

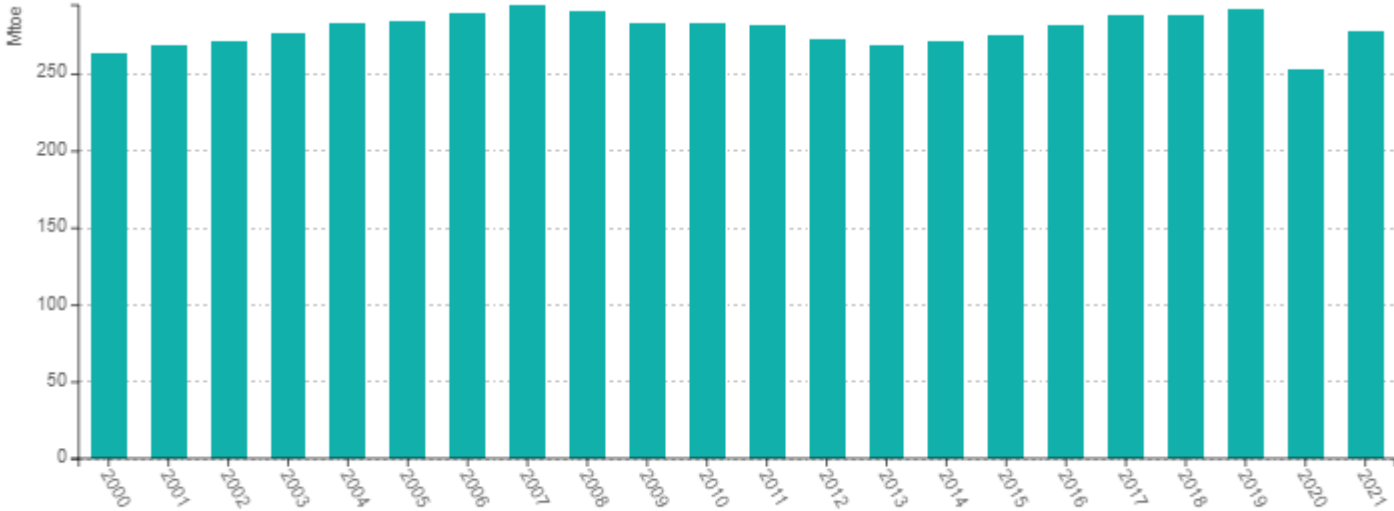
Sectoral Profile - Transport

Energy consumption

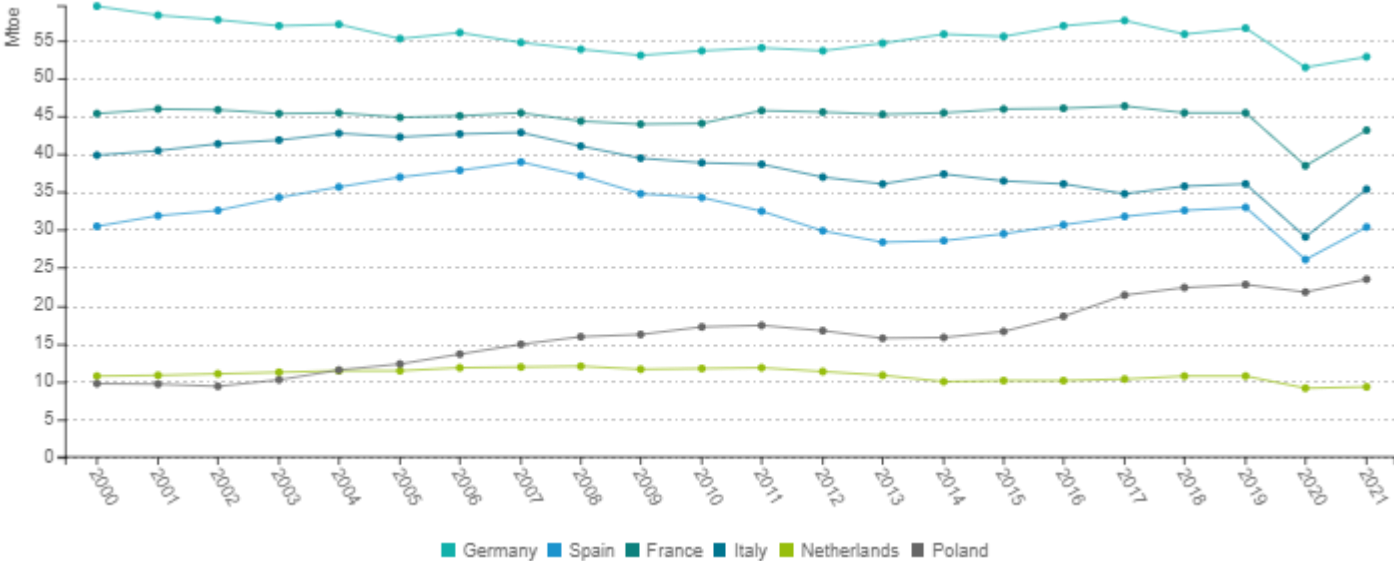
Overview

- The energy consumption of transport grew by 9.3% in 2021, reaching 277 Mtoe at EU level. 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 (+1.7%/year), which contrasts with the previous period impacted by the economic crisis (-1.5%/year from 2007 to 2013).
- In 2021, the energy consumption of transport of the EU was 5% below its pre-COVID level and 5% above its 2000 level.

Energy consumption trends in transport in the EU



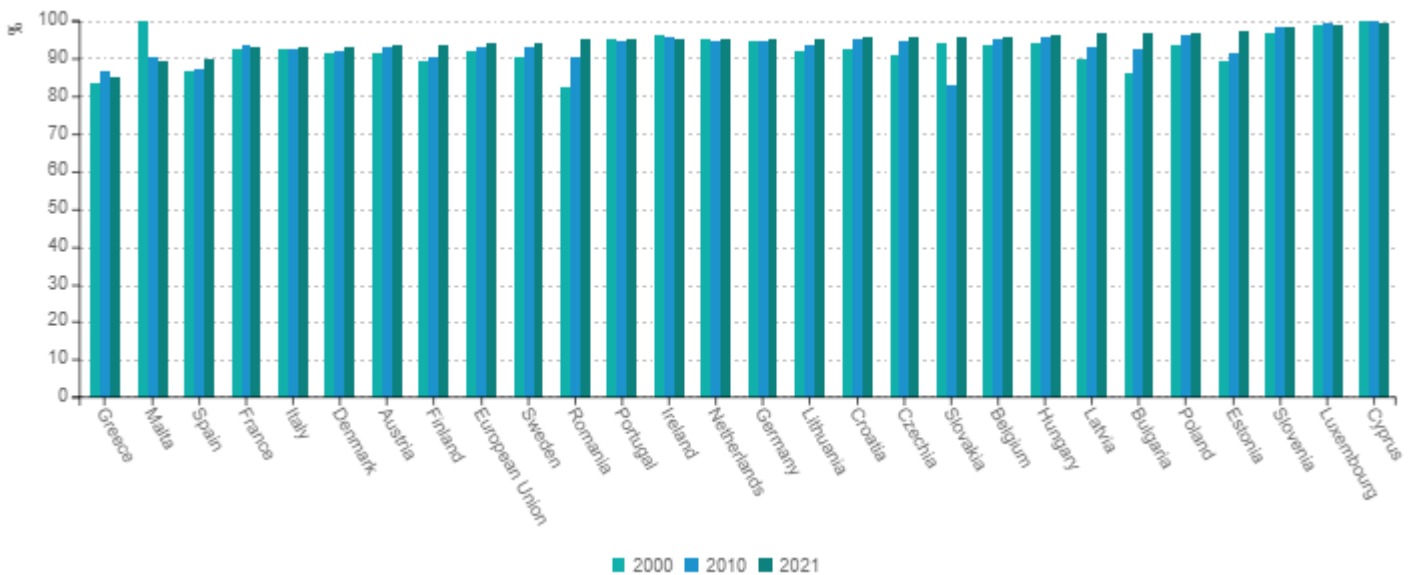
Energy consumption of transport in selected countries



Share of road in transport energy consumption

- Road transport absorbs 94% of the final energy consumption of transport in the EU in 2021 (range 85-99%).
- Increasing share of road transport at EU level (+1.8 percentage point between 2000 and 2021), with an increasing share in 85% of EU countries. This trend accelerated in 2020 and 2021 due in particular to the isolation measures linked to the COVID outbreak (+1.1 percentage point in 2020).

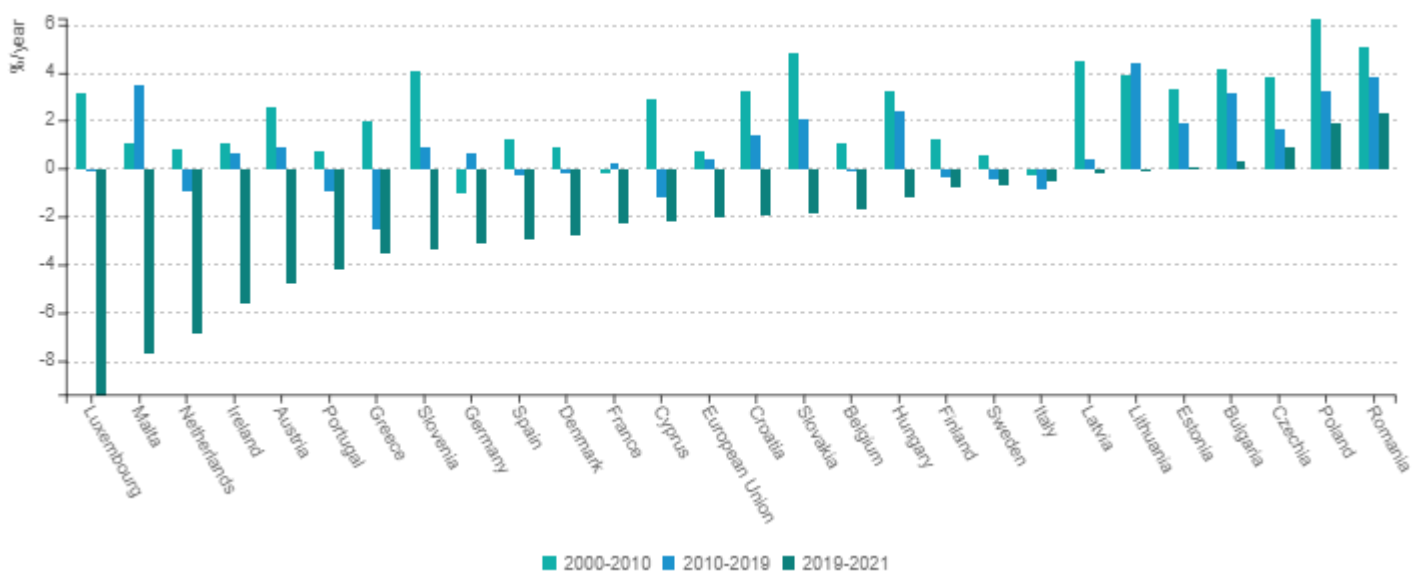
Share of road in transport energy consumption



Trends in road transport

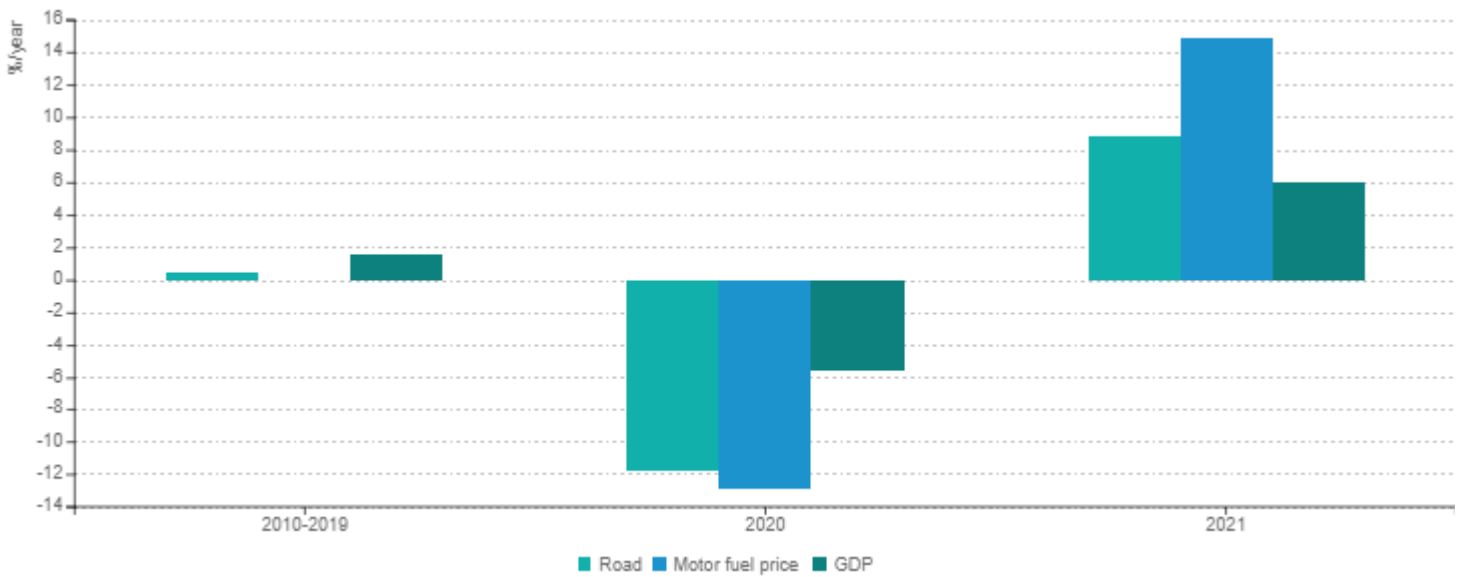
- The consumption of road transport decreased in 22 EU countries from 2019 to 2021 (-2%/year at EU level). Only Eastern European countries saw a growth in road transport consumption in this period (until +2%/year for Romania).
- Previously, it grew slowly at EU level between 2010 and 2019 (+0.4%/year), with disparities across countries: significant growth in most Eastern countries, stabilization or slow growth in most Western countries, decrease in Southern countries.

Energy consumption trends in road transport



- Since 2013, road consumption is increasing again (1.5%/year). This trend is mainly explained by the economic growth rebound (2.1%/year increase of the GDP) and significant decrease of motor fuel prices (-2.5%/year).
- Before that, consumption of road transport decreased between 2007 and 2013 (-1.4%/year), after a rapid progression between 2000 and 2007 (1.5%/year) despite increasing motor fuel prices.

