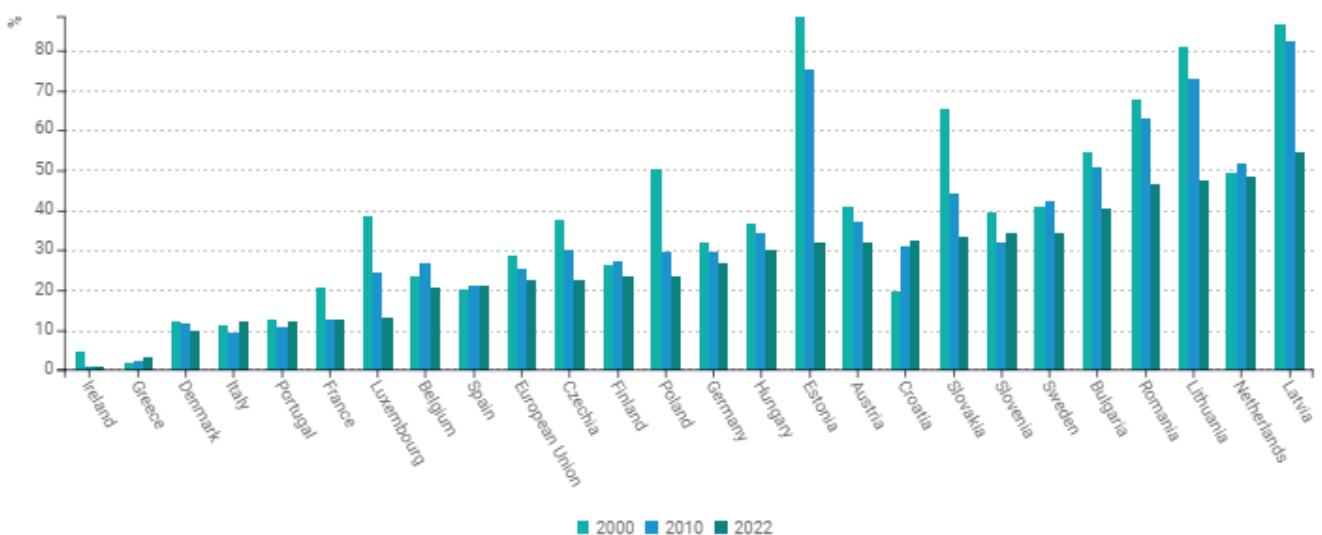
Freight traffic per unit of GDP



Share of rail and water in total goods of traffic

- The share of rail and water in the traffic of goods has sharply decreased at EU level between 2000 and 2022 (-6 points) and in three quarters of EU countries (21), despite the policies implemented to promote rail or water transport. It has increased in Italy, Spain, Greece and Croatia, as well as in Portugal and Slovenia since 2010.
- At EU level, 22% of goods traffic was carried by rail and water transport in 2022.
- Latvia, Netherlands, Lithuania and Romania have the highest share of rail and water (>45%). The highest progression since 2000 has been seen in Croatia (+13 points).

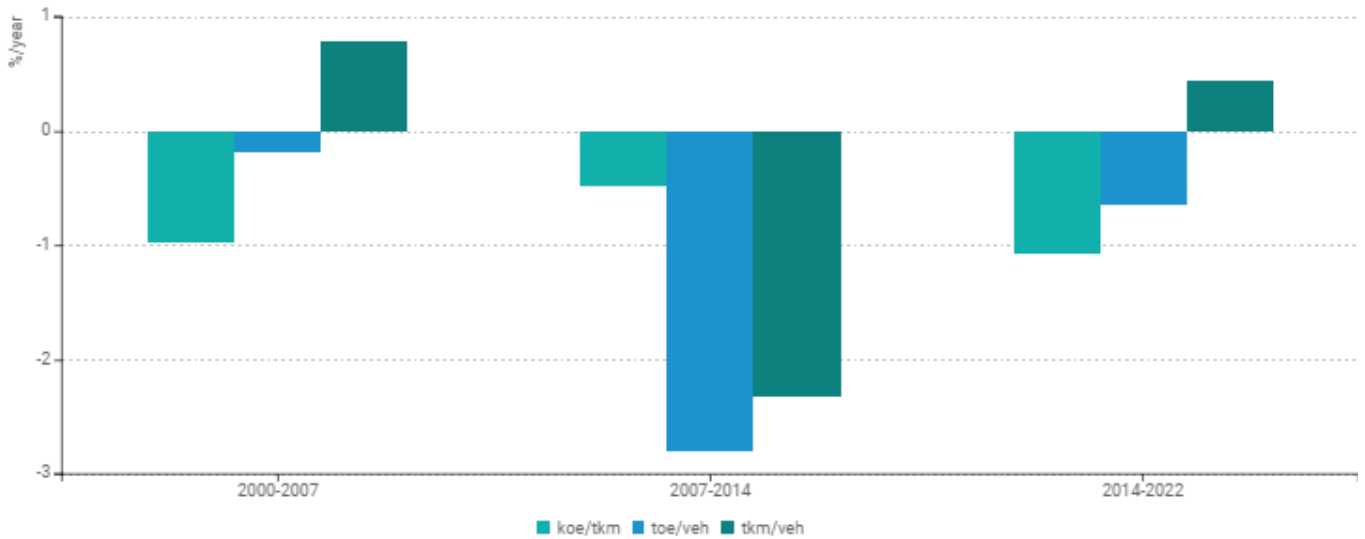
Share of rail and water in total goods traffic



Unit consumption of road transport of goods

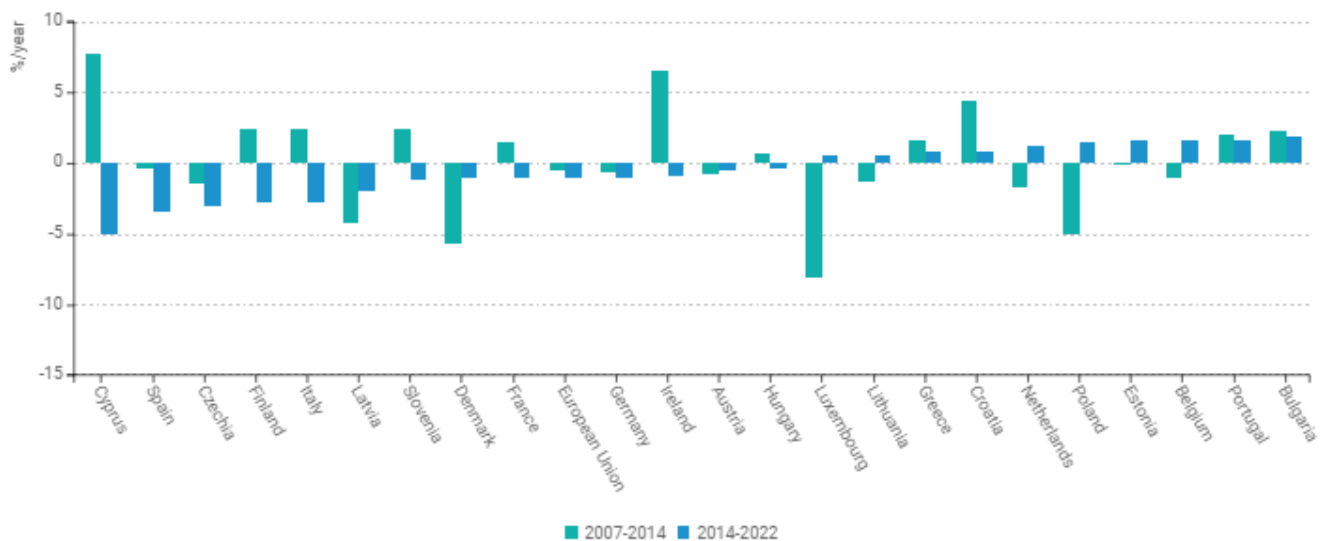
- Energy efficiency progress of road freight transport, as measured from the decrease of the road freight traffic consumption per ton-km, has accelerated at EU level since 2014 (around 1.1%/year, compared to 1%/year between 2000 and 2007 and 0.5%/year for the period 2007-2014). This is due to the combined effect of an increase in load factors (i.e. tkm/veh) and a reduction of the specific consumption per vehicle (toe/vehicle).

Change in the unit consumption of road freight transport (EU)



- Deterioration of energy efficiency in 10 EU countries since 2014 despite the rebound in freight traffic.

Unit consumption of road transport of goods



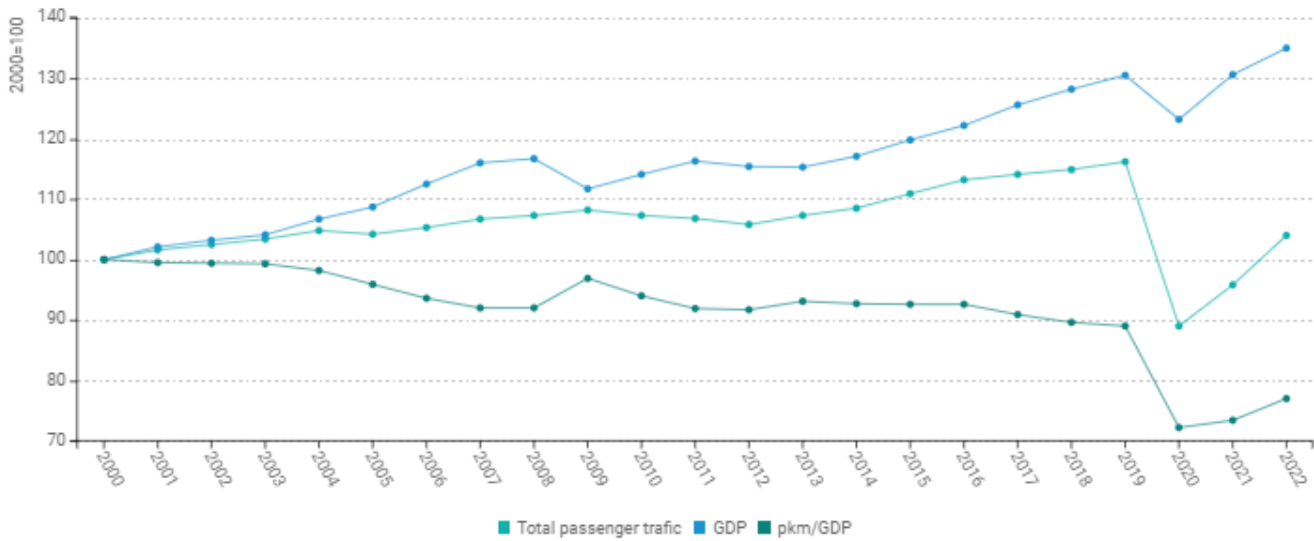
Passenger transport

Passenger traffic and GDP at EU level

- Passenger traffic increased, at a lower rate compared to the GDP on average at EU level from 2000 to 2019, as shown by the 0.6%/year decrease of the passenger transport intensity (pkm/GDP).

- It fell, much more than GDP in 2020, because of travel restrictions linked to the Covid pandemic. Passenger transport intensity has been increasing since 2020 (+3.3%/year over 2020-2022, implying that passenger traffic recovered at a faster than pace than GDP). It remains under its pre-covid level (-13.5%).

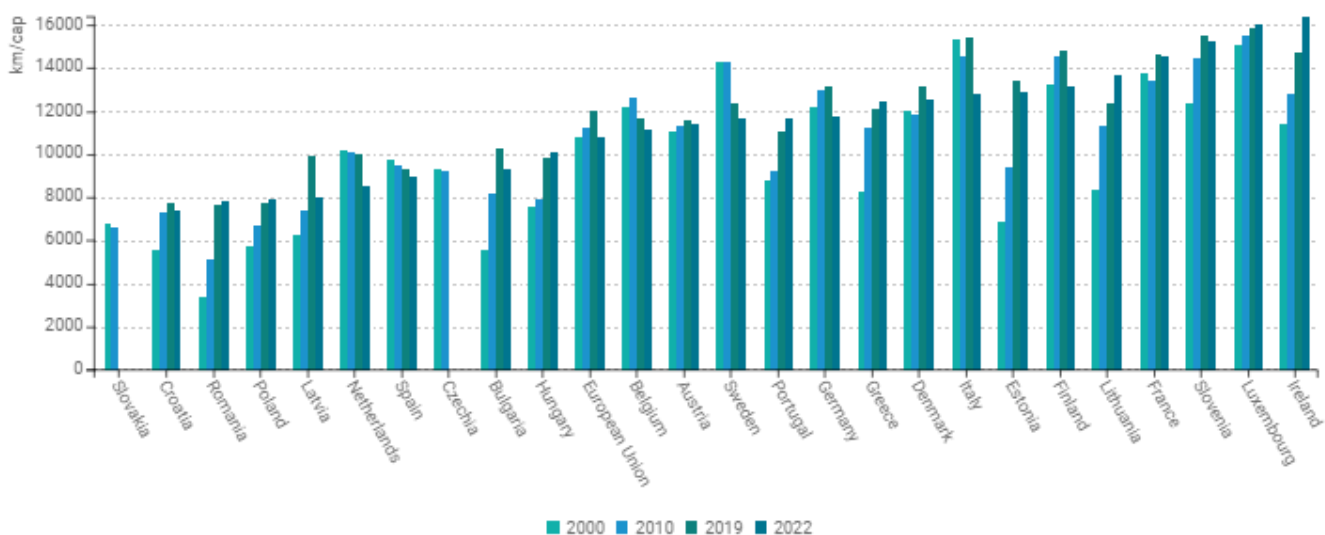
Passenger traffic and GDP at EU level



Passenger mobility per capita

- The average mobility per capita (km/year) has decreased in all countries between 2019 and 2021 (-18% at EU level) due to measures to fight COVID, and rebounded strongly in 2022 (+8.6%). It ranged from 7 400 km/year in Croatia in 2022 (10 800 km/year at EU level) to 16 400 km/year in Ireland in 2022 (10 800 km/year at EU level).
- Previously, it has increased in all countries between 2000 and 2019, except the Netherlands, Belgium, Spain and Sweden (+0.6%/year at EU level); it however decreased between 2000 and 2010 in several countries such as Czechia, Italy, Denmark and France following the 2008/2009 financial crisis.

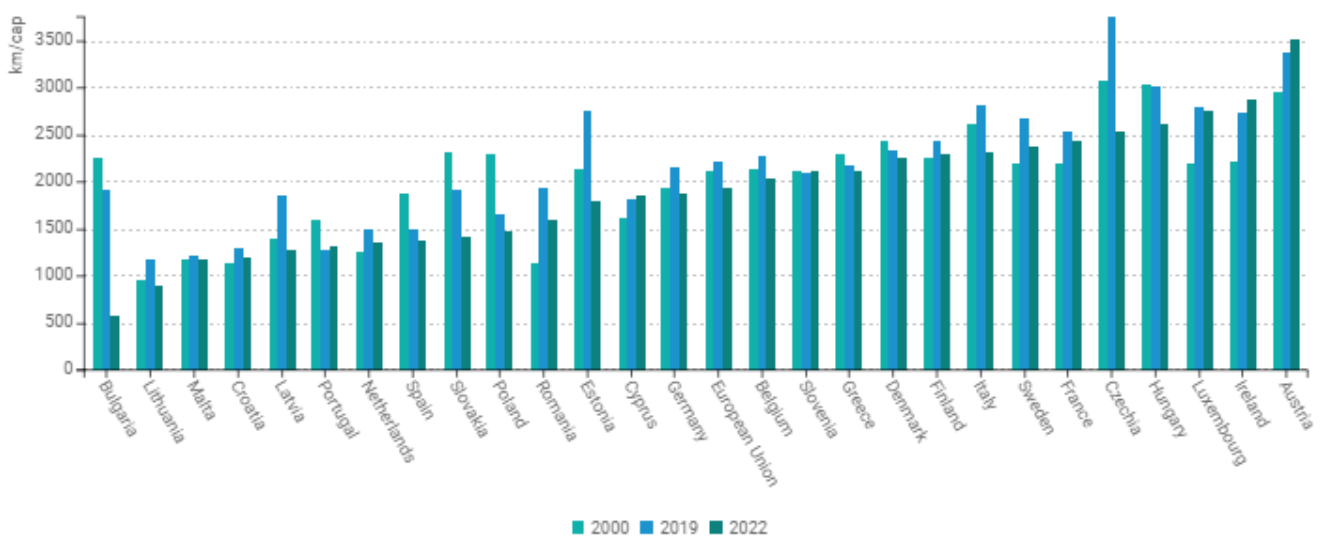
Passenger mobility per capita



Public transport

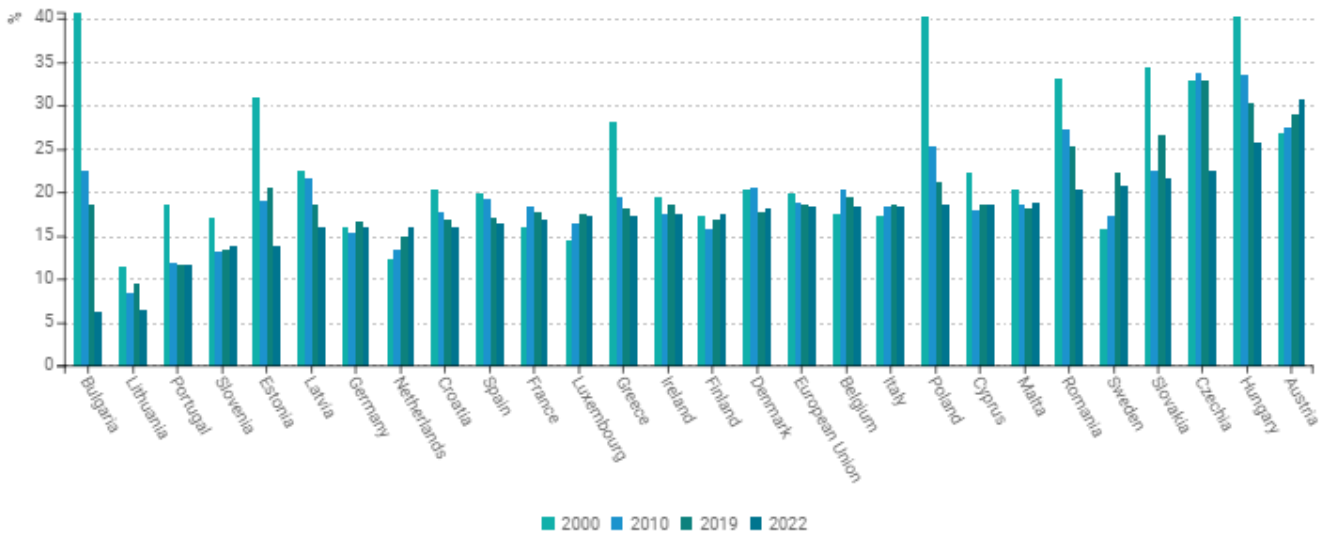
- The mobility by public transport has increased between 2000 and 2019 in almost 70% of EU countries (+5% at EU level or 114 km). It has decreased in some Eastern and Southern countries (Hungary, Slovenia, Greece, Bulgaria, Slovakia, Spain, Portugal and Poland).
- The use of public transport fell in all EU countries in 2020 due to travel restrictions and social distancing measures to fight COVID outbreak (-43% at EU level). It recovered only partially in 2021 and 2022 (+23%/year), which means a 2022 level still 13% lower than 2019. The result is that only in 10 countries the use of public transport was higher in 2022 than in 2000.
- Austria, Ireland, Luxembourg, Hungary and Czechia have the highest use of public transport in 2022 (above 2,500 km/year), compared to an EU average of around 1,900 km/year, whereas Bulgaria and Lithuania have the lowest use (below 1,000 km/year).

Mobility of public transport per capita



The Covid outbreak resulted in a general reduction of the share of public transport in total passenger traffic in all countries (-5 points, to 19% in 2020 at EU level), with the highest reduction in Czechia (-11 points), Estonia and Poland (around -8 points for both). Since 2020, the share of public transport has increased in most EU countries (except Romania and Bulgaria), bringing it back to pre-covid levels in 16 MS. Before Covid, the share of public transport decreased at EU level and in 19 EU countries (-1 point at EU level since 2000 to 18.7% in 2019). It decreased the most rapidly in all Central and Eastern European countries, where public transport used to be dominant (especially in Estonia, Poland and Bulgaria). The share of public transport however increased in 8 countries between 2000 and 2019, mostly in Western European countries, especially in Sweden (+6.5 points) and Luxembourg (+3 points). In 7 other countries, there was a growth in the share of public transport from 2010 to 2019, following a decrease in the previous decade, but not counterbalancing the long-term decreasing trend. Czechia, Hungary and Austria had the highest share of public transport in 2019 (around 30%).

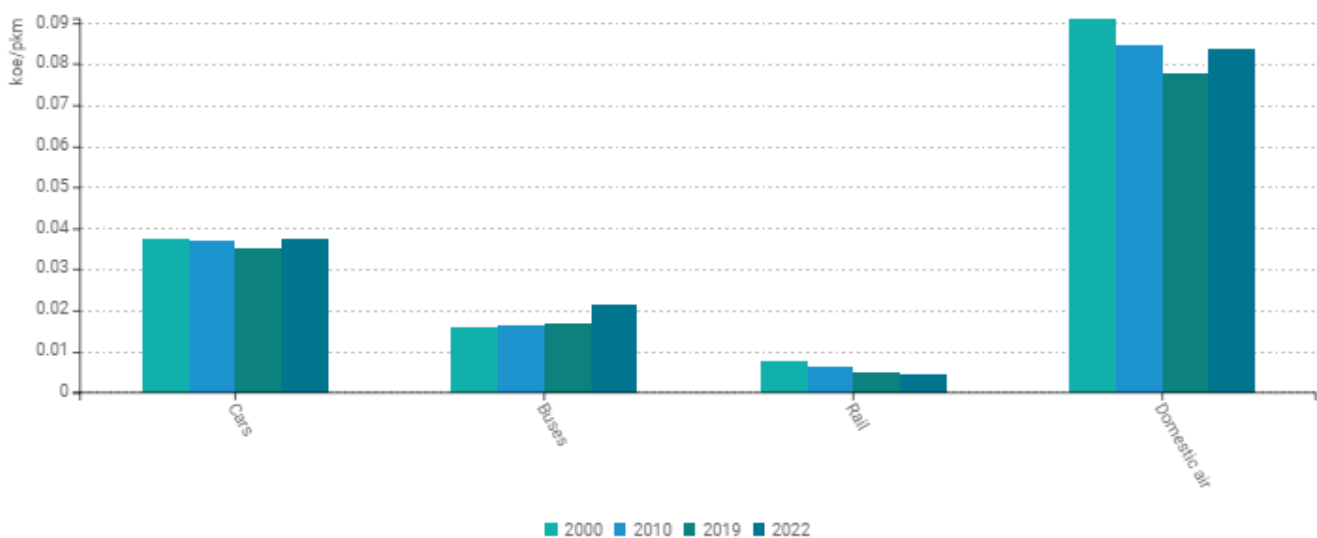
Share of public transport in total passenger traffic



Specific consumption

- The specific energy consumption of the different modes of transport has been decreasing or stable until 2019. However, there was an increase in 2020 and 2021, especially for public transport, due to lower occupancy rates. In 2022, it has almost returned to 2019 levels except for buses, whose specific energy consumption remains 26% higher than 2019 level.
- In 2019, cars required almost 2.1 times more energy per passenger-km than buses, and 7.4 times more than rail transport. Domestic air transport is more than twice more energy intensive than cars and 16 times more intensive than rail.

Specific energy consumption by transport mode

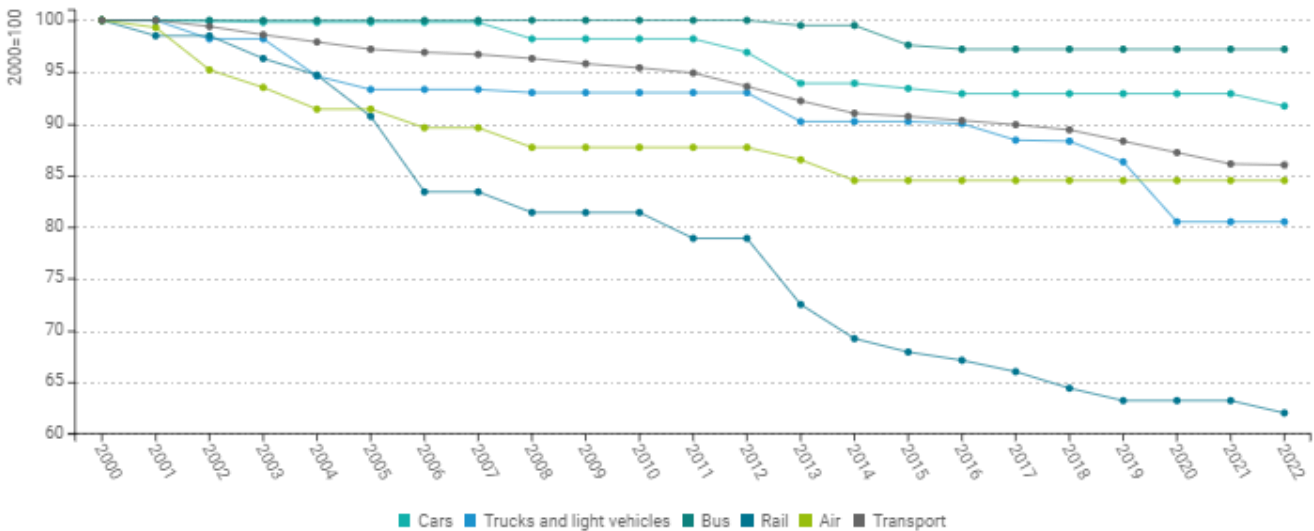


Energy efficiency and savings

Energy efficiency index for transport

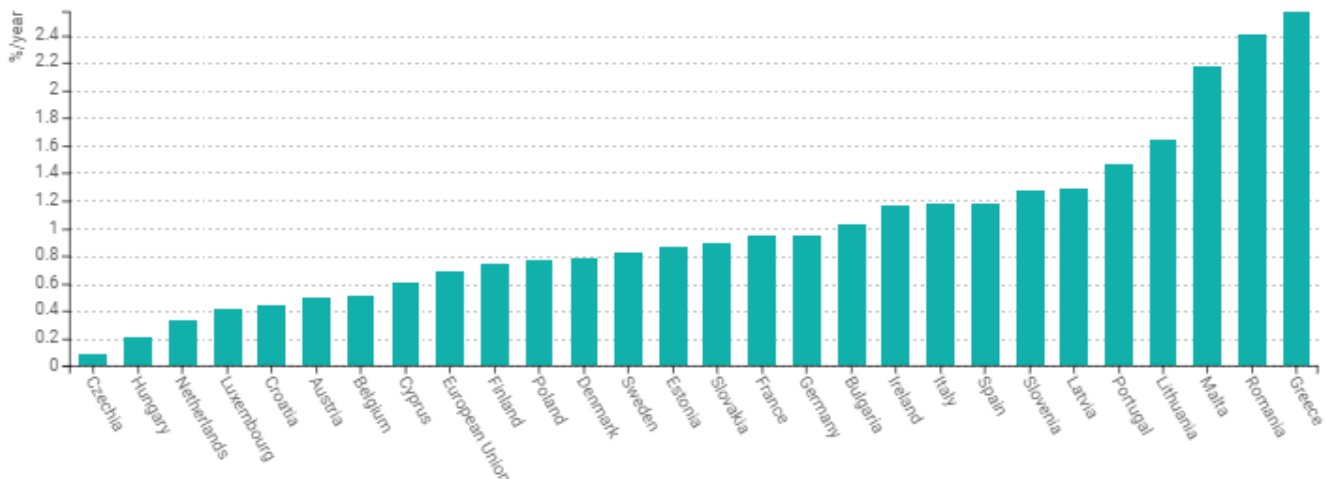
- Energy efficiency of transport improved by 0.7%/year, on average, between 2000 and 2022, as measured by ODEX that combines the energy efficiency trends of the different modes of transport (cars, trucks and light vehicles, bus, motorcycles, air, waterways, rail).
- Energy efficiency progress for cars was slower (0.4%/year), and quite low since 2014, because of an increase in the specific consumption of new cars, due to two main factors: a decrease in diesel shares (from 56% in 2012 to 18% in 2022) and a growing share of SUV (from 25% to around 50%, according to ACEA).
- For trucks and light vehicles, energy efficiency has been improving rapidly since 2012 (1.4%/year). There was no efficiency progress between 2008 and 2012 because of the economic crisis.
- Important energy efficiency progress was achieved over 2000-2022 in rail transport (2.2%/year).

Energy efficiency index by mode (EU)



- Discrepancies are observed in energy efficiency gains in transport in EU countries: from around 2.5%/year in Greece and Romania to less than 0.5%/year in Czechia, Hungary, The Netherlands, Luxembourg, and Croatia.

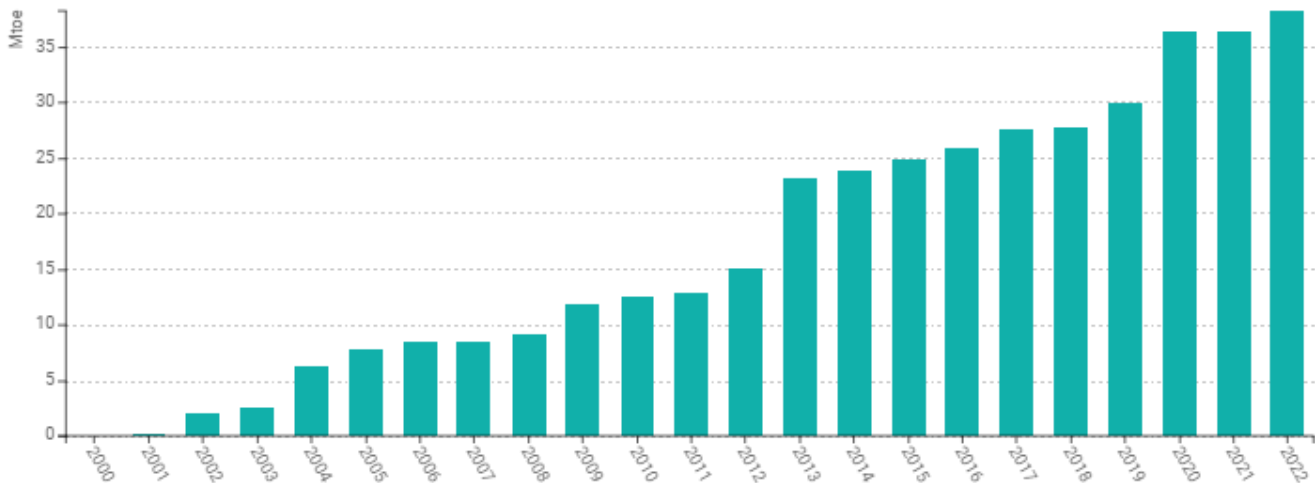
Energy efficiency gains for transport by country (2000-2022)



Energy savings in transport (EU)

- In 2022, energy savings in transport reached around 38 Mtoe at EU level. This means that without energy efficiency improvements, the energy consumption would have been 38 Mtoe higher.
- There has been a slowdown in annual additional energy savings between 2009 and 2012, mainly due to no more progress for goods transport because of the economic recession.

Energy savings in transport (EU)

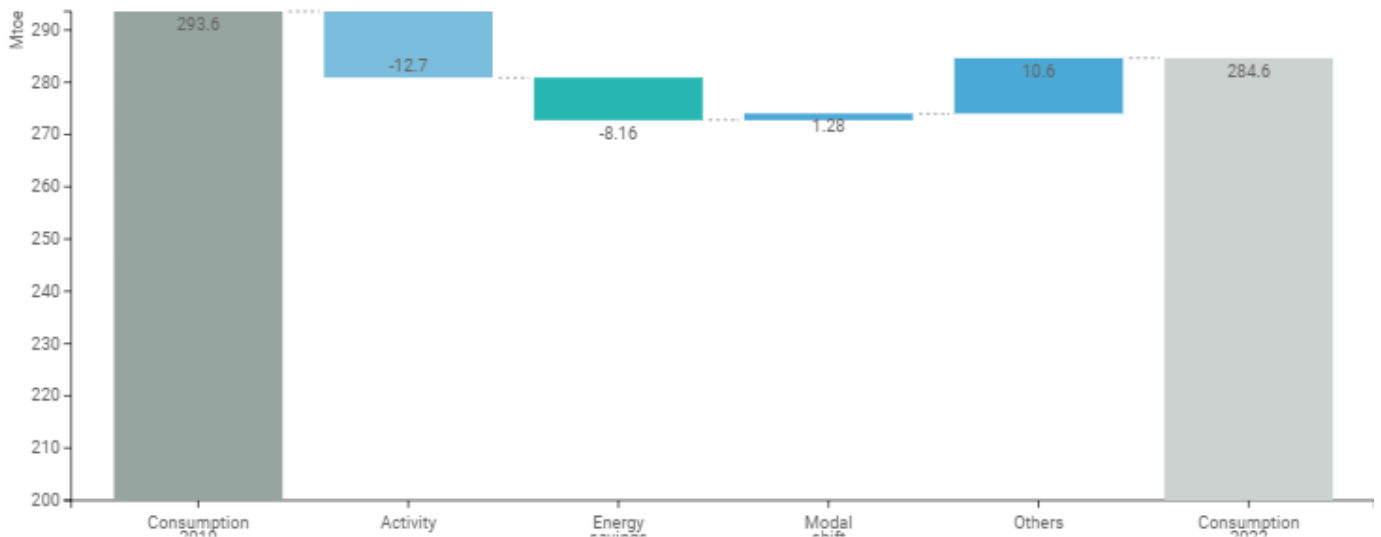


Decomposition of energy consumption

Drivers of transport consumption

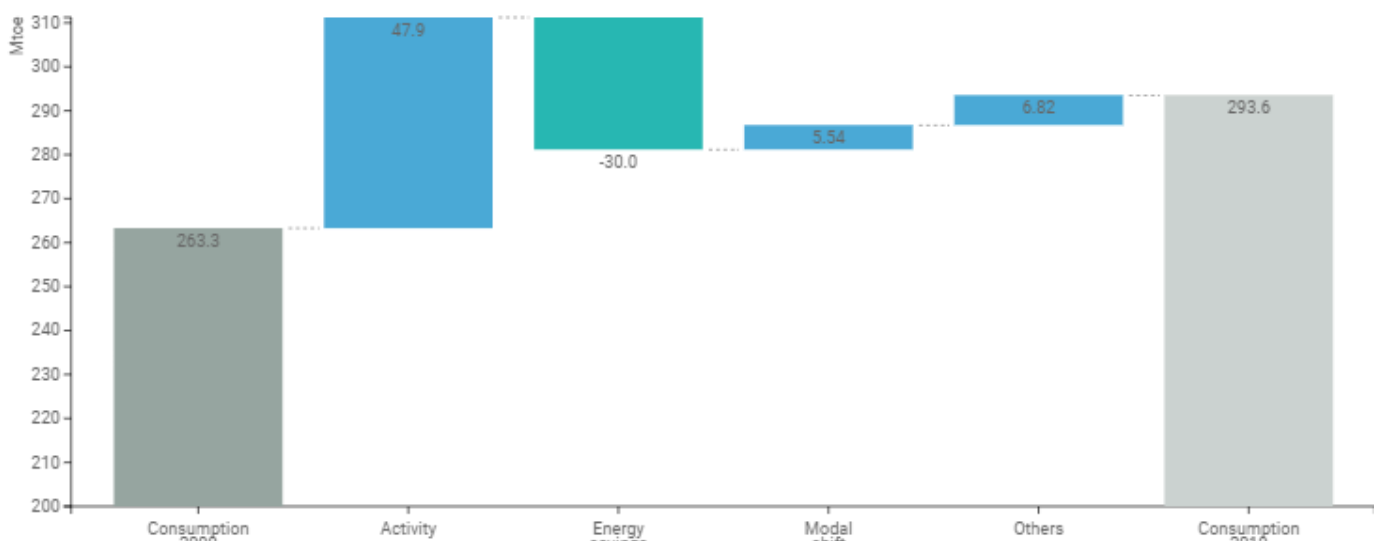
- At EU level, the energy consumption of transport decreased by 9 Mtoe between 2019 and 2022.
- Two factors contributed to lower consumption: a drop in traffic of passenger and goods ("activity effect"), that contributed to decrease this consumption by 13 Mtoe and energy savings (i.e. change in the efficiency of cars, trucks, airplanes, etc.), that reduced consumption by 8 Mtoe.
- These effects were partially counterbalanced by the modal shift, i.e. changes in the share of transport mode in the total traffic, that contributed to an increase by 1 Mtoe (mainly due to higher share of cars) and by other effects (+10 Mtoe), mainly explained by lower occupancy rates for passenger transport (cars and public transport).

Drivers of energy consumption variation in transport at EU level (2019-2022)



- Between 2000 and 2019, the energy consumption of transport increased by 30 Mtoe at EU level.
- The rise in traffic contributed to increase this consumption by 48 Mtoe and "modal shift" by around 6 Mtoe. Other effects, mainly behavioral effects, also contributed to increase the consumption (around 7 Mtoe) (decrease in load factor, driving behavior).
- "Energy savings" partially counterbalanced these effects, leading to a decrease by 30 Mtoe of transport energy consumption.

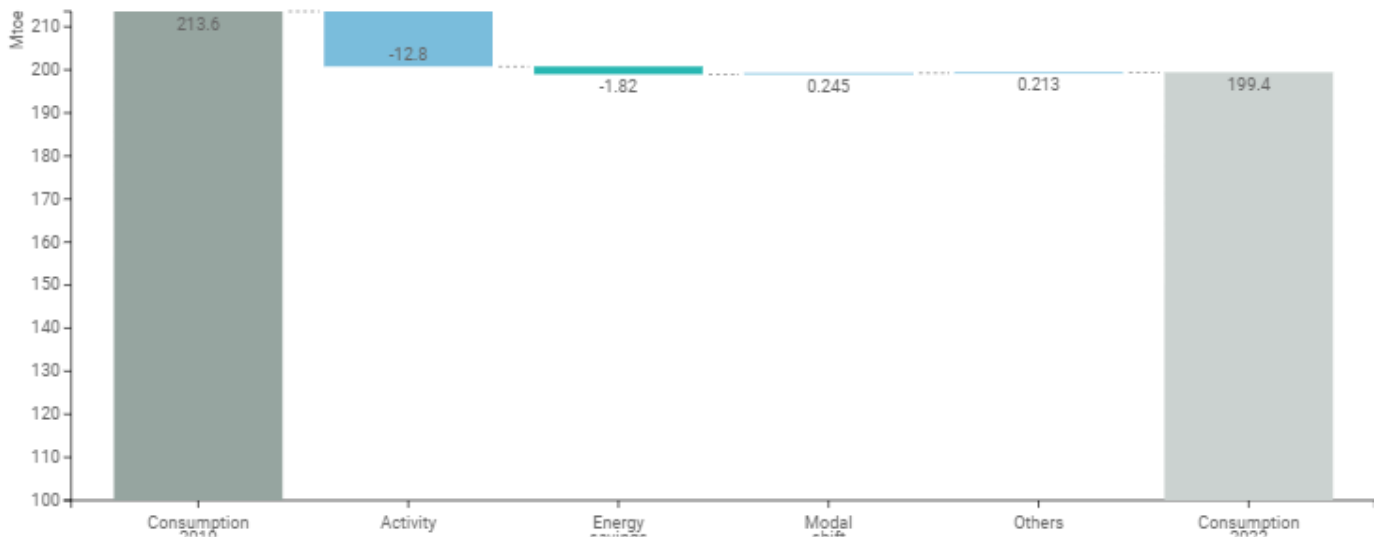
Drivers of energy consumption variation in transport at EU level (2000-2019)



Drivers of passenger energy consumption

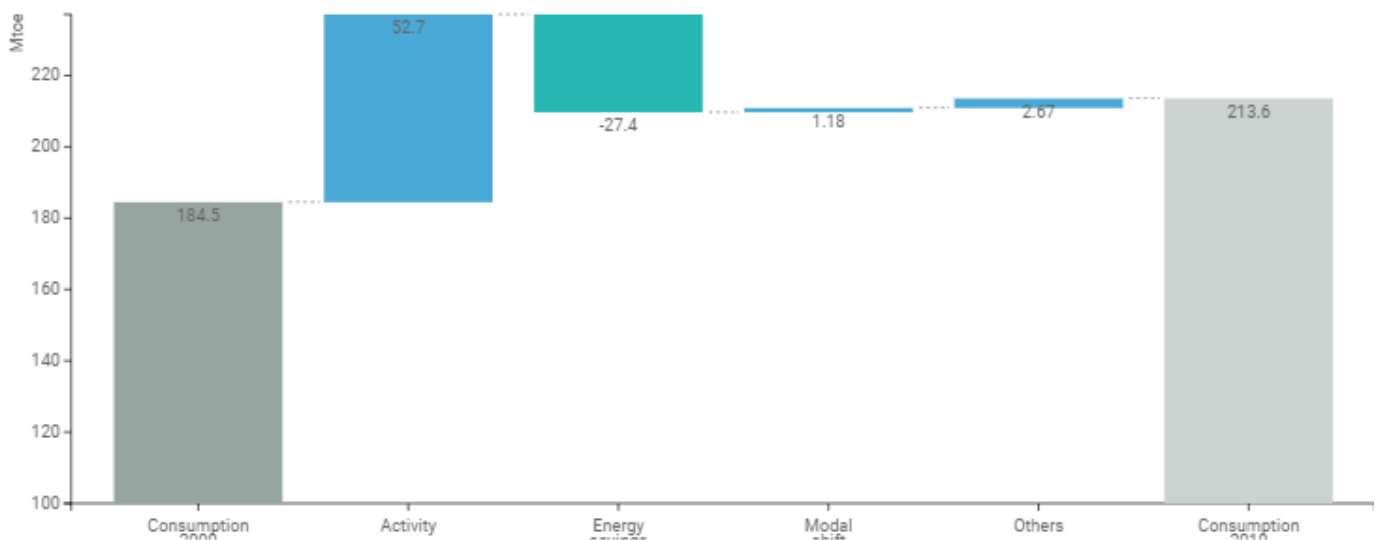
- The energy consumption for passenger fell by 14 Mtoe between 2019 and 2022.
- The reduction of consumption was mainly due to the reduction in traffic (-13 Mtoe), and energy savings (-2 Mtoe). Modal shift and other effects had only a negligible impact on the consumption.

Decomposition of energy consumption for passengers (EU) (2019-2022)



- Previously, between 2000 and 2019, the energy consumption for passenger transport increased by 29 Mtoe at EU level.
- This increase was mainly explained by the traffic growth (53 Mtoe), partially counterbalanced by energy savings (27 Mtoe). Modal shift and other effects marginally pushed up the consumption, by 1 and 3 Mtoe respectively.

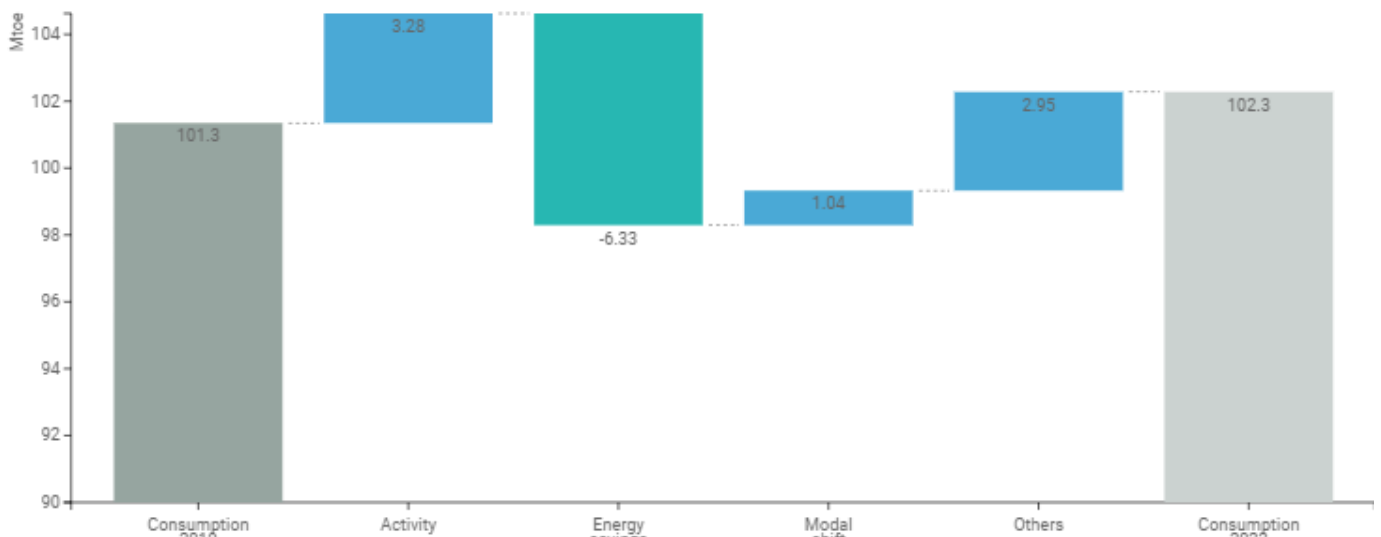
Decomposition of energy consumption for passengers (EU) (2000-2019)



Drivers of goods energy consumption variation

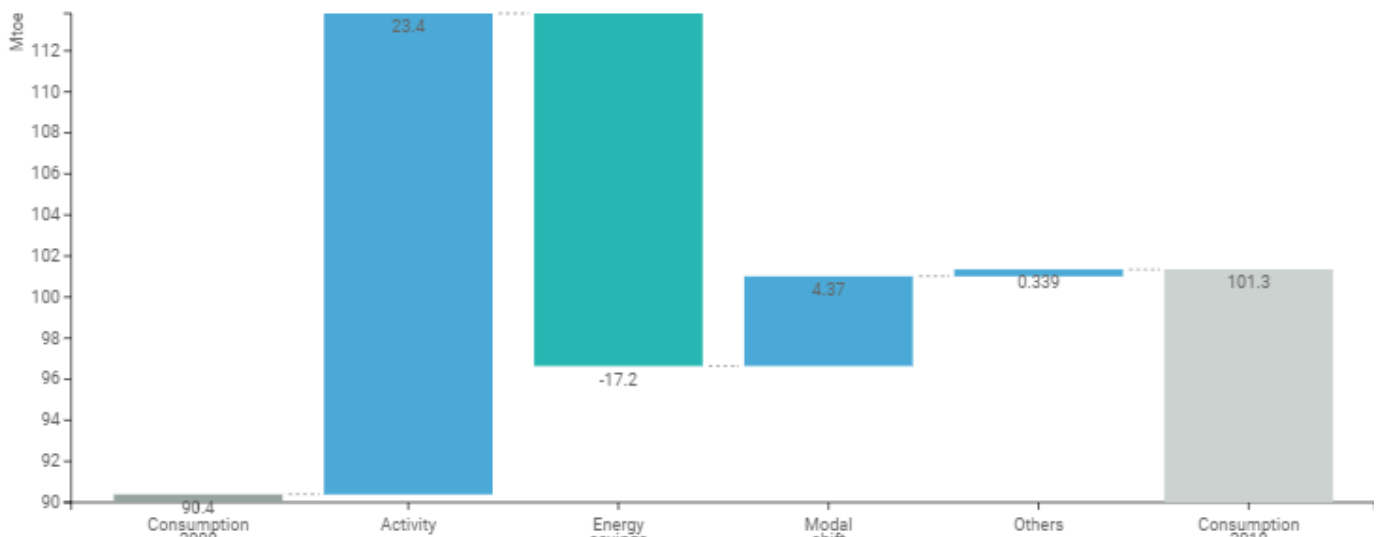
- The energy consumption for freight was in 2022 almost at the same level as in 2019 at EU level. This stability is explained by the fact that several factors have contributed to increase consumption, i.e. increase in traffic in ton-km, modal shift to road transport and other effects (by respectively 3 Mtoe, 1 Mtoe and 3 Mtoe), were largely counterbalanced by energy savings (6 Mtoe).

Decomposition of energy consumption for freight (EU) (2019-2022)



- Previously, the energy consumption of freight transport increased by 11 Mtoe between 2000 and 2019. This is the result of two opposite trends: the increase in traffic and, to a lesser extent, modal shift to road transport have contributed to raise consumption (by 23 and 4 Mtoe, respectively), while energy savings have decreased consumption by 17 Mtoe.

Decomposition of energy consumption for freight (EU) (2000-2019)



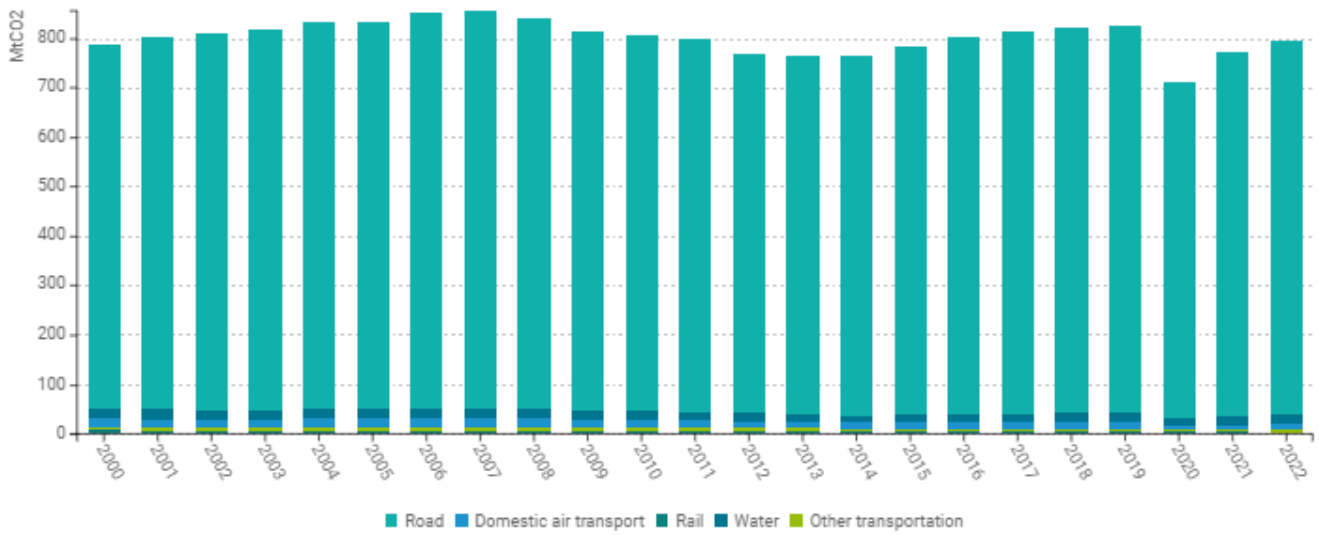
CO2 emissions

Emissions from transport

- Road transport represents around 95% of CO2 emissions from transport (roughly stable over time).
- Emissions decreased from 2007 to 2013 (-1.6%/year) and increased from 2014 to 2019 by 1.5%/year, following consumption trends.
- This rise was stopped by the Covid breakout with emissions falling by 13.5% in 2020.

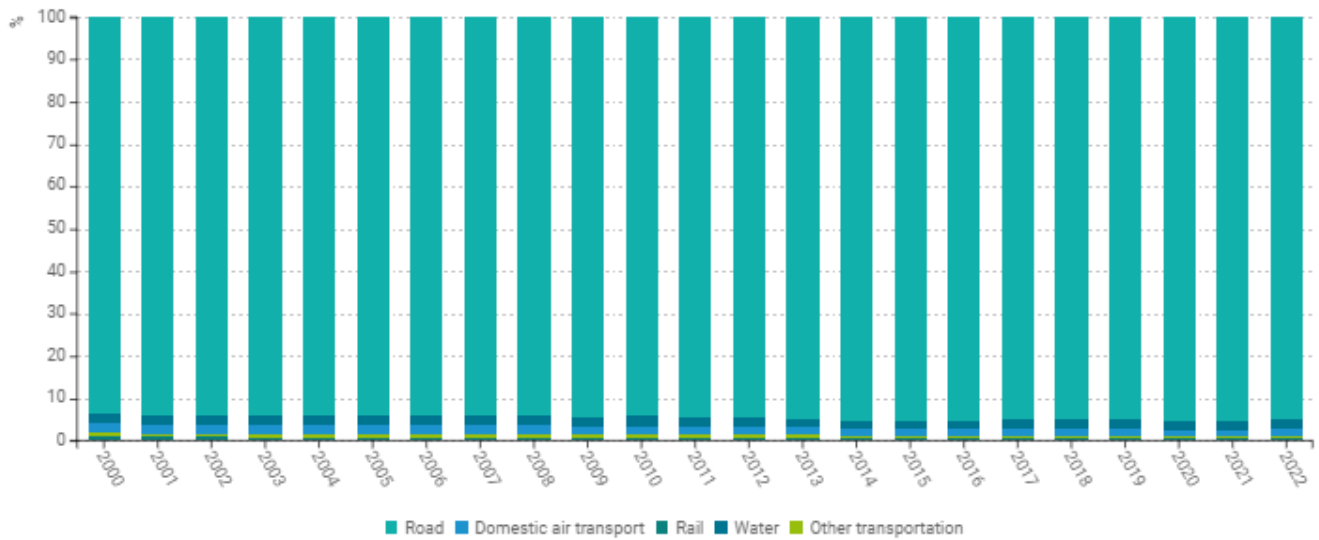
- In 2022, CO2 emissions from transport were still 3.6% lower than in 2019 and similar to 2000 level.

CO2 emissions from transport (EU)



Source: EEA

CO2 emissions from transport (% EU)



Source: EEA