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Role of individual mobility in the national Long-Term Strategies of EU Member States

A Climate Recon 2050 report

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Executive summary

Transport and mobility are an essential part of our daily lives. Unfortunately, currently, most of the transport modes depend on fossil fuels contributing to greenhouse gas (GHG) emissions and global warming. Transport also has other negative impacts on society, such as pollution, as well as noise pollution and it also uses plenty of space.

Long-term climate strategies (LTS) are economy-wide documents outlining the transition to a climate neutral society until 2050. The transport sector, with its emissions, plays an important role in the path towards climate neutrality. In almost all EU countries the majority of GHG emissions in transport comes from personal road transport. For this reason, our report focuses on how European Union (EU) Member States (MS) approach and deal with individual mobility in their LTSs. In the report, we analysed all **23 LTSs** that were submitted by December 2022 and **all of them cover the transport sector.** Due to different approaches and analytical backgrounds, as well as the data provided, our analysis is divided into two parts. In the first part, we used and compared the data on current transport emissions as well as projections under different scenarios that EU MS report to EEA and UNFCCC. In the second part, we focused on the LTSs and how they cover different aspects connected to individual mobility: electricity and hydrogen as fuels, public transport, a decrease in mobility needs/transport demand, the role of cycling and walking, and the role of spatial planning.

In 2020, emissions from domestic transport accounted for a bit more **than 22 % of the whole EU-27** emissions. However, the year 2020 was atypical due to the COVID-19 pandemic which resulted in a decrease of the emissions from transport sector compared to the preceding year. Nevertheless, the trend has been upwards so far as emissions from domestic transport in 2019 in EU-27 increased by 24 % compared to the year 1990.

In all countries that have submitted their LTSs, personal road transport emissions account for more than 50 % of the total country's transport emissions. The country with the highest share of personal road transport emissions is Italy (66 %), followed by Estonia (65 %) and Croatia (65 %).

Out of all countries that report to EEA and UNFCCC, only six reported the projections with additional measures (WAM) until 2050. For Portugal and Slovenia, the projected decrease is in line with the goals in the LTS. Despite this, all countries providing WAM scenarios need to make more progress to reach the goal of 90 % GHG emissions reductions in the transport sector by 2050. Another important conclusion from the reported WAM scenarios for the year 2030 is, that although all countries predicted emission reductions (compared to the year 2019, which was one of the years with the highest GHG transport emissions), none of the countries exceeds 50 % emission reduction.

Bolder steps in the next two decades will therefore be crucial to reach the goal of 90 % GHG emissions reduction by 2050. The assessment of the road transport emissions (including freight transport), which accounted for over 90 % of transport emissions in all countries excluding Greece in 2019, has uncovered an additional gap between current actions, emission reduction pathways and ambitious goals to be achieved.

Unsurprisingly, all countries emphasise future electrification as a way to decarbonise individual mobility. Extensive electrification is foreseen in all countries, especially in passenger car fleets. However, more emphasis should also be put on alternative options and measures rather than just replacing fossil fuels with electricity. Within electric vehicles (EVs), material efficiency should further be addressed.

According to the LTSs, hydrogen is more or less seen as a future fuel in freight transport and not so much to be used as a fuel in passenger cars.

Manny countries emphasise the role of rail transport when discussing public transport, but only three countries provided quantification of the expected change in public transport in the upcoming years. Several LTSs also mention the need for interconnectivity of transport modes, synchronised schedules and the use of digitalisation.

Only 12 countries addressed the decrease in transport demand in their document. The most frequently mentioned measures are digitalisation, remote work, teleworking, online shopping, and e-administration.

Cycling and walking are part of the so-called active mobility. Cycling has been recognised by 16 countries as important for the mobility of individuals and is considered as one of the mobility options in urban areas. Countries also emphasise that with cycling, more interconnected travel options are necessary. Secured bike infrastructure is one of the most important measures listed by the MS. Walking is seen as an option of movement for short distance travels. However, improved infrastructure is crucial to increase walking in the MS. When addressing walking in the LTSs, countries are more focused on soft measures such as campaigns to promote walking.

Spatial planning can also be a strong tool for the decarbonisation of individual mobility. Only eight countries are specifically addressing spatial planning as a tool to reduce GHG emissions. Efficient spatial planning helps to reduce transport demand, but on the other hand requires more time to be implemented and for changes to take place. With spatial planning, countries can also introduce car-free city centres, which, besides the reduction of the GHG emissions, brings multiple other benefits to the urban area such as improving health (if fossil fuel vehicles are banned), reduction of noise pollution as well as reallocating more space to citizens.

Our analysis showed that most of the countries rely on electrification as the main solution contributing to the reduction of the GHG emissions in individual mobility in their national strategies. However, if a completely electrified transport is to become environmentally friendly, the electricity would need to be produced from renewable sources or other low-carbon alternatives. None of the countries highlighted possible bottlenecks in e-vehicles manufacturing, as well as material needed to produce vehicles, especially production of batteries. Currently, electric cars are also considered expensive[1] and to be able to exchange all passenger vehicles, a significant amount of finance is needed. Also, if we just change the fuel (from fossil to electricity), congestions and required space for roads and parking still remains the same. The analysis of reported projections on emissions from MS showed that plenty of work needs to be done in the upcoming decades to achieve the ambitious goal of reaching climate neutrality in the EU. In addition to more efficient vehicles and changes in fuel mix, other measures contributing to sustainable individual mobility are needed.

[1] Presoja vplivov zakonodajnega svežnja “Pripravljeni na 55 “ (“Fit for 55”) na sektor prometa in stavb v Republiki Sloveniji-izbira in priprava metodologije in analize, Institut Jožef Stefan, Energy efficiency centre, 2022

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List of Abbreviations

EEA	European Environment Agency
EU	European Union
EV	Electric vehicle
GHG	Greenhouse gas
LTS	Long term strategy
MS	Member States
NECP	National Energy and Climate Plan
WAM	With additional measures
WEM	With existing measures
UNFCCC	United Nations Framework Convention on Climate Change

1. Introduction

Within the EU Governance Regulation (Regulation on the governance of the energy union and climate action (EU/2018/1999)[2], EU Member States are obliged to develop and submit long term climate strategies (LTSs). Long term climate strategies are considered to be economy wide low carbon transition plans until 2050, covering wide range of sectors; from modelling GHG emissions to providing measures on how to reduce those emissions. Ideally, LTSs, together with their modelling, present a clear trajectory to shape near- and mid-term policy making in different sectors, engage different stakeholders and adopt international obligations into national context.[3] LTSs are crucial to follow the long-term goals set in the Paris Agreement and to hold the increase in the global average temperature well below 2°C compared to pre-industrial levels and try to limit the global temperature increase to 1,5°C. By January 2020, all countries should have submitted their strategies to the EU, although unfortunately still not all the countries fulfilled their obligations. The EU aims to become climate neutral by 2050 and as such the first continent to become climate neutral. The climate strategies of MS should contribute to that goal and follow the EU path to net zero GHG emissions by 2050.

As enshrined in the Regulation, the LTSs have to cover, among others, total GHG emission reductions and removals by sinks, and emission reductions and enhancements of removals in individual sectors, namely: electricity generation, industry, transport, heating and cooling, buildings, agriculture, waste and land use, land use change and forestry.

LTSs should also be consistent with MS National Energy and Climate Plans (NECPs), which have a more short-term scope from 2021-2030 and are more action oriented.

Although the deadline for MS to submit their LTS was in 2020, Cyprus, Ireland, Romania and Poland still have not submitted their national LTSs to this date (as of December 2022).

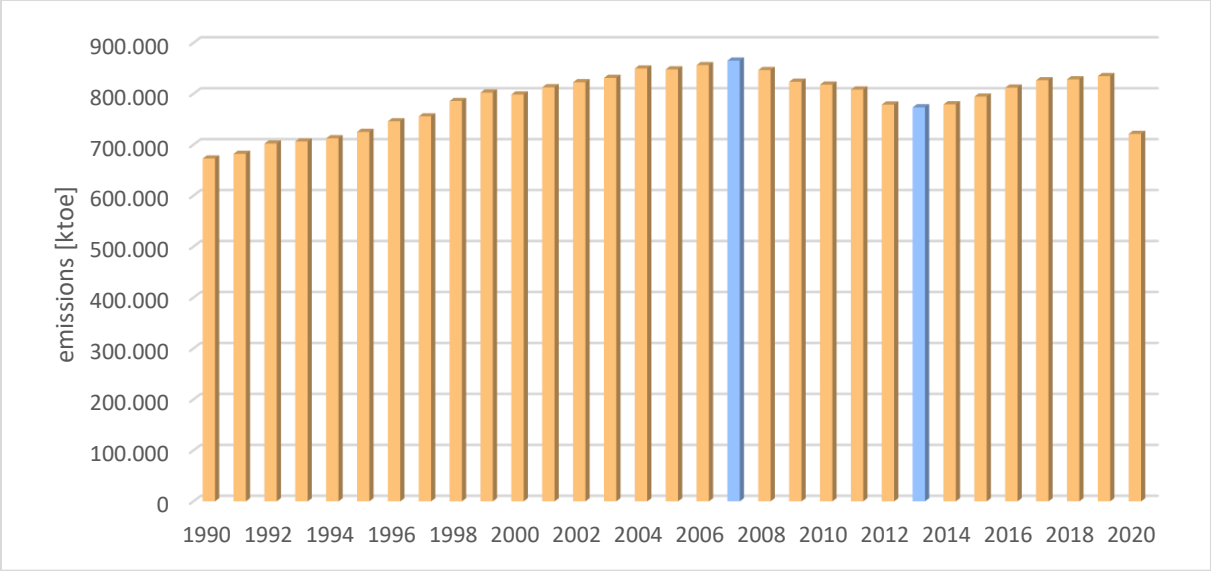
1.1. Overview of transport sector

Mobility is essential in our daily life. The transport and mobility sector is the second largest area of expenditure for European households. Further, the sector contributes 5 % to European GDP and employs directly around 10 million workers[4]. In 2018, private households in the EU-27 spent EUR 931 billion or roughly 13 % of their total consumption on transport-related items. Around 30 % of this sum (around EUR 262 billion) was used to purchase vehicles, around half (EUR 510 billion) was spent on the operation of personal transport equipment (e.g. to buy fuel for the car) and the rest (EUR 159 billion) was spent for transport services (e.g. bus, train, plane tickets)[5].At the same time, transport has negative effects on our society. This ranges from pollutant emissions, noise and congestions to road crashes. Transport also contributes to climate change with greenhouse gas (GHG) emissions. According to the European Environment Agency[6], domestic transport accounted for a bit more than 22 % of whole EU-27 emissions in 2020. Although emissions in transport in 2020 decreased compared to the year 2019 this is mainly to be attributed to the Covid-19 pandemic. Sadly, the emissions already bounced back in 2021. As can be seen from **Figure 1,** emissions in

[2] Regulation on the governance of the energy union and climate action (EU/2018/1999).
[3] Haase,I., Duwe, M., 2022. Long-term strategies: state of play, challenges and possible support through the G20.
[4] European Commission, Transport and the Green deal (https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/transport-and-green-deal_en).
[5] European Commission. (2022). Statistical pocketbook 2020. EU Transport in figures. (https://op.europa.eu/en/publication-detail/-/publication/da0cd68e-1fdd-11eb-b57e-01aa75ed71a1/language-en)
[6] European Environment Agency, 2022 (https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer).

the transport sector kept increasing since 1990 reaching their peak in 2007 and started decreasing until 2013 when they started growing again until 2020, when they significantly dropped because of the Covid-19 pandemic.

Figure 1: GHG emissions from (domestic) transport in EU-27 1990-2020



Source: EEA, 2022

In all EU countries except Luxemburg and Finland[7], personal transport[8], represents the majority of GHG emissions in the sector (Figure 4). EU member MS differ in their current modal splits of personal transport, as well as on their approaches to sustainable mobility. Reaching the EU goal of climate neutrality requires significant changes in the sector and indicating a clear pathway how to achieve a 90 % reduction of GHG emissions in the transport sector on the EU level as it is foreseen in Sustainable and Smart Mobility Strategy.[9]

1.2. Aim of this report

As already mentioned above, GHG emission from transport sector (in the EU) have increased since 1990 and were still on the rise before the Covid-19 pandemic. The aim of this report is to look at how EU member state countries address individual mobility in their LTSs; the GHG emissions as well as measures and policies they plan to put in place. For this report we defined **individual mobility** as part of transport sector with exclusion of freight transport, aviation and naval modes of transport and related emissions.

Submitted strategies differ to a large extent in length, approaches and details in the topics that are covered. Some are just describing scenarios, while others are based on qualitative data only, which makes them difficult to compare. For this reason, our analysis consists of two parts. In the first part we looked into the projections of GHG emissions that MS report to the EEA and the UNFCCC which enabled us to harmonise the data for our analysis[10]. Personal road transport emissions comprise road transportation emissions by cars and motorcycles.

[7]For Finland transport is not divided in different sections
[8] Emission in transport sector excluding freight transport emissions
[9]Sustainable and Smart Mobility Strategy – putting European transport on track for the Future, 2020(https://transport.ec.europa.eu/system/files/2021-04/2021-mobility-strategy-and-action-plan.pdf).
[10] EEA, Member States´ GHG emission projections, 2022 (https://www.eea.europa.eu/data-and-maps/data/greenhouse-gas-emission-projections-for-9).

In the second part we reviewed all of the LTSs that were submitted by December 2022 and focused on different topics within individual mobility: the role of electricity, the role of hydrogen, decrease in transport demand, the role of cycling and walking, the role of public transport and role of spatial planning. Finally, the report also outlines selected specific measures and directions from the submitted LTSs that could serve as good practices for other countries.

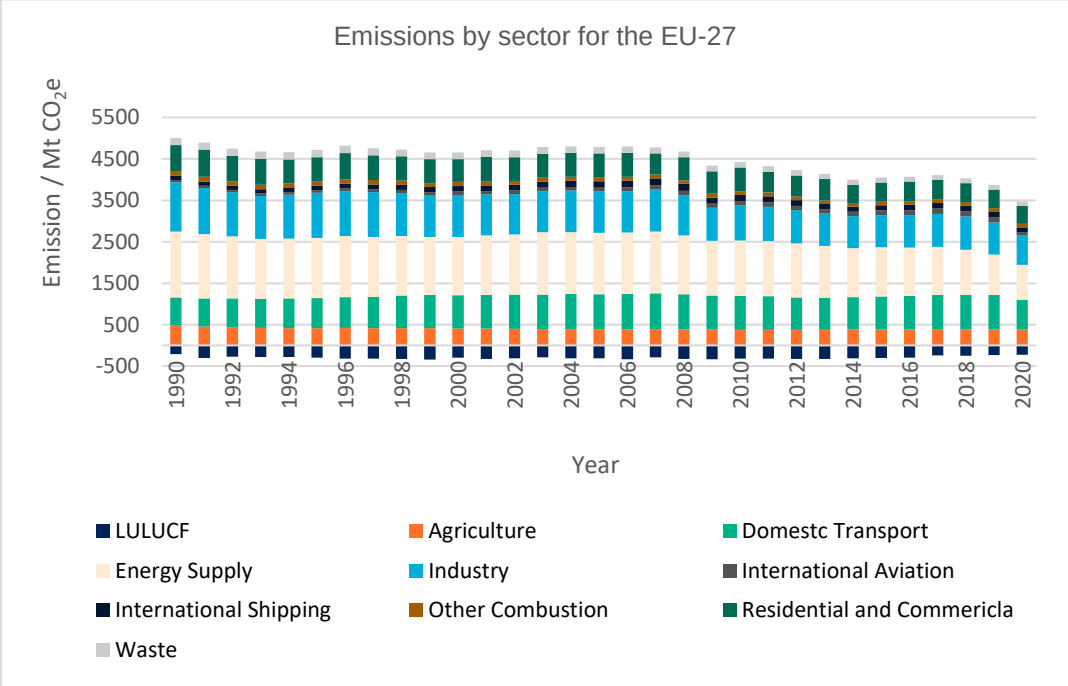
As discussed above, we only covered the EU-27 countries that have submitted their LTSs by December 2022. Because of the different time span and scope, we did not look into the NECPs of those countries which did not submit their LTSs.

2. Emissions from transport sector in the EU

Before assessing individual mobility in detail, we would like to briefly discuss current and past emissions in the EU as a whole and separately in the transport sector. Greenhouse gas emissions in the EU have been decreasing on a yearly basis since 1990. In 2020, annual emissions were lower by more than 30 % compared to the 1990 level (**Figure 2**). Despite, it is important to mention that 2020 was not a typical year due to the Covid-19 pandemic when the total GHG emissions decreased by 10 % compared to the previous year. In the EU, the total transport GHG emissions increased by 33 % in 2019 compared to the year 1990[11] (including emissions from international aviation and maritime transport), while emissions in domestic transport increased by 24 % in 2019 compared to 1990.

In 2020, emissions from domestic transport accounted for a little more than 22 % of total EU-27 emissions (which is a bit less than in 2019). In 1990, domestic transport was responsible for only 14 % of the total EU-27 emissions. Compared to 1990, domestic transport emissions have increased by 7 % in 2020, and by 24 % in 2019.[12] As already mentioned above, emission from transport decreased in 2020 due to the Covid-19 pandemic.

Figure 2: Emission by sector in the EU-27 in 1990-2020

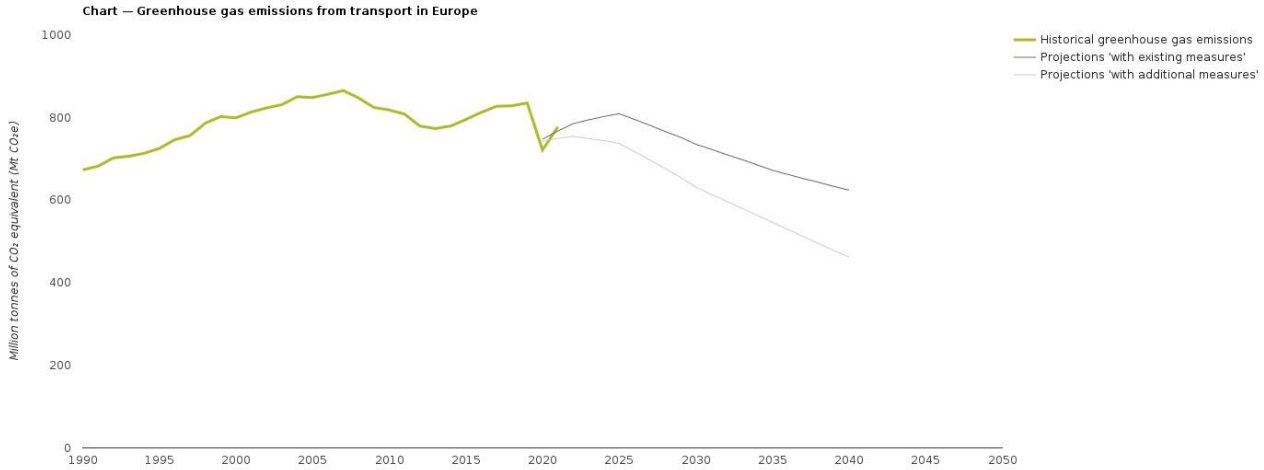


Source: Walke, P., Tool, B., Tamm, K. (2022): Carbon Dioxide Removal options in the National Long-term Strategies of EU Member States. Stockholm Environment Institute. Tallinn.

Although transport emissions started to increase in the period 2013-2019 (**Figure 3**) the sectoral emissions dropped substantially in 2020 due to the Covid-19 pandemic due to a drastic decrease in transport activities. Preliminary estimation shows, however, the emission rebound in 2021 by 7,7 %. In the period 2013-2019, emissions grew because of passenger transport and inland freight volumes.

[11] EEA, Transport and environment report 2021.Decarbonising road transport — the role of vehicles, fuels and transport demand, 2022.
[12] EEA, data viewer, 2022. https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer

Figure 3: GHG emissions from transport in Europe