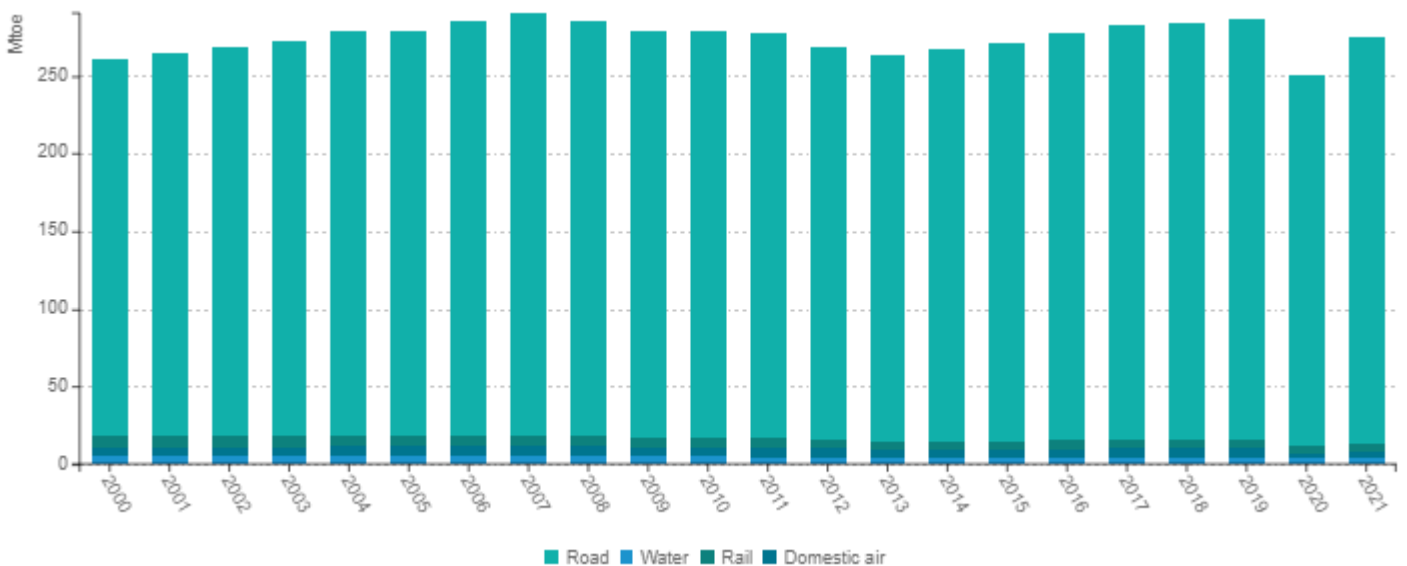
Energy consumption of road transport, fuel prices and GDP (EU)



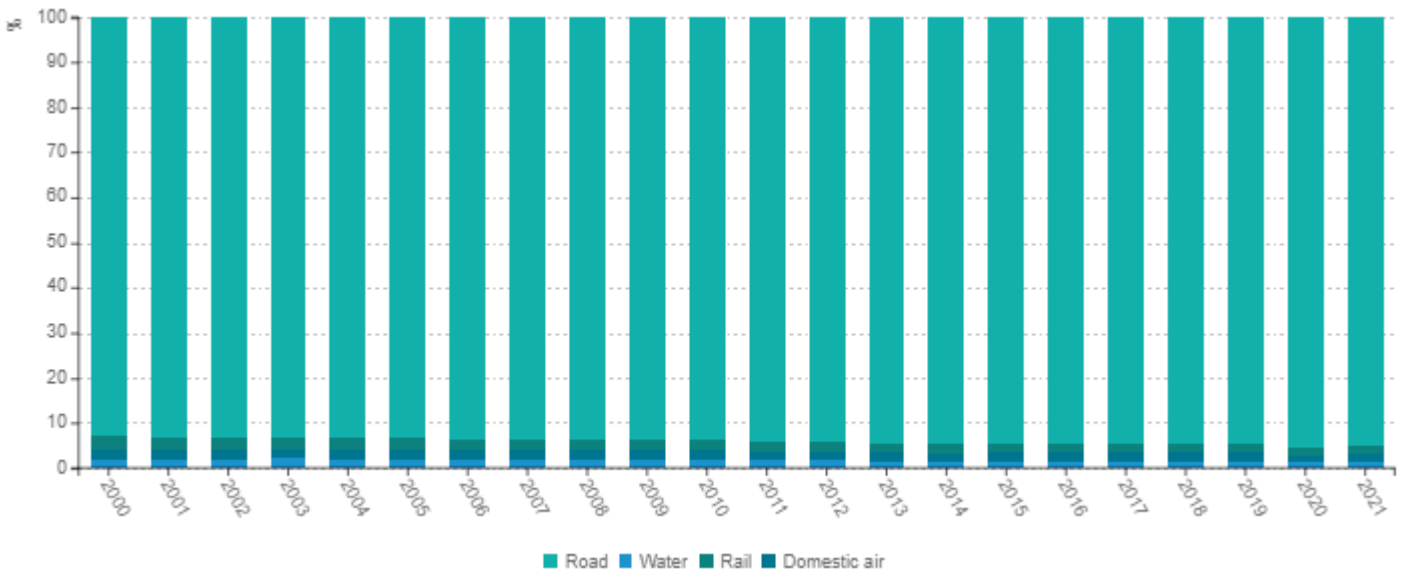
Consumption by mode

- While the share of road transport has increased since 2000 (+1.8 percentage points), the share of rail and water has decreased (from 2.8% in 2000 to 1.9% in 2021 for rail and from 2% in 2000 to 1.5% in 2021 for water transport).
- The share of domestic air transport was stable around 2.1% between 2000 and 2019 and then fell in 2020 to 1.2% due to travel restrictions put in place to face COVID crisis. It increased to 1.6% in 2021.

Energy consumption by mode (EU)



Share of energy consumption by mode (EU)

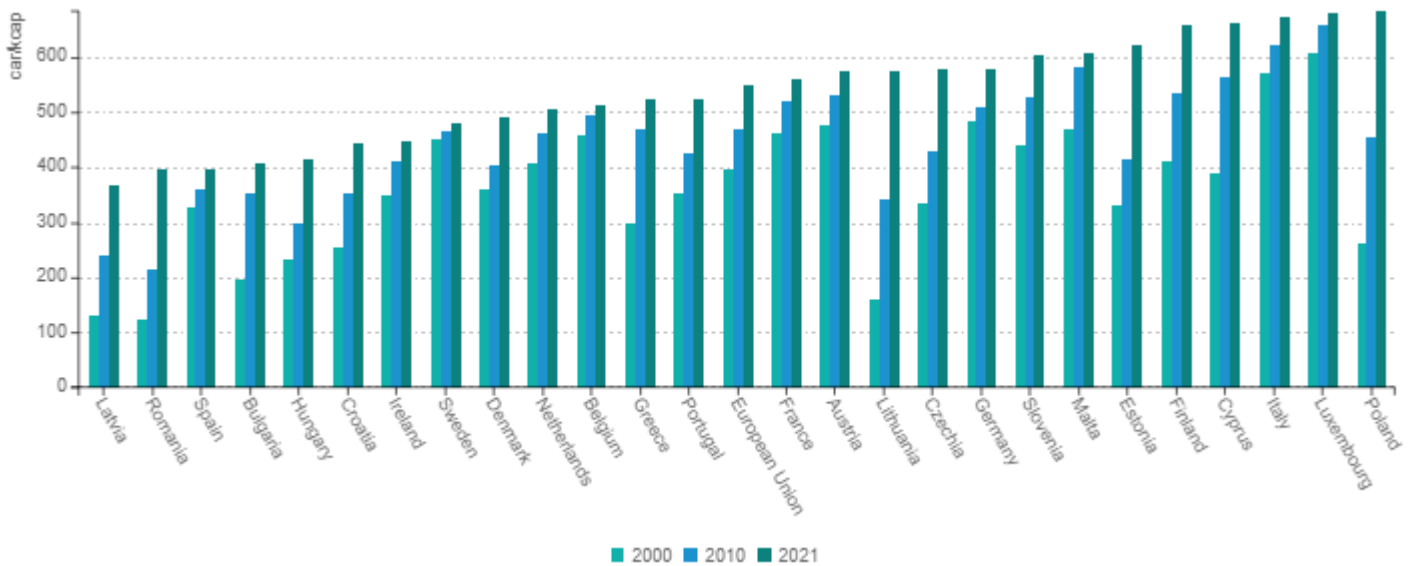


Cars

Number of cars per capita

- Very rapid growth of car ownership in less developed EU countries because of their lower equipment level, with 3 countries with a progression above 5%/year (Latvia, Lithuania and Romania) and 3 other between 3% and 5%/year (Poland, Bulgaria and Estonia). The trend is slowing in most countries since 2010, except in Romania, Hungary and Czechia.
- Slower progression in other EU countries due to saturation, especially since 2010 in Sweden, Italy, Luxembourg and Belgium.

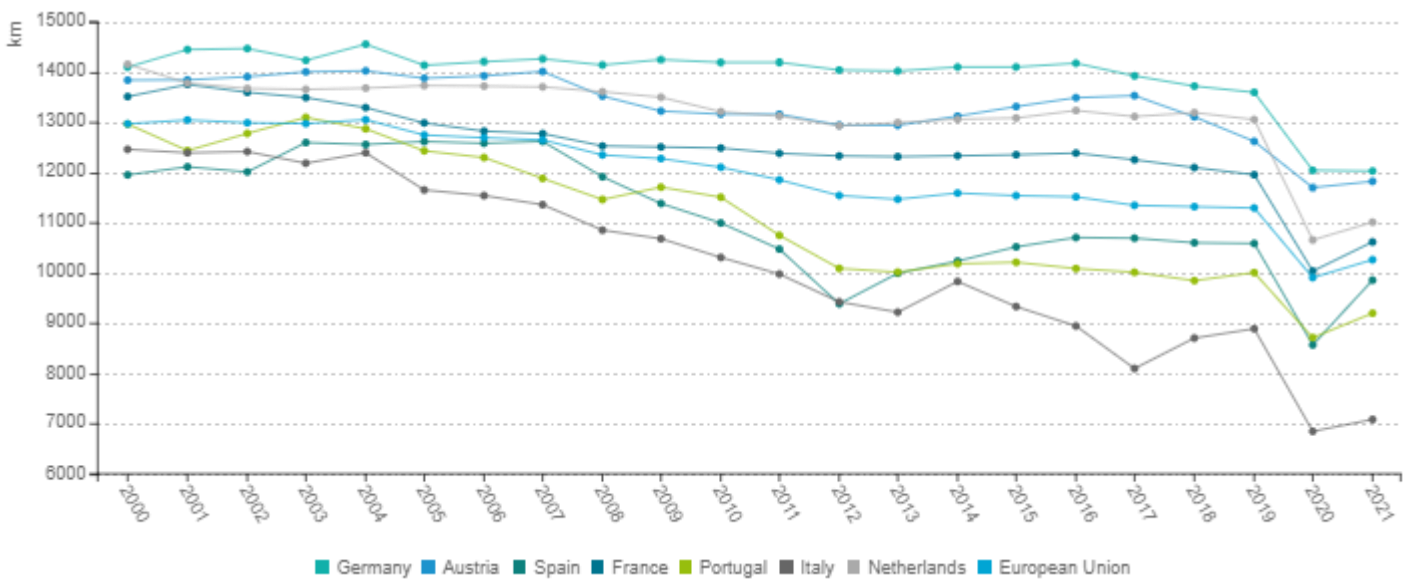
Number of cars per capita



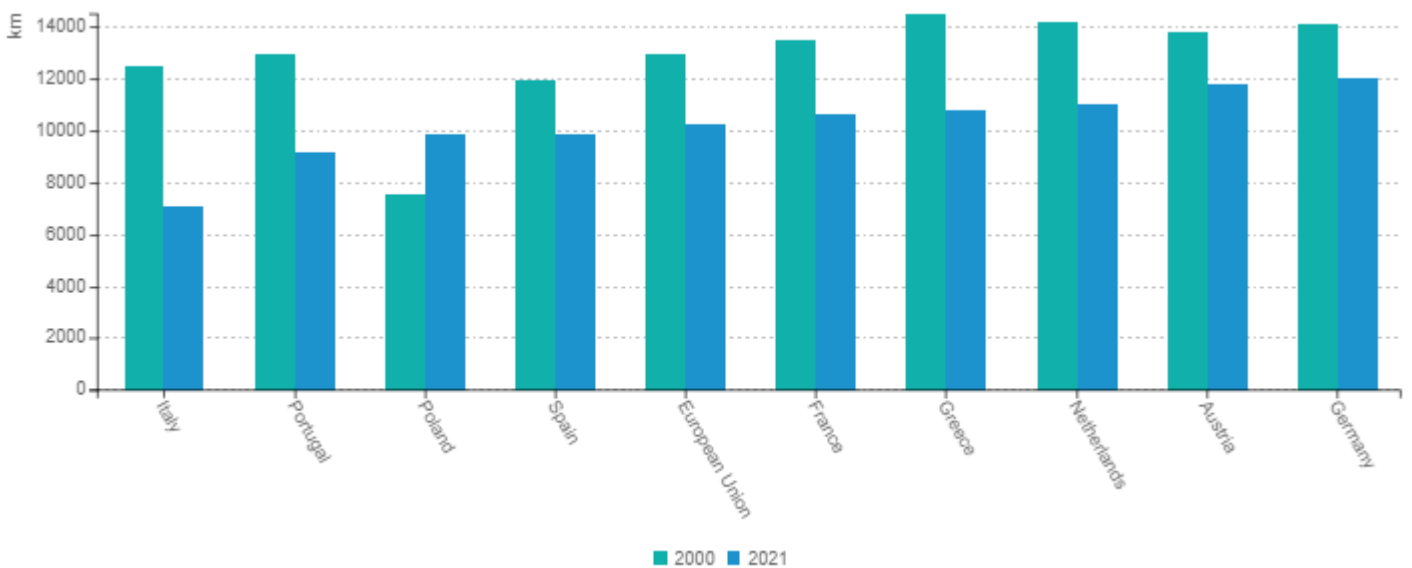
Change in distance travelled by car

- Sharp decrease in distance travelled by car in 2020 in most countries (-12% at EU level) and slow recovery in 2021 (+3.5%).
- Previously, decrease in distance travelled by car between 2000 and 2019 in most countries (around -1,700 km/year at EU level) with a very sharp reduction above 20% in Greece, Italy and Portugal; it had however increased in Poland, Croatia and Slovenia. 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: around 14,500 km/year for Ireland in 2021; around 6,900 km/year in Italy, and on average 10,300 km/year for the EU.
- The distance travelled is around 2,700 km lower at EU level in 2021 than in 2000, with the largest reduction in Italy (around 5,000 km).

Change in distance travelled by car



Change in distance travelled by car for selected countries

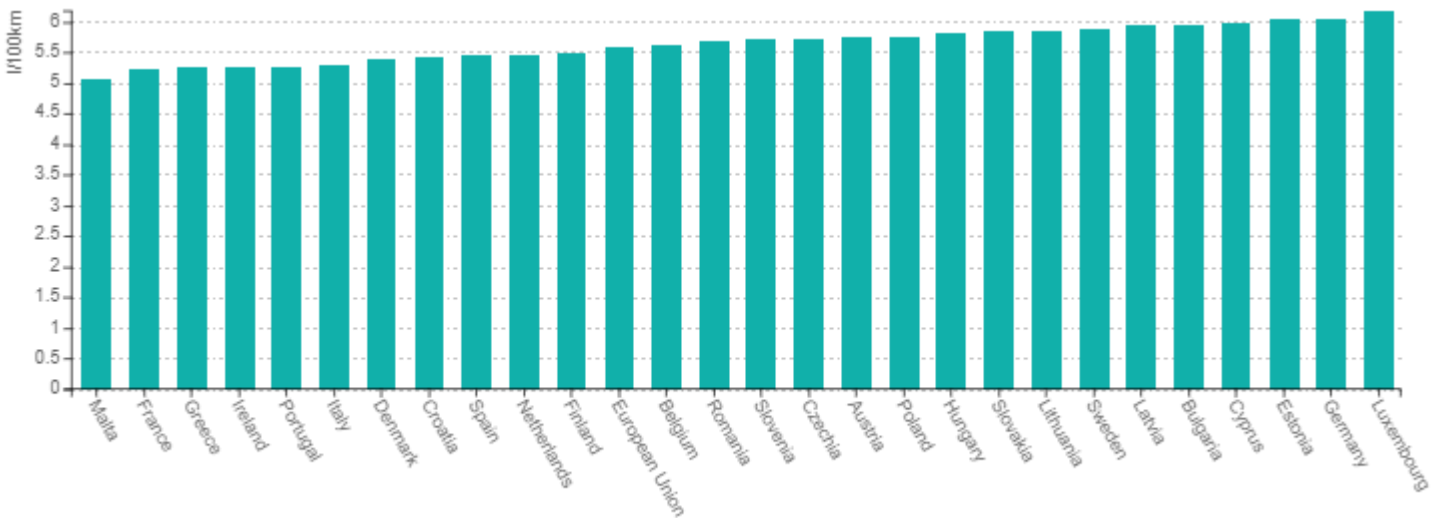


Specific consumption

Specific consumption of new cars by country

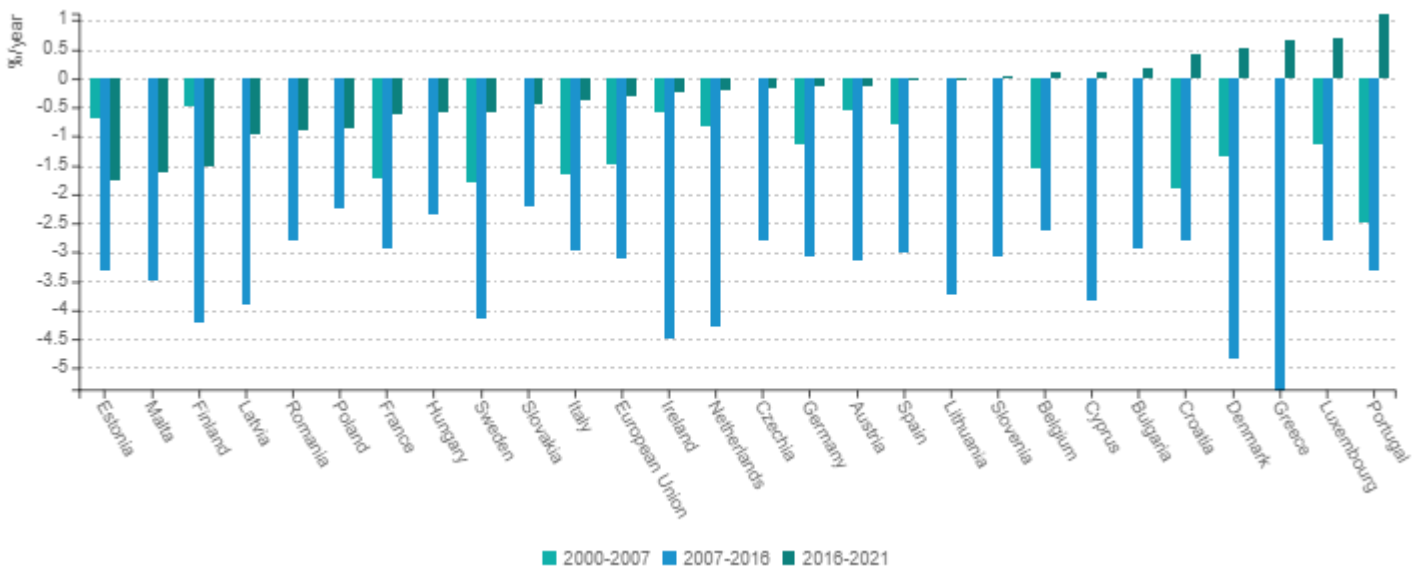
- Average specific consumption of new thermal cars is between 5 and 6 l/100km in almost all EU countries in 2021, with Malta, France and Greece in the lower range (5.1l/100km for Malta, 5.2l/100km for France and Greece) and Estonia, Germany and Luxembourg in the higher range (above 6 l/100km).
- At EU level, new cars consume 2.8 l/100km less in 2021 than in 2000 (5.6 l/100km compared to 8.4 l/100km).

Specific consumption of new cars (2021)



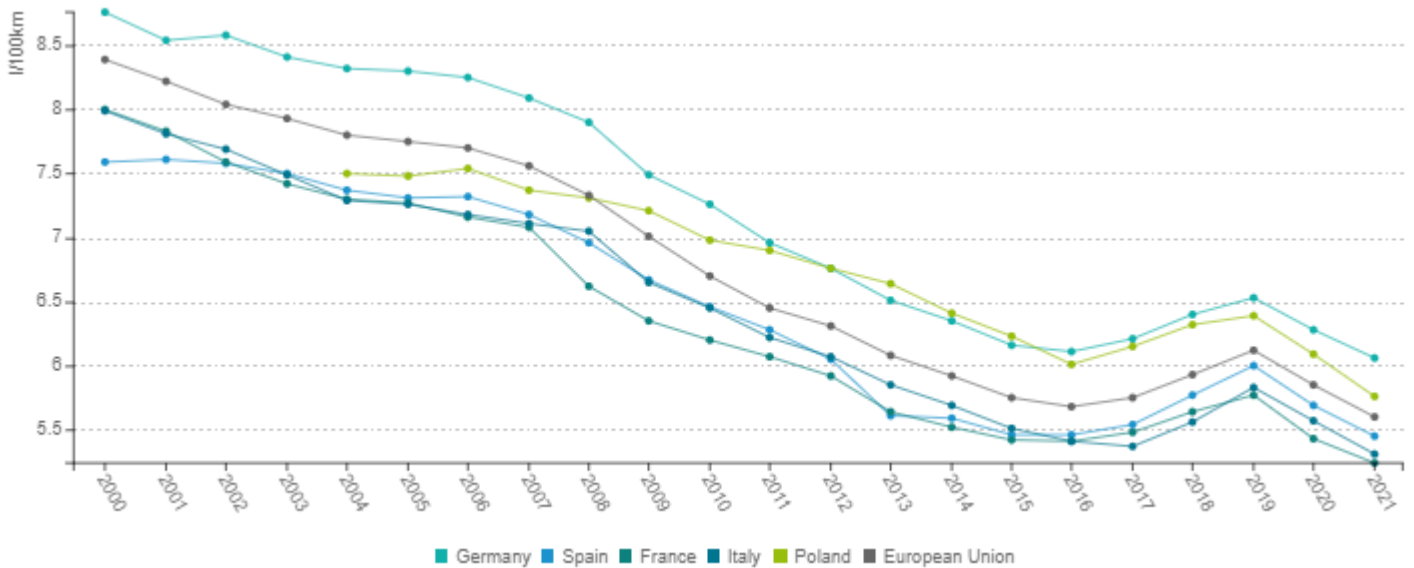
- Reduction of new cars specific consumption was the strongest between 2007 and 2016 (3.1%/year compared to 1.5% between 2000 and 2007 at EU level), as a result of EU regulations (labeling and standards), national fiscal incentives and rising fuel prices.

Trends in specific consumption of new 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 4.4%/year from 2019 to 2021, resulting in a stable specific consumption over 2016–2021 at EU level. It can be explained by a larger share of SUVs in new cars sales (almost 50% of sales in 2021, with higher specific consumptions) and also a higher share of gasoline cars, which specific consumption is higher than diesel cars.
- Despite the decreasing trend seen on two last years, 10 countries have seen a growth in specific consumption of new thermal cars since 2016.

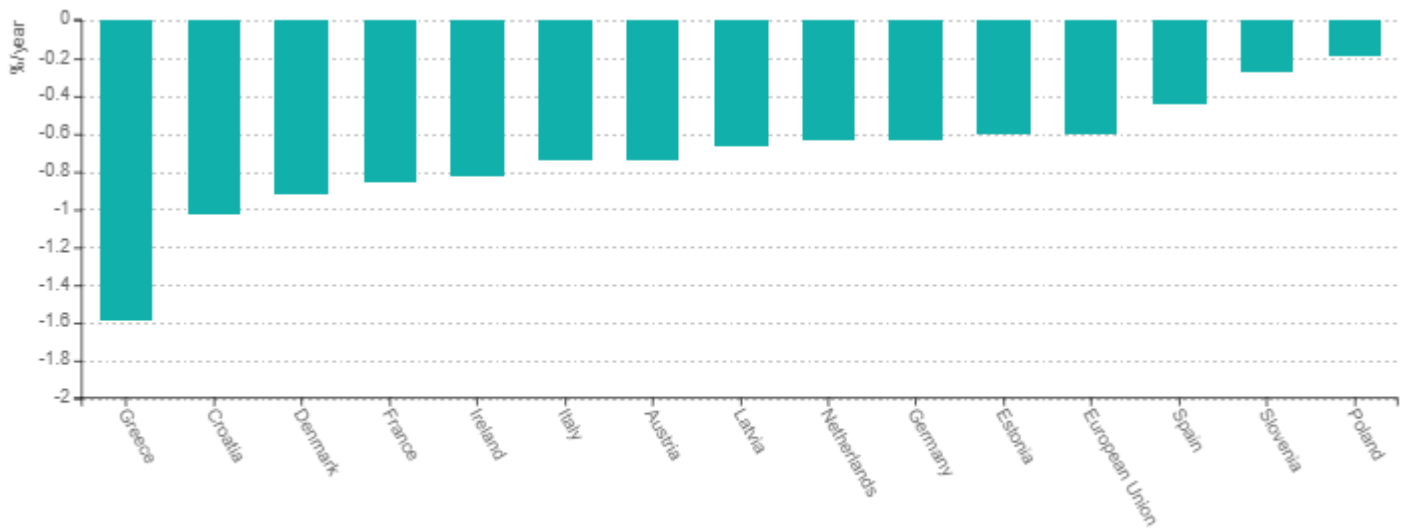
Long term specific consumption trends of new cars



Trends in specific consumption of cars by country

- Decrease of the average specific consumption of the car stock (l/100km) in all countries, by 0.6%/year on average at EU level since 2000.
- Different trends across countries : from -1.6%/year in Greece, due to the economic recession and large price increases, to -0.2%/year in Poland.
- Large difference between countries regarding the level in this specific consumption, depending of the share of large cars and SUV, motor fuel prices and the share of efficient cars : from 5.8 l/100km in Greece to 8 l/100km in Latvia in 2021..

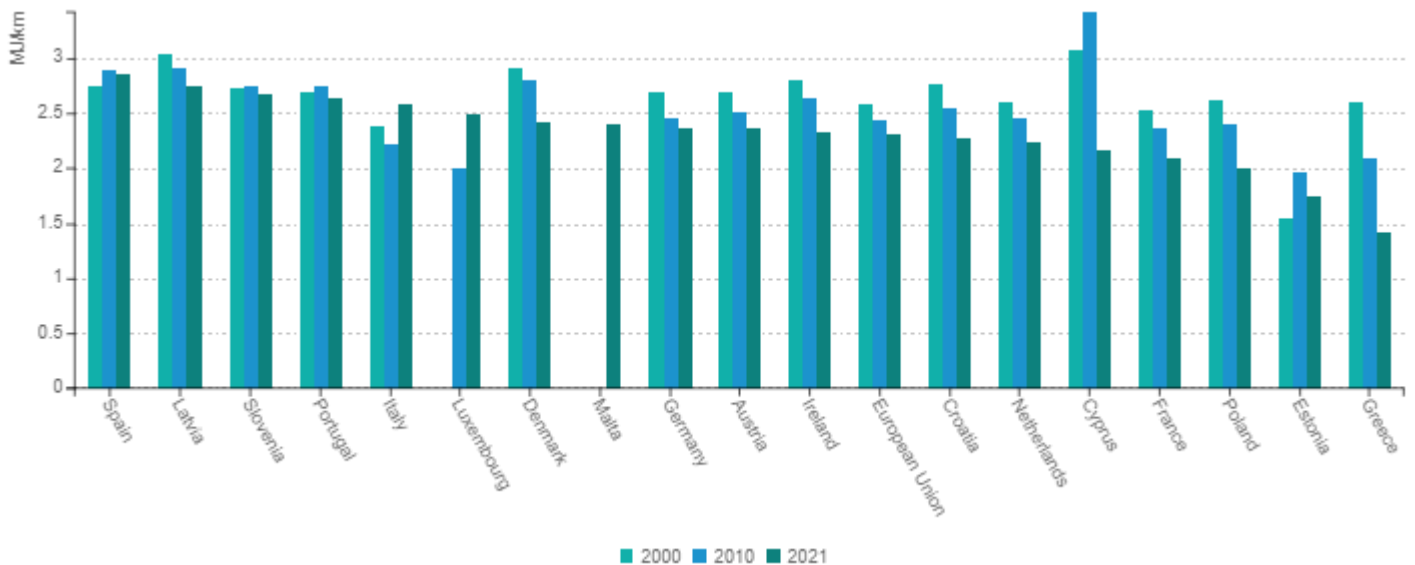
Trends in specific consumption of cars by country (2000-2021)



Energy consumption of cars per km

- Decreasing trends in energy consumption of cars per km since 2000 in most countries (-0.5%/year on average at EU level). In Estonia, Spain, Portugal 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



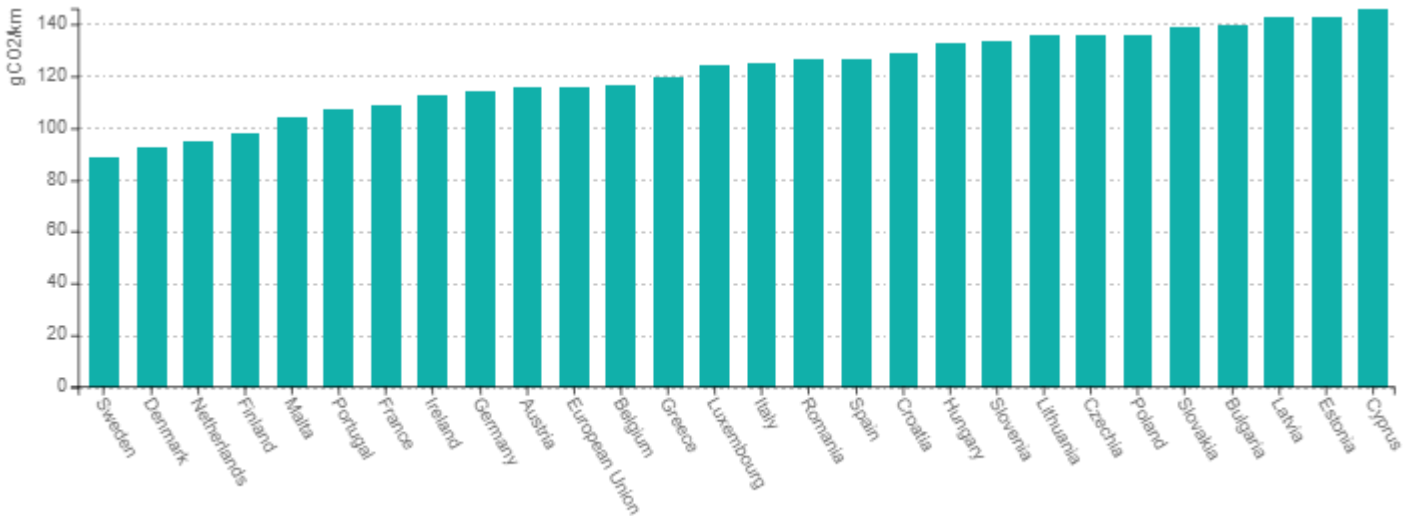
Specific CO2 emissions

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 95 gCO₂/km (Sweden, Netherlands and Denmark) to more than 140 gCO₂/km (Latvia, Estonia, Cyprus).
- 116 gCO₂/km for EU average in 2021.

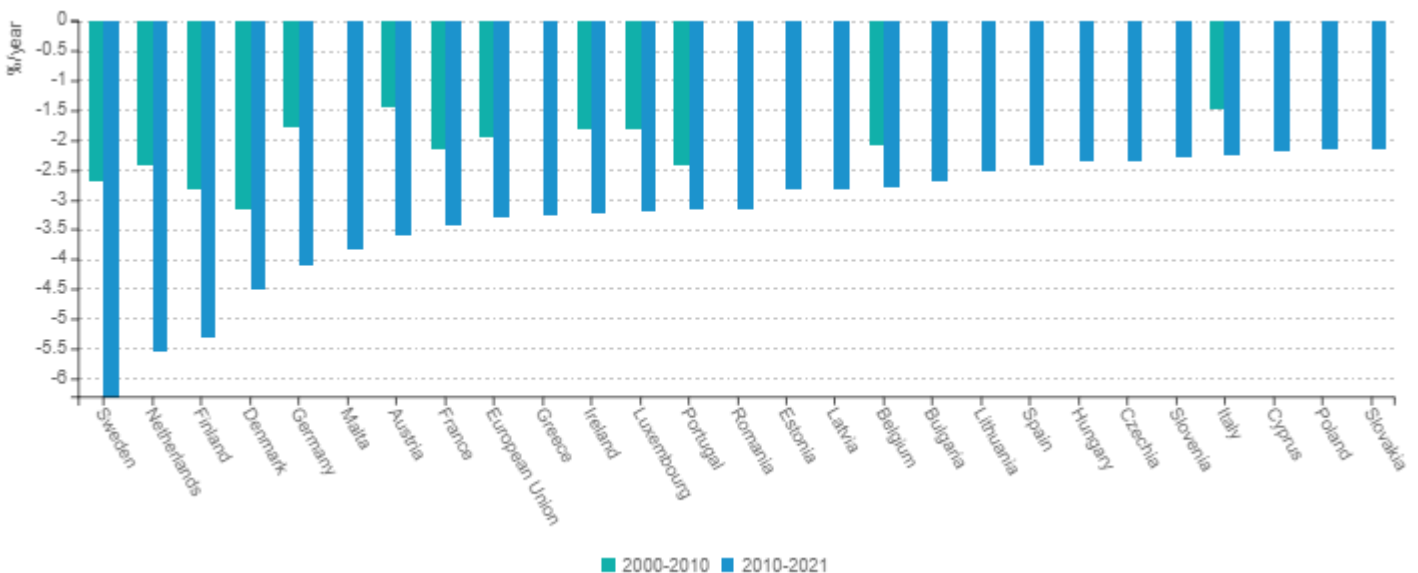
- 9 EU countries below 115 gCO₂/km: Sweden, Denmark, the Netherlands, Finland, Malta, Portugal, France, Ireland and Germany.
- In 2021, two countries have reached the 2025 mandatory limit of 93.6gCO₂/km (WLTP): Denmark and Sweden. Two countries are less than 10% above: the Netherlands and Finland.

Specific CO₂ emissions of new cars (2021)



- Rapid progress since 2010 in all countries, especially in Sweden, the Netherlands, Finland, Denmark 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.

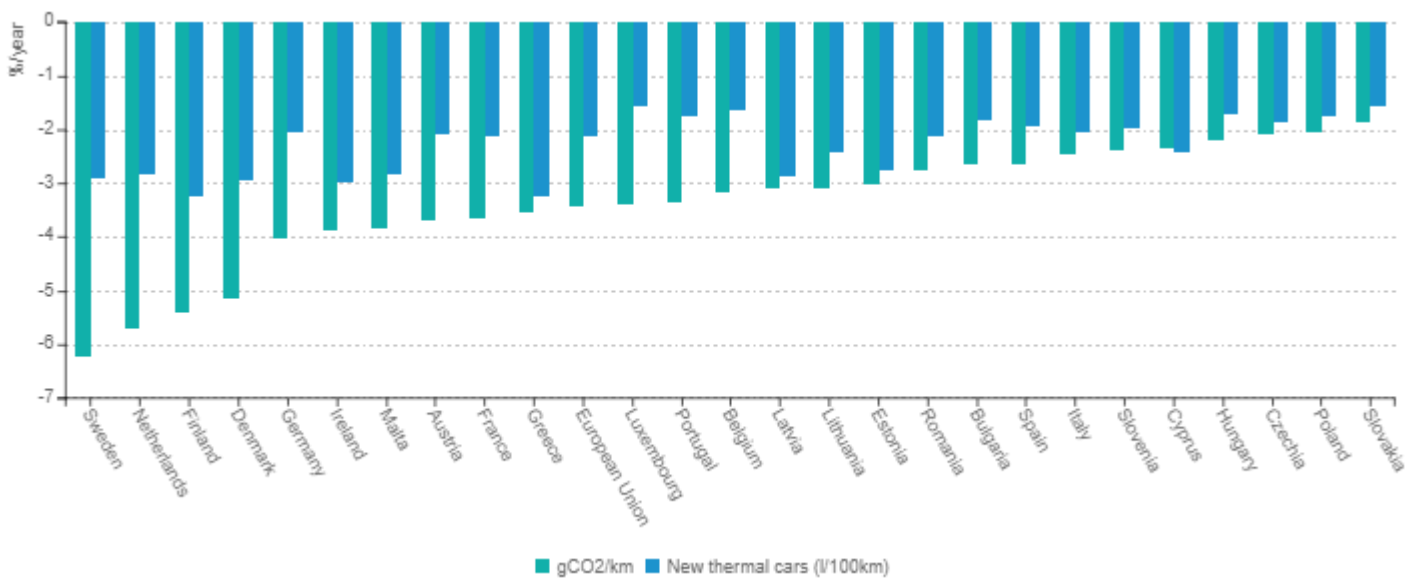
Trends in the specific emissions of new cars



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 most rapidly compared to specific consumption of new thermal cars due to the spread of electric cars.

Specific emission vs consumption of new cars (2007-2021)

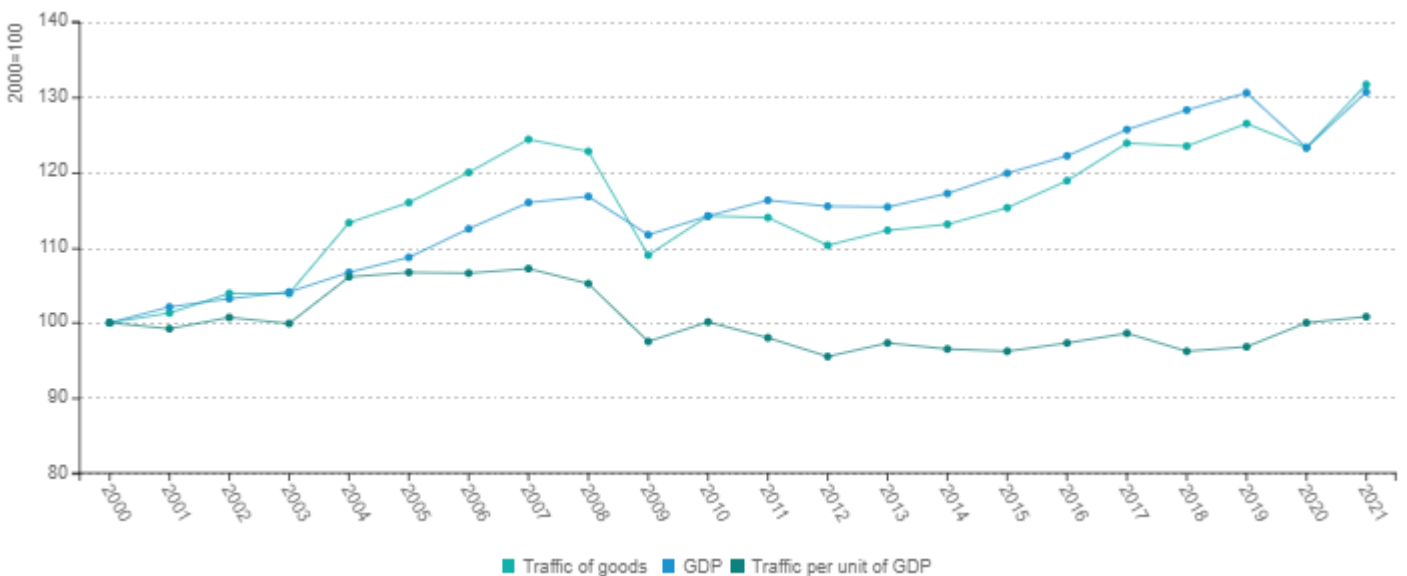


Transport of goods

Trends in freight traffic

- Increasing traffic of goods since 2012 (2%/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 since 2012 (+0.6%/year), after a reduction over 2007-2012 (-2.3%/year).

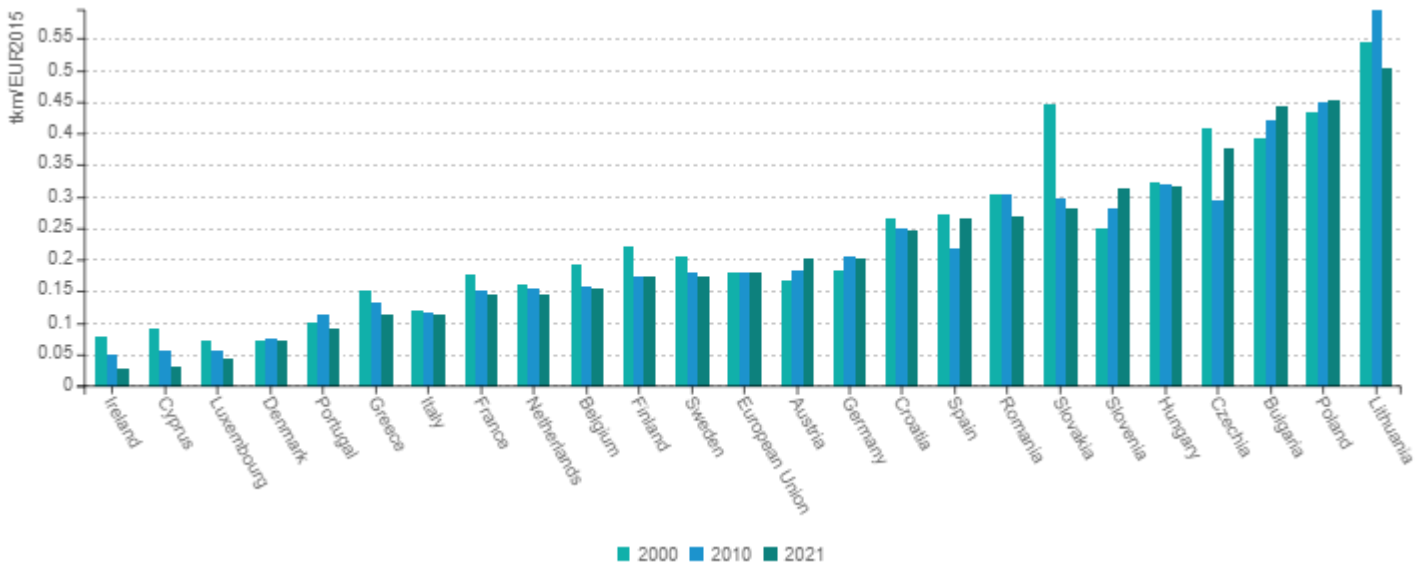
Trends in freight traffic and GDP (EU)



- In the majority of the EU MS (19), a reduction in traffic intensity has been observed since 2000, with Ireland and Cyprus showing a reduction of more than 3%/year.

- In 4 EU MS, there is a steady increase since 2000 of the traffic intensity, while in 6 other countries there has been an increase before the crisis and a decrease after.

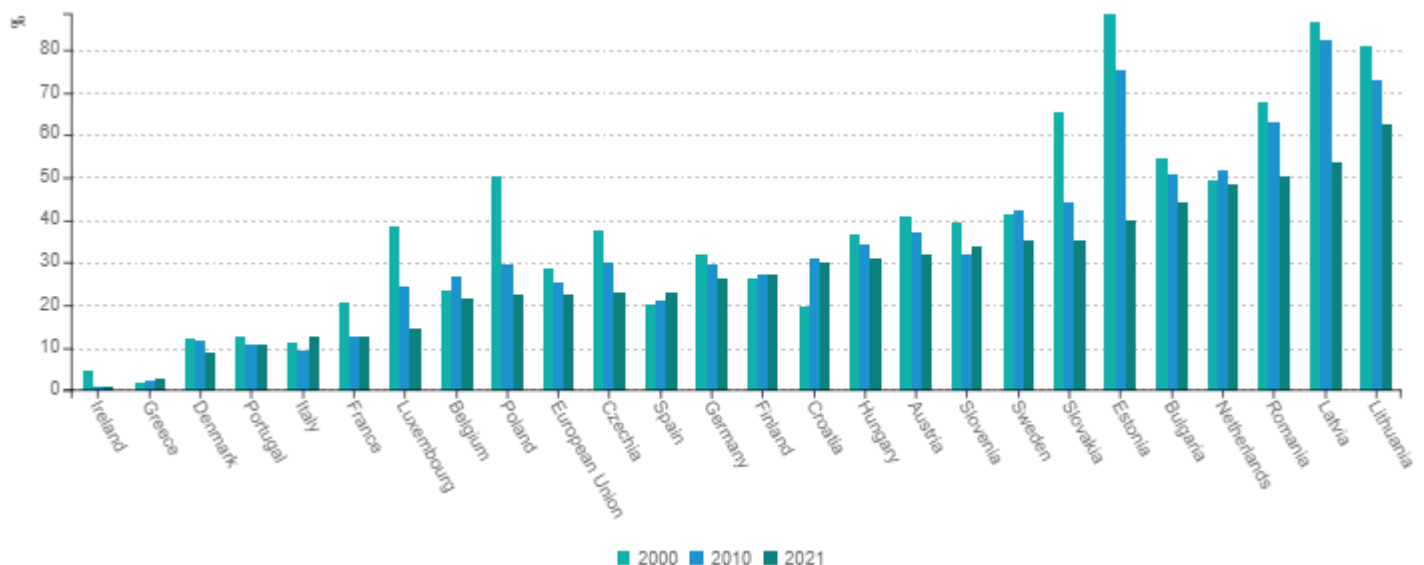
Freight traffic per unit of GDP



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 2021 (-6 points) and in almost three quarters of EU countries (19), despite the policies implemented to promote rail or water transport). It has increased in Spain, Finland and Greece (from a very low level for Greece), as well as in Italy, France and Slovenia since 2010.
- At EU level, 23% of goods traffic was carried by rail and water transport in 2021.
- Lithuania, Latvia and Romania have the highest share of rail and water (>50%). The highest progression since 2000 has been seen in Spain (+2.8 points).

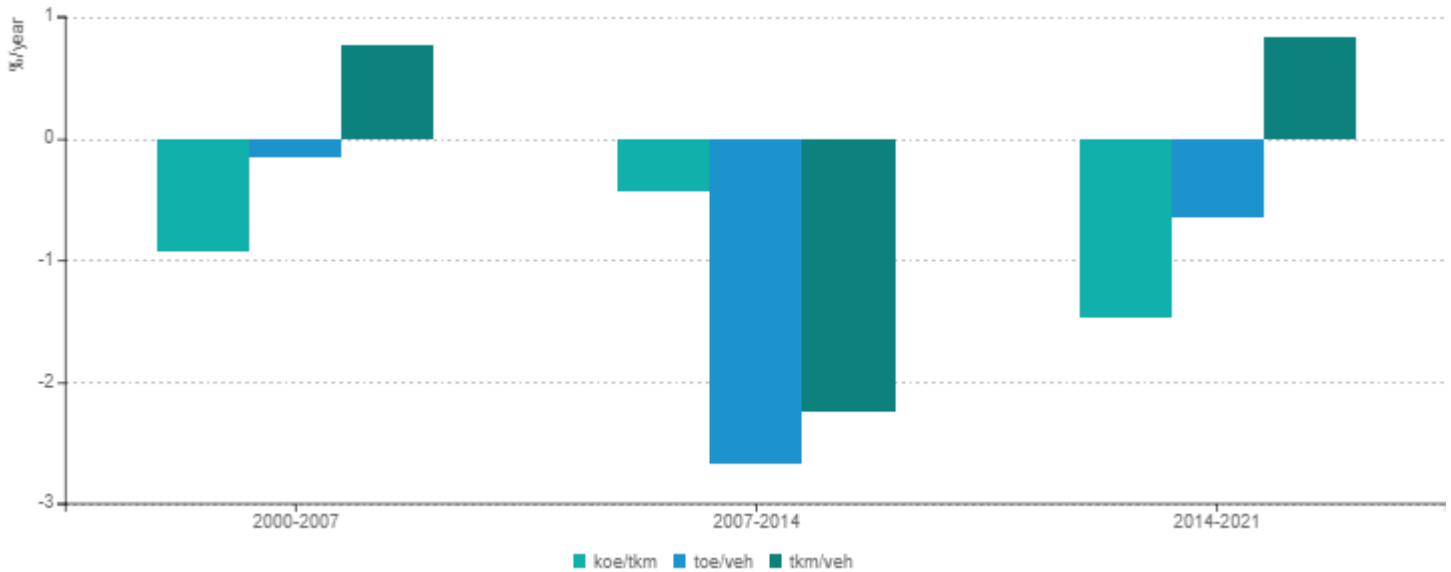
Share of rail and water in total goods traffic



Unit consumption of road transport of goods

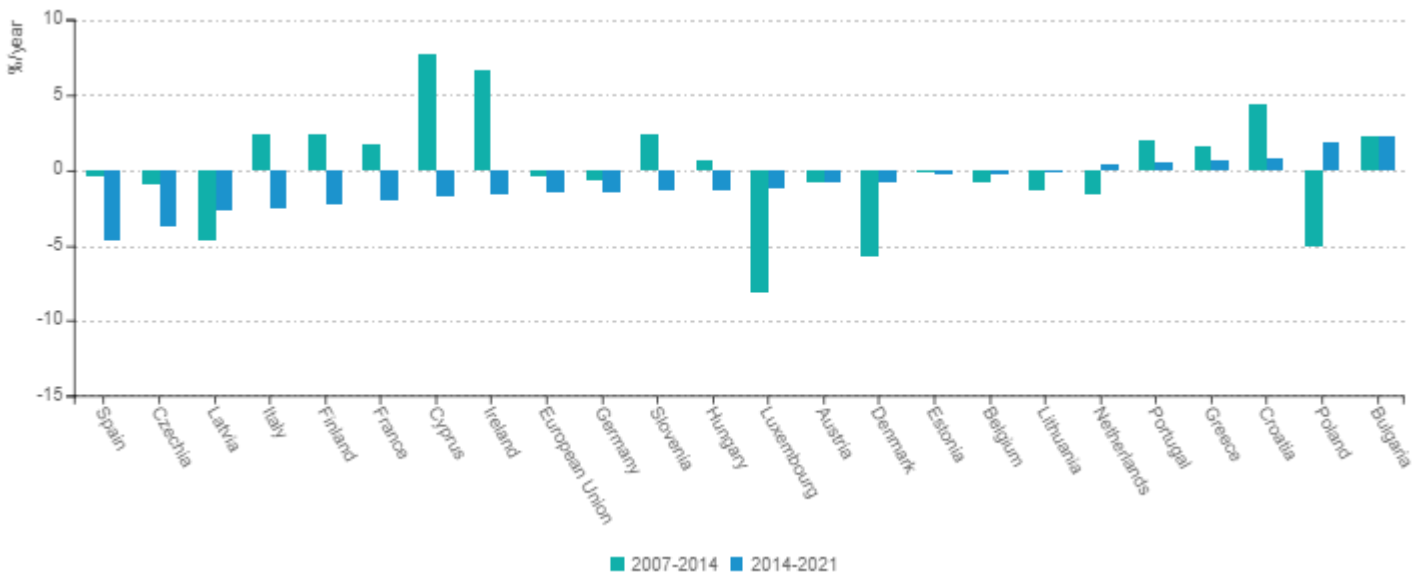
- Energy efficiency progress of road freight transport, as measured from the decrease of the road freight traffic consumption per ton-km, has accelerated at EU level since 2014 (around 1.5%/year, compared to 0.9%/year between 2000 and 2007 and 0.4%/year for the period 2007-2014). This is due to the combined 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 6 EU countries since 2014 despite the rebound in freight traffic.

Unit consumption of road transport of goods



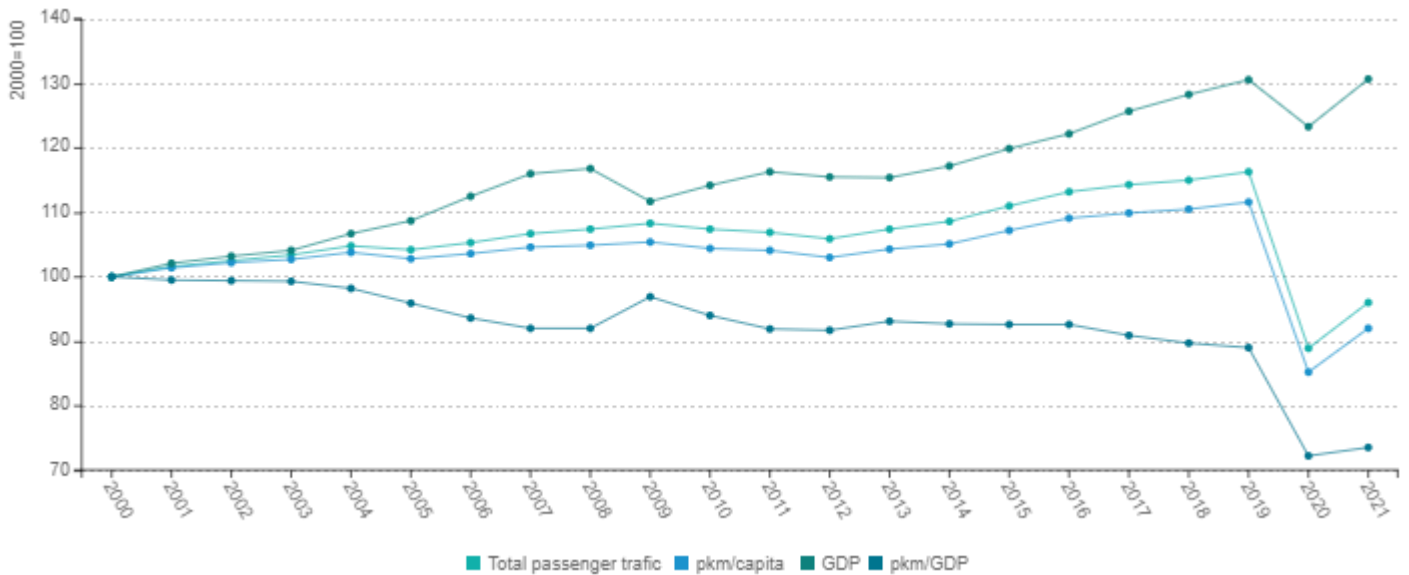
Passenger transport

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, and remained almost stable in 2021 (i.e. because it recovered at the same pace compared to GDP)

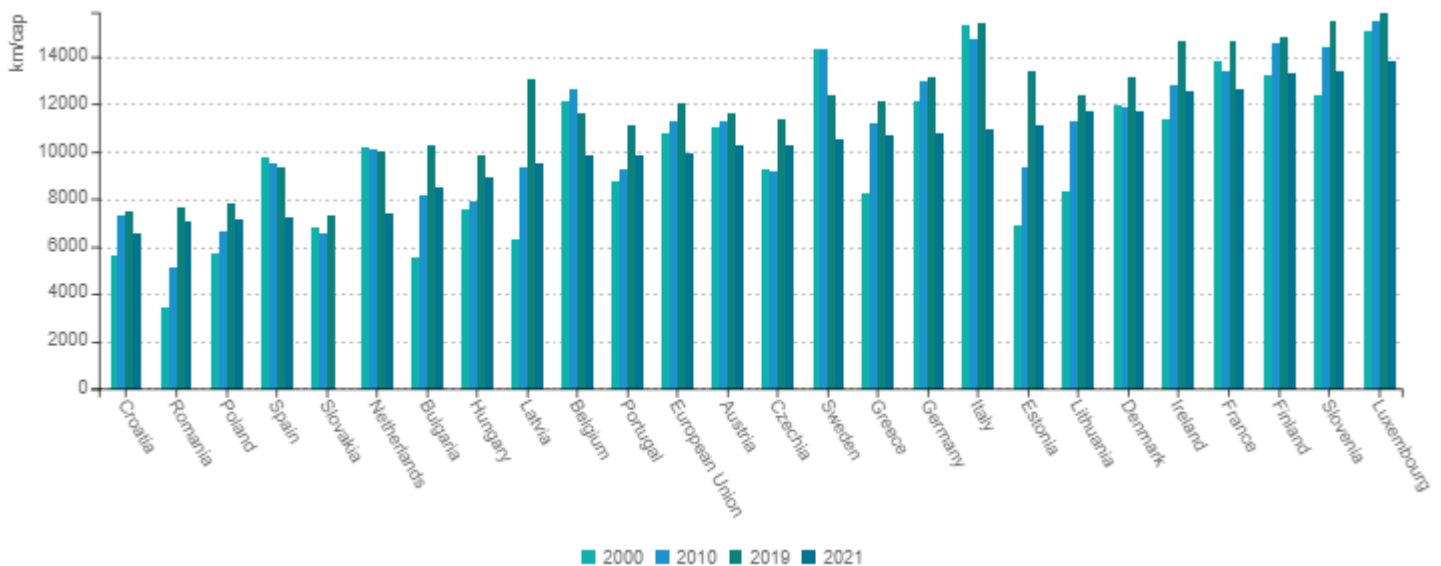
Passenger traffic and GDP at EU level



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. It ranged from 6 600 km/year in Croatia to 13 800 km/year in Luxembourg in 2021.
- Previously, it has increased in all countries between 2000 and 2019, except Belgium, the Netherlands and Spain (+12% 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.

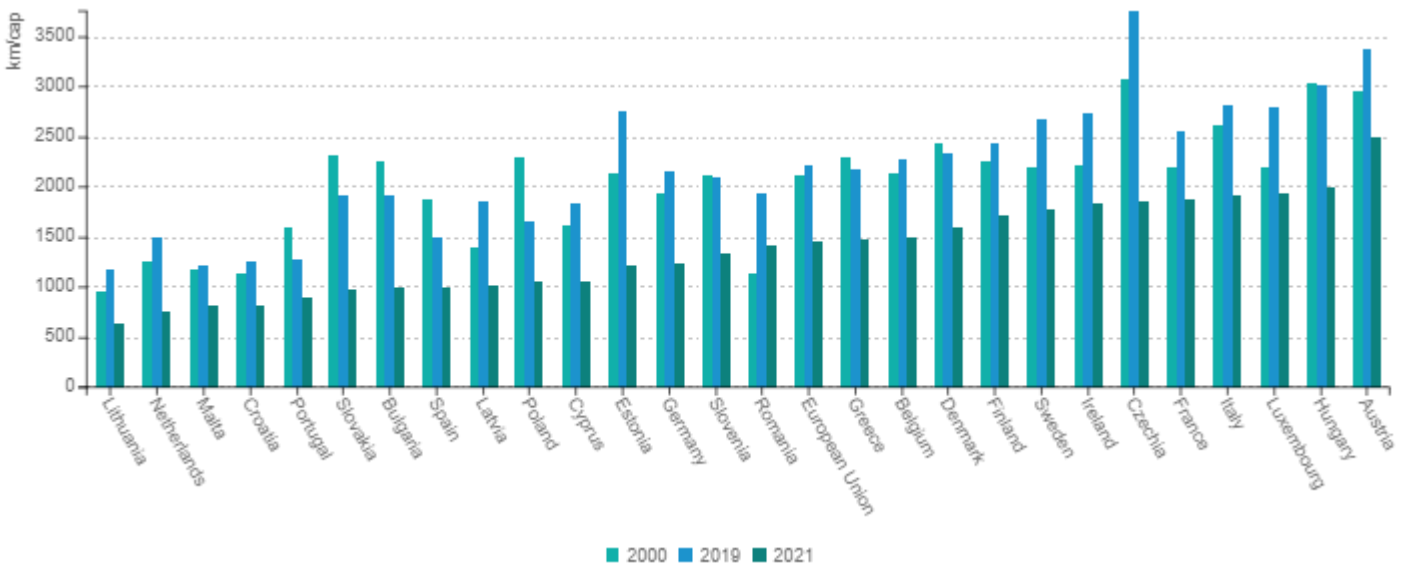
Passenger mobility per capita



- The use of transport public has increased between 2000 and 2019 in 70% of EU countries (+6% at EU level or 115 km). It has decreased in some Eastern and Southern countries (Slovakia, Bulgaria, Poland, Hungary, Portugal, Spain, Greece and Slovenia).

- 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 very partially in 2021 (+15%, which means a level 34% lower than 2019). The result is that all countries, except Romania, saw a lower use of public transport in 2021 compared to 2000.
- Austria, Hungary, Luxembourg and Italy have the highest use of public transport in 2021 (above 1,900 km/year), compared to an EU average of around 1,450 km/year whereas Lithuania, the Netherlands and Malta have the lowest use (below 800 km/year)

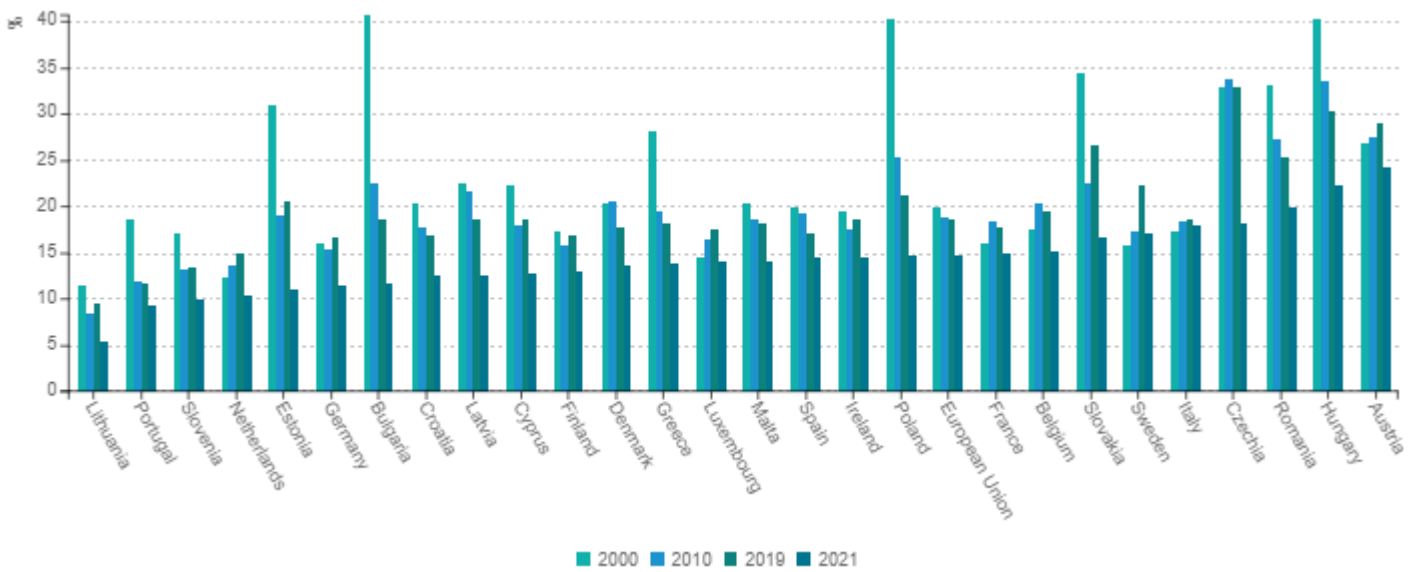
Mobility of public transport per capita



Public transport

- The share of public transport in total passenger traffic decreased in 19 EU countries between 2000 and 2019 (- 1 point at EU level 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 increased between 2000 and 2019 in 8 countries, mostly in Western European countries. The highest increases were in Sweden (+6 points) and The Netherlands (+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 a share of public transport in 2019 (around 30%).
- The Covid outbreak resulted in a general reduction of the share of public transport in all countries (-3.9 points, to 14.8% in 2021 at EU level), with the highest reduction in Czechia (-14 points), Slovakia and Estonia (around -10 points for both)

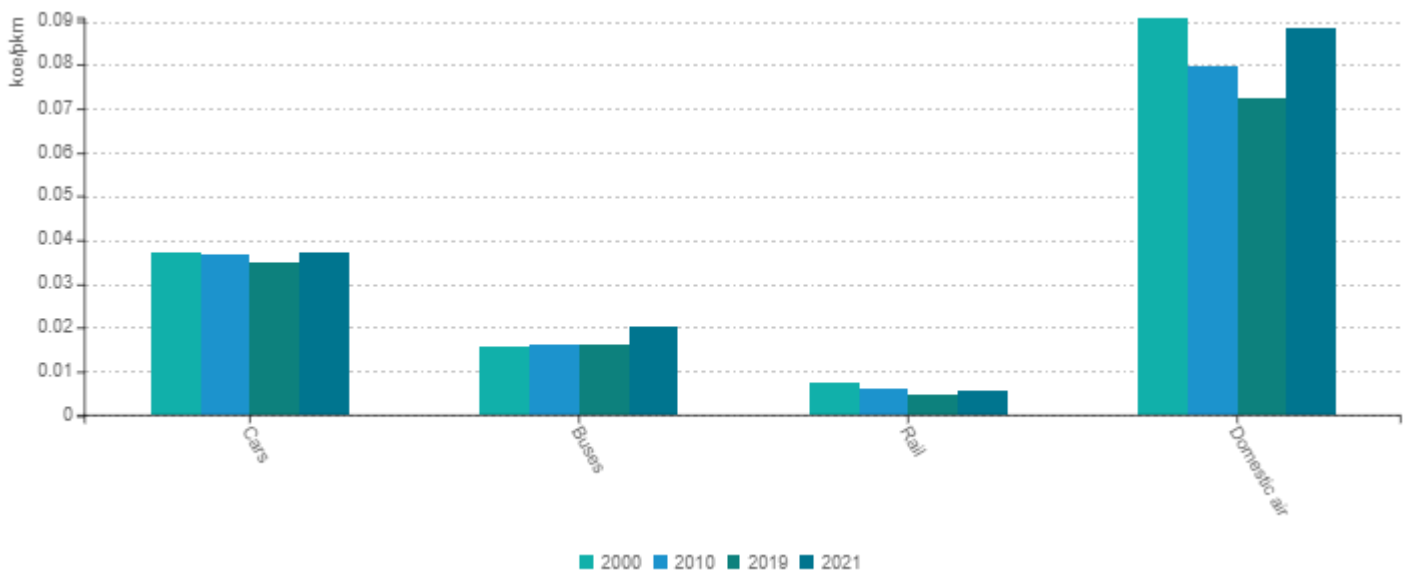
Share of public transport in total passenger traffic



Specific consumption

- The specific energy consumption of the different modes of transport has been decreasing until 2019. However, there was an increase in 2020 and 2021, especially for public transport, due to lower occupancy rates.
- In 2019, cars required almost 2.2 times more energy per passenger-km than buses, and 7.3 times more than rail transport. Domestic air transport is more than twice more energy intensive than cars and 15 times more intensive than rail.

Specific energy consumption by transport mode

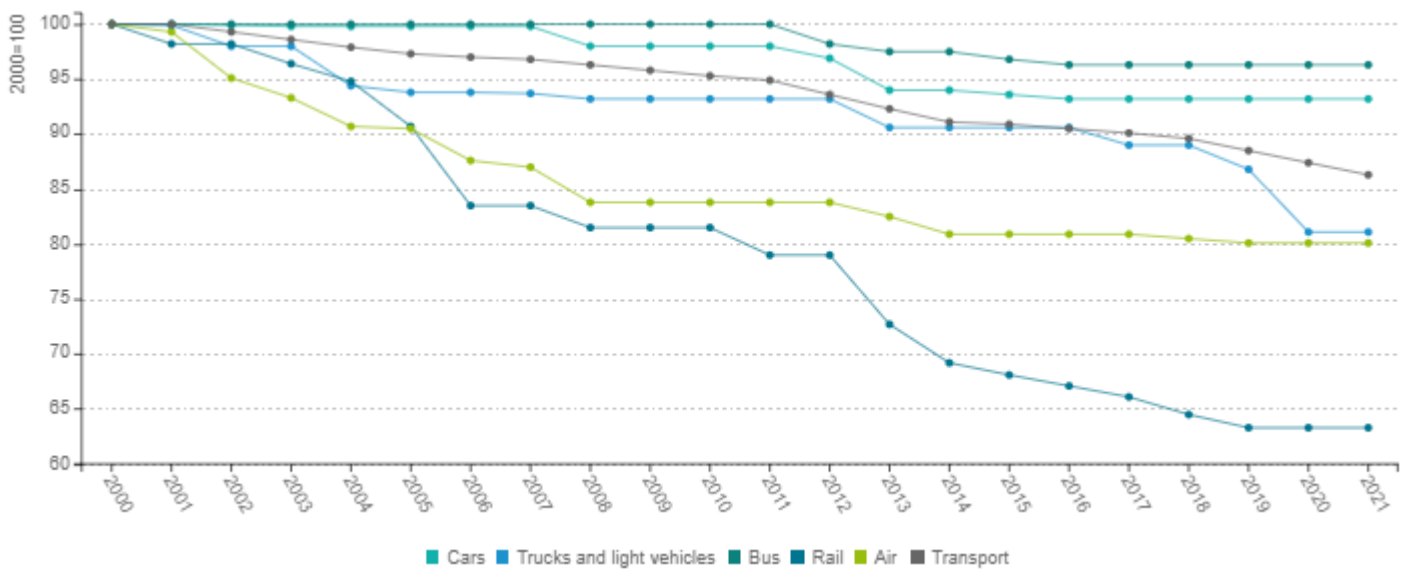


Energy efficiency and savings

Energy efficiency index for transport

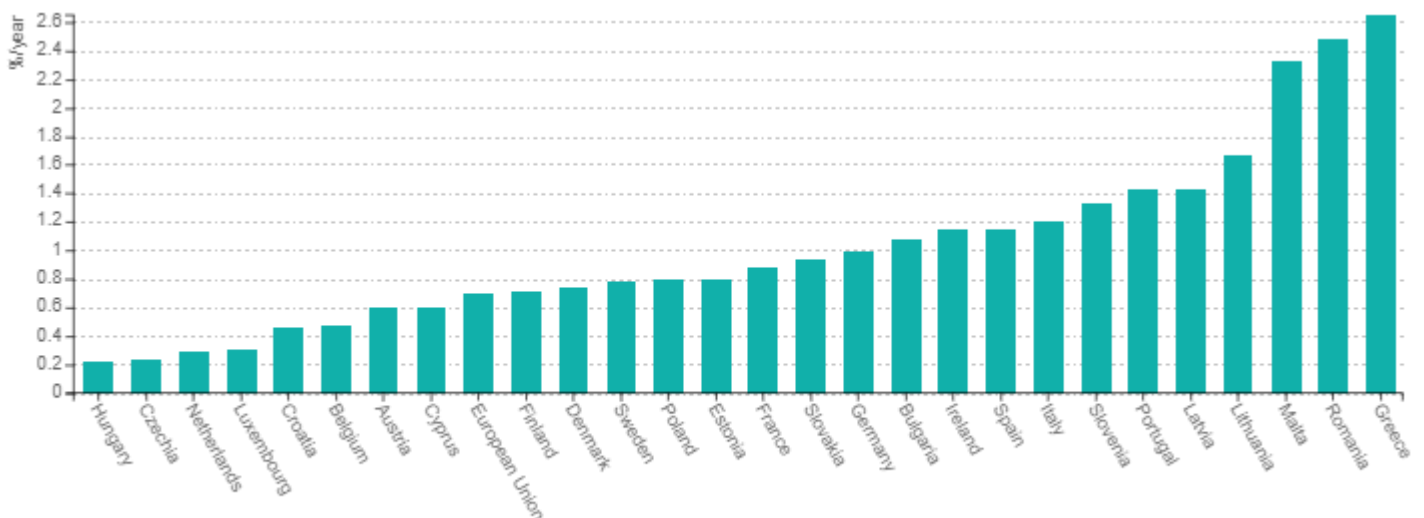
- Energy efficiency of transport improved by 0.7%/year, on average, between 2000 and 2021, as measured by ODEX that combines the energy efficiency trends of the different modes of transport (cars, trucks and light vehicles, bus, motorcycles, air, waterways, rail).
- Energy efficiency progress for cars was slower (0.3%/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 21% in 2021) and a growing share of SUV (from 25% to around 45%).
- For trucks and light vehicles energy efficiency has been improving rapidly since 2012 (1.5%/year). There was no efficiency progress between 2008 and 2012 because of the economic crisis.
- Important energy efficiency progress was achieved in rail transport (2.2%/year) and domestic air (1.1%/year).

Energy efficiency index by mode (EU)



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

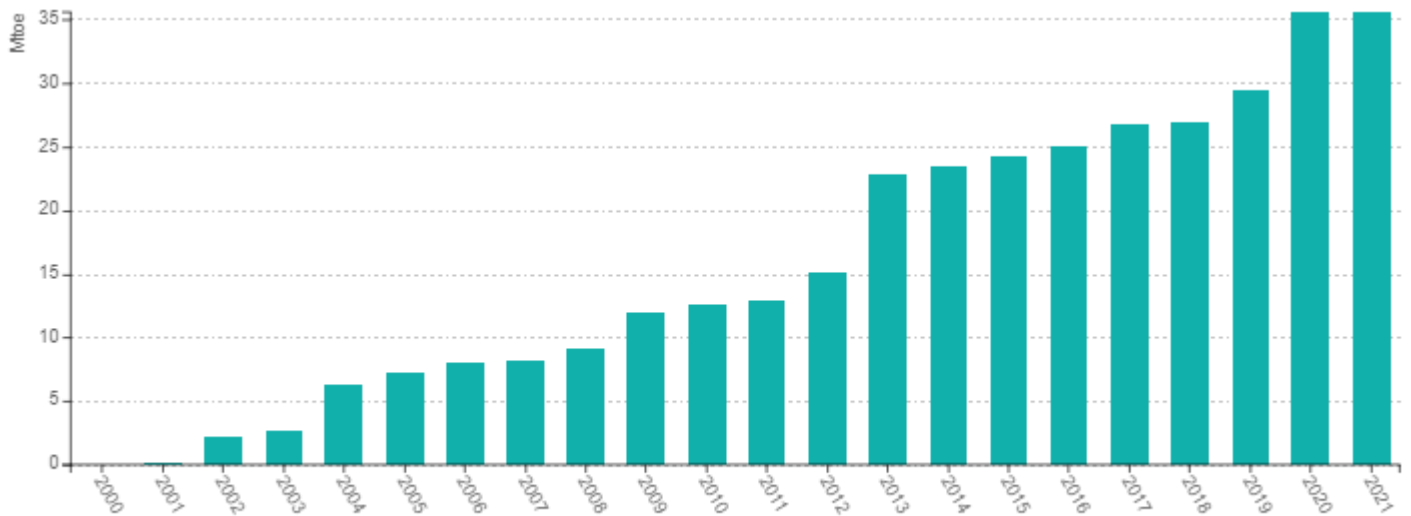
Energy efficiency gains for transport by country (2000-2021)



Energy savings in transport (EU)

- In 2021, energy savings in transport reached around 35 Mtoe at EU level: without energy efficiency improvement, the energy consumption would have been higher by 35 Mtoe.
- Slowdown in energy savings between 2009 and 2012, mainly due to no more progress for goods transport because of the economic recession. High gains in energy efficiency in 2020 also due to goods transport progress.

Energy savings in transport (EU)

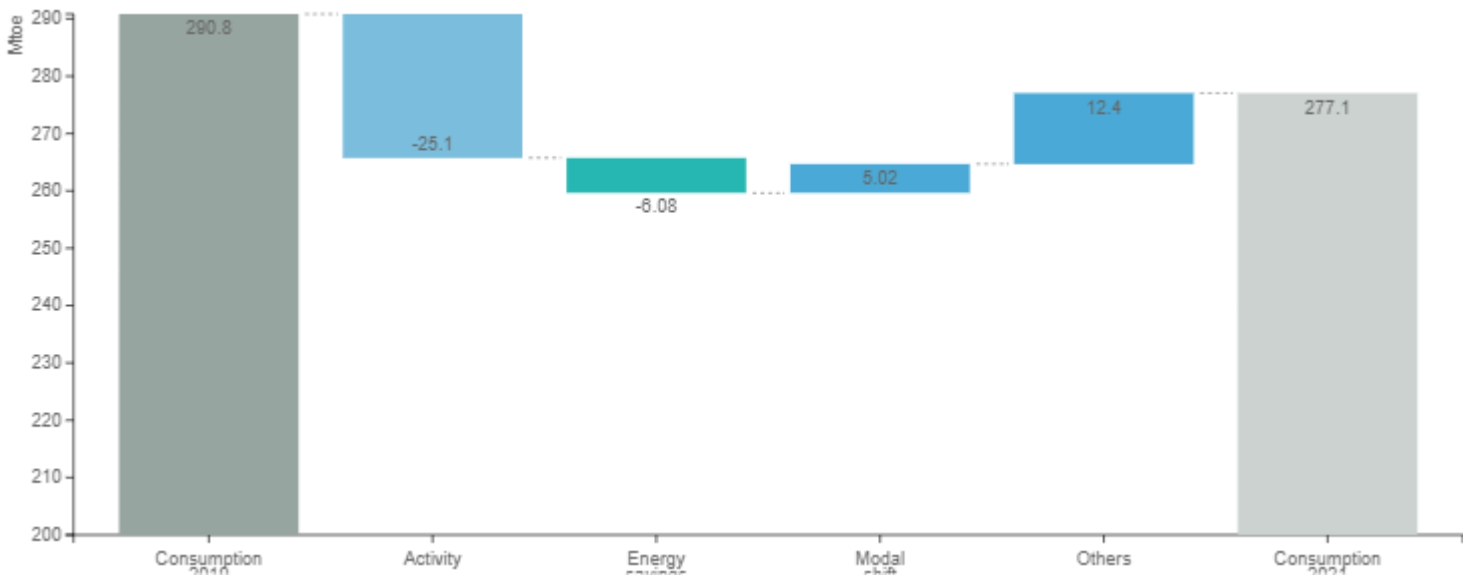


Decomposition of energy consumption

Drivers of transport consumption

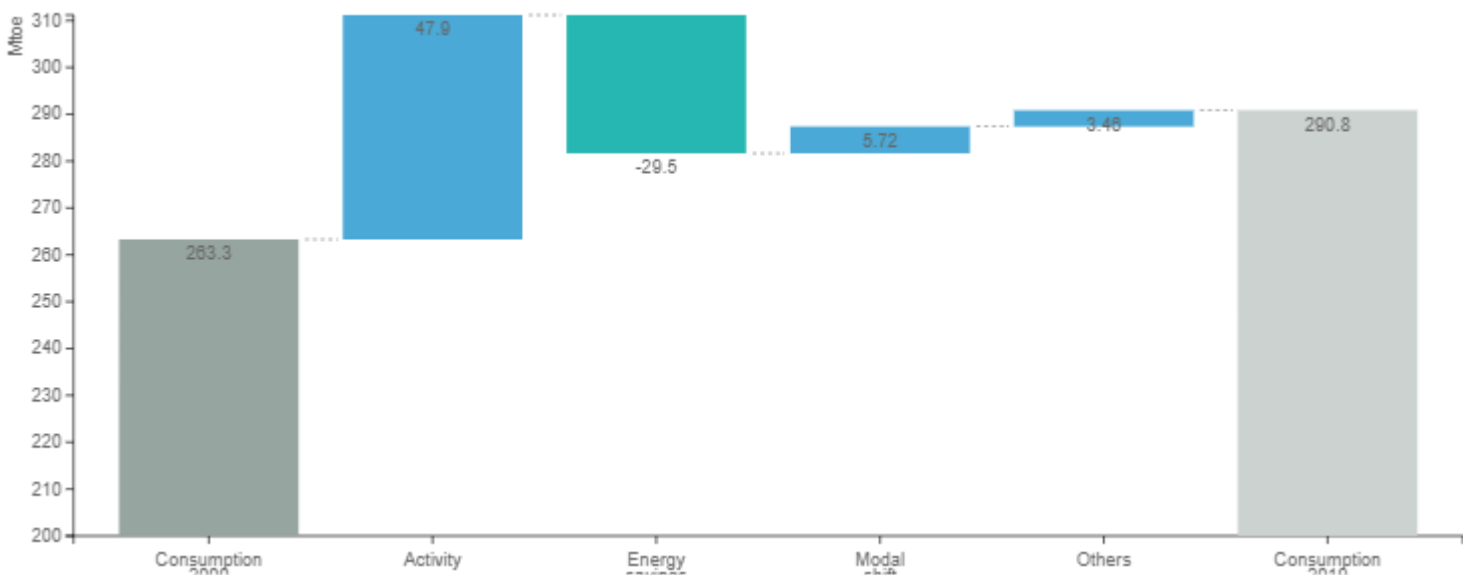
- At EU level, the energy consumption of transport increased by 28 Mtoe between 2000 and 2019, and fell by 14 Mtoe between 2019 and 2021; as a result, it was 14 Mtoe higher in 2021 than in 2000.
- Between 2019 and 2021, two factors contributed to lower consumption: a drop in traffic of passenger and goods ("activity effect"), that contributed to decrease this consumption by 25 Mtoe and energy savings (i.e. change in the efficiency of cars, trucks, airplanes, etc.), that reduced consumption by 6 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 5 Mtoe (mainly due to higher share of cars) and by other effects (+12 Mtoe), mainly explained by lower occupancy rates for passenger transport (cars and public transport).

Drivers of energy consumption variation in transport at EU level (2019-2021)



- Between 2000 and 2019, the increase in traffics contributed to increase the transport consumption by 48 Mtoe and the "modal shift" by around 6 Mtoe. Other effects also contributed to increase the consumption by around 3 Mtoe.
- "Energy savings" partially counterbalanced these effects, leading to a decrease by 30 Mtoe of transport energy consumption.

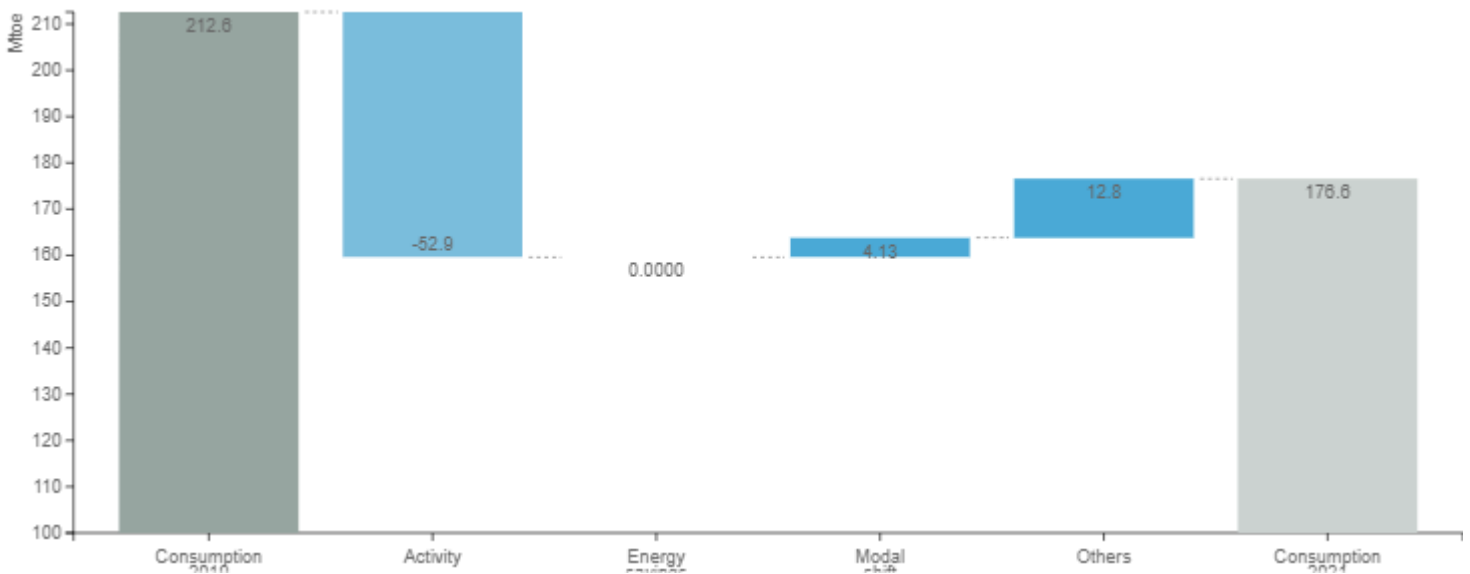
Drivers of energy consumption variation in transport at EU level (2000-2019)



Drivers of passenger energy consumption

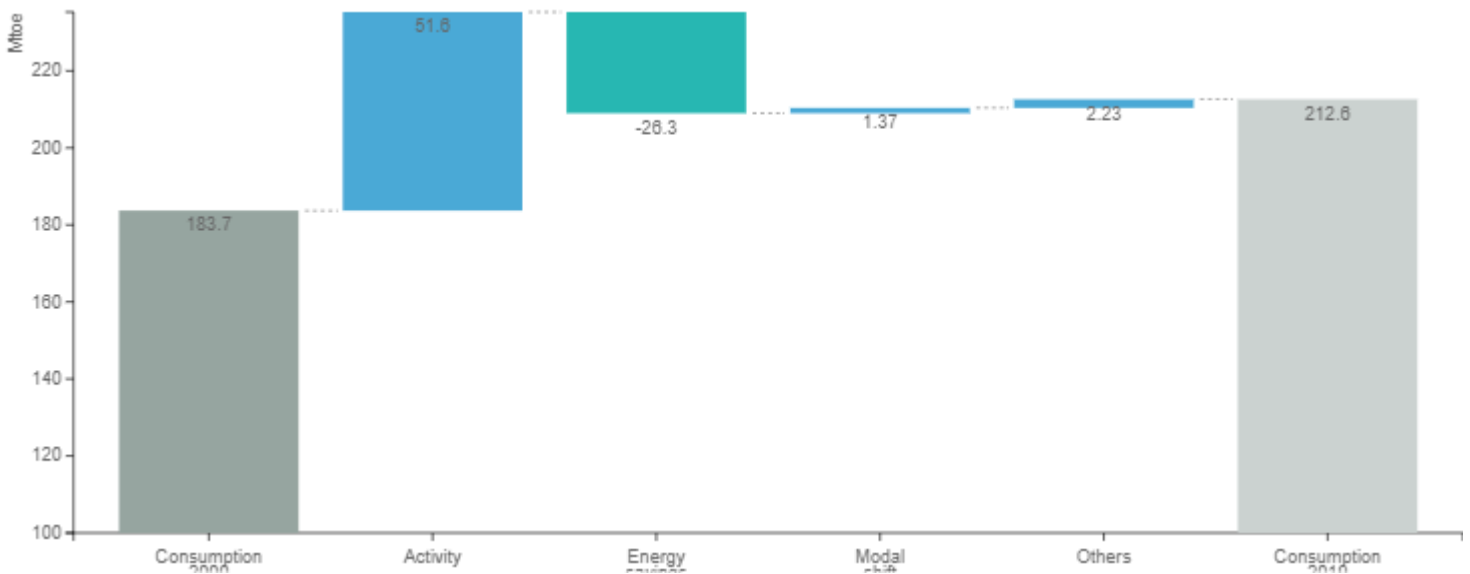
- The energy consumption for passenger increased by 29 Mtoe between 2000 and 2019 at EU level and then fell by 36 Mtoe between 2019 and 2021. As a result, this consumption was 7 Mtoe lower in 2021 than in 2000.
- The reduction of consumption between 2019 and 2021 is mainly due to the effect of traffic drop (-53 Mtoe). The lower use of public transport (modal shift) and the lower rate of occupancy of public transport, induced by social distancing measures, ("other effects") contributed to raise consumption by 4 and 13 Mtoe, respectively). There was no quantifiable energy savings in passenger transport over this period.

Decomposition of energy consumption for passengers (EU) (2019-2021)



- Previously, between 2000 and 2019, the increase of passenger transport consumption was mainly explained by the traffic growth (52 Mtoe), partially counterbalanced by energy savings (26 Mtoe). Modal shift and other effects marginally pushed up the consumption, by 1 and 2 Mtoe respectively.

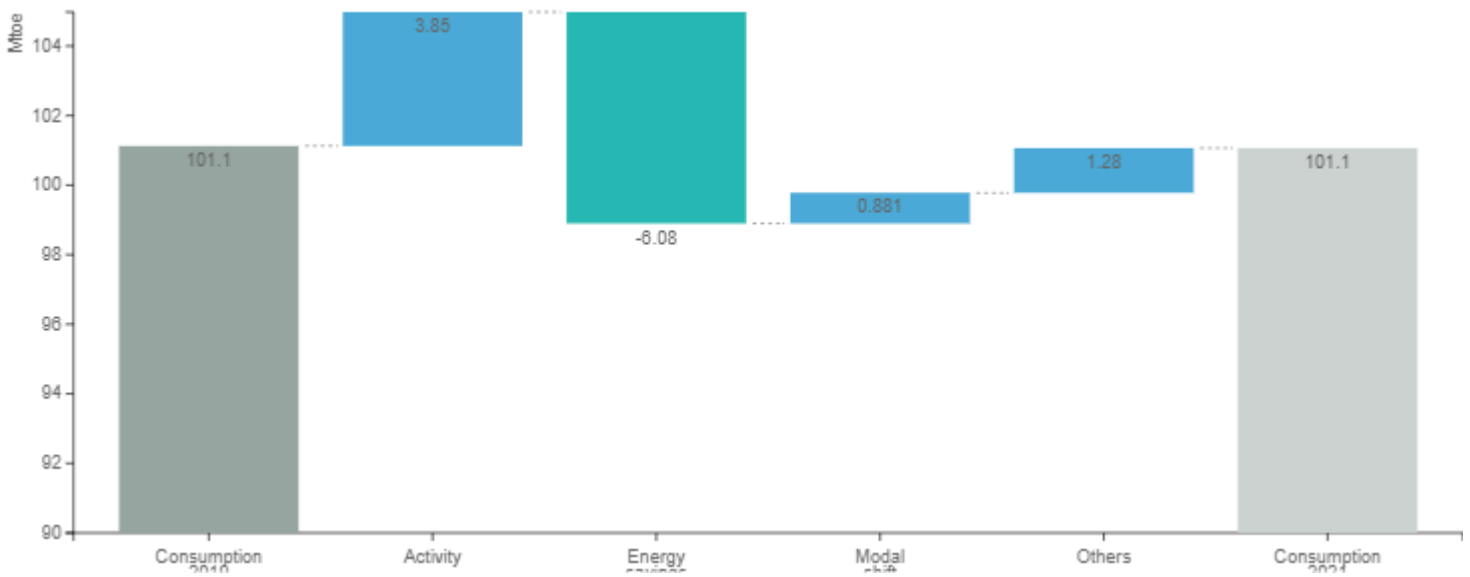
Decomposition of energy consumption for passengers (EU) (2000-2019)



Drivers of goods energy consumption variation

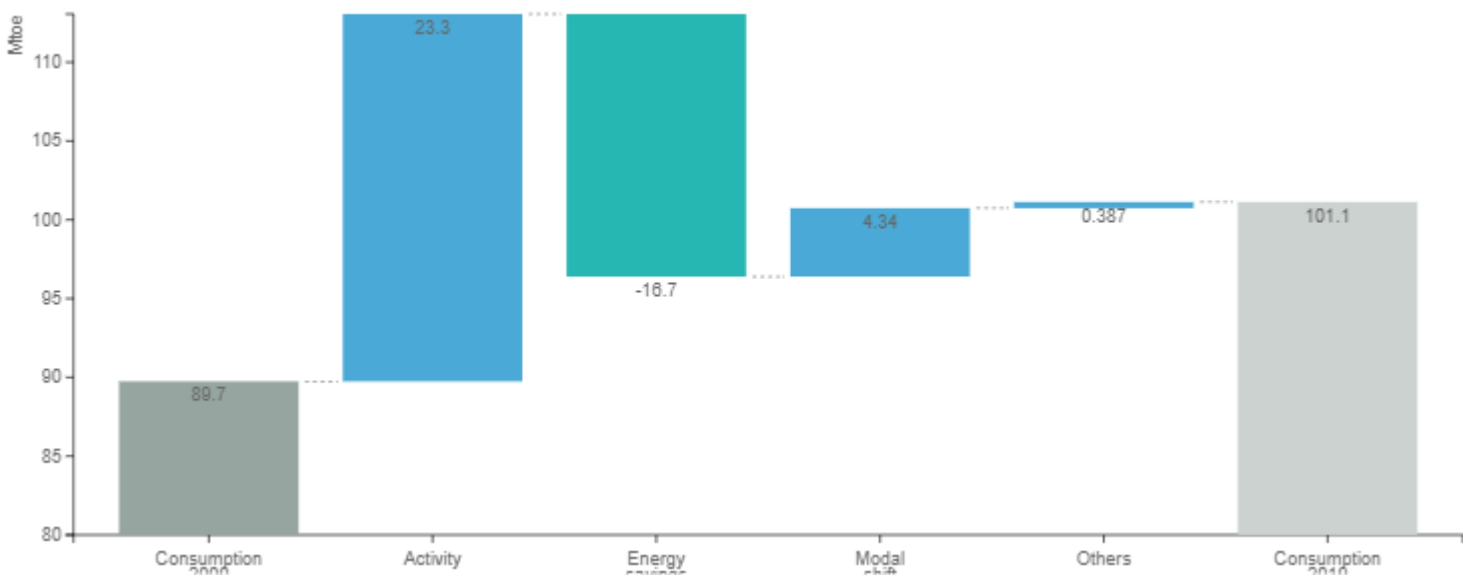
- The energy consumption for freight was stable between 2019 and 2021 at EU level. This trend is explained by an increase in traffic in ton-km (3.9 Mtoe), a modal shift to road transport (0.9 Mtoe) and other effects (1.3 Mtoe). These effects were counterbalanced by energy savings (6 Mtoe).

Decomposition of energy consumption for freight (EU) (2019-2021)



- 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)

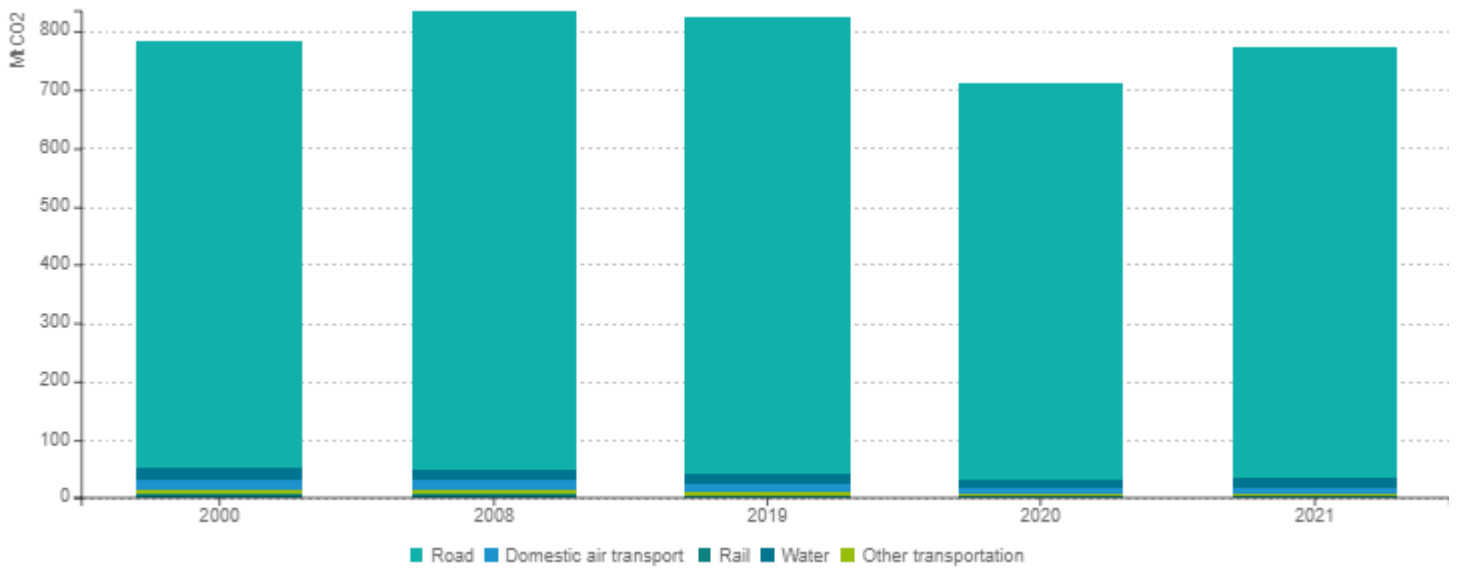


CO2 emissions

Emissions from transport

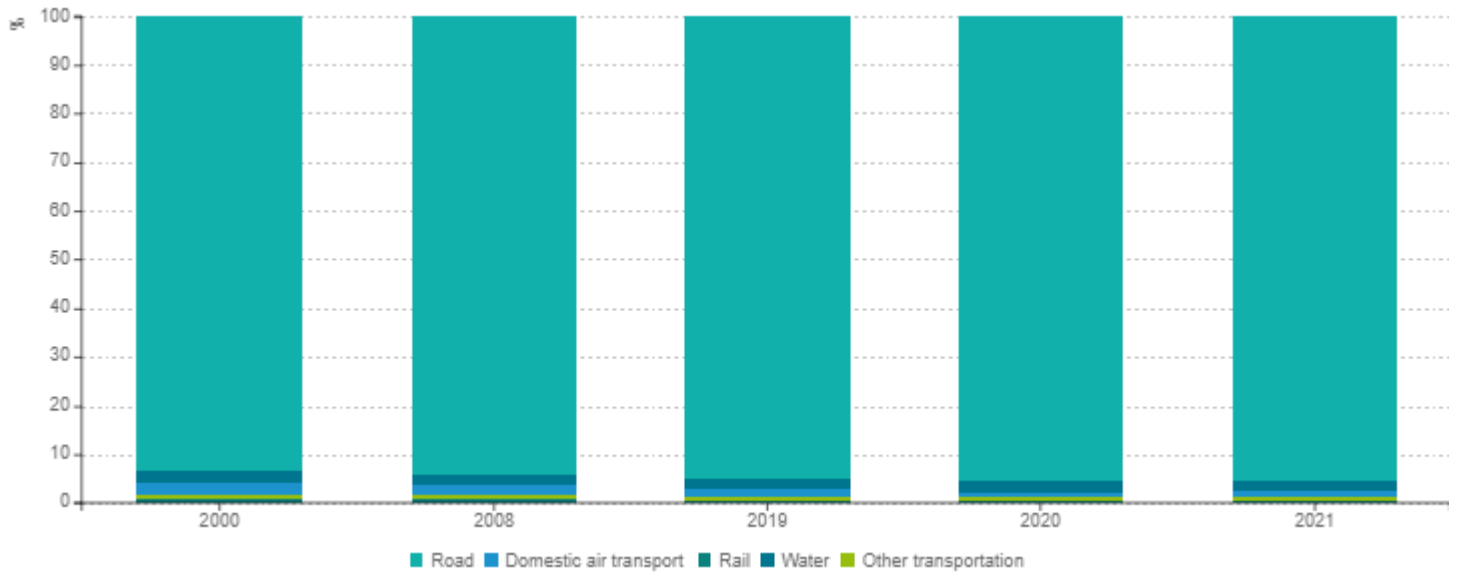
- Road transport represents around 96% of CO2 emissions from transport. Emissions have started decrease since 2008. This trend has accelerated in 2020 and 2021 due to lower passenger traffic.

CO2 emissions from transport (EU)



Source: EEA

CO2 emissions from transport (% , EU)



Source: EEA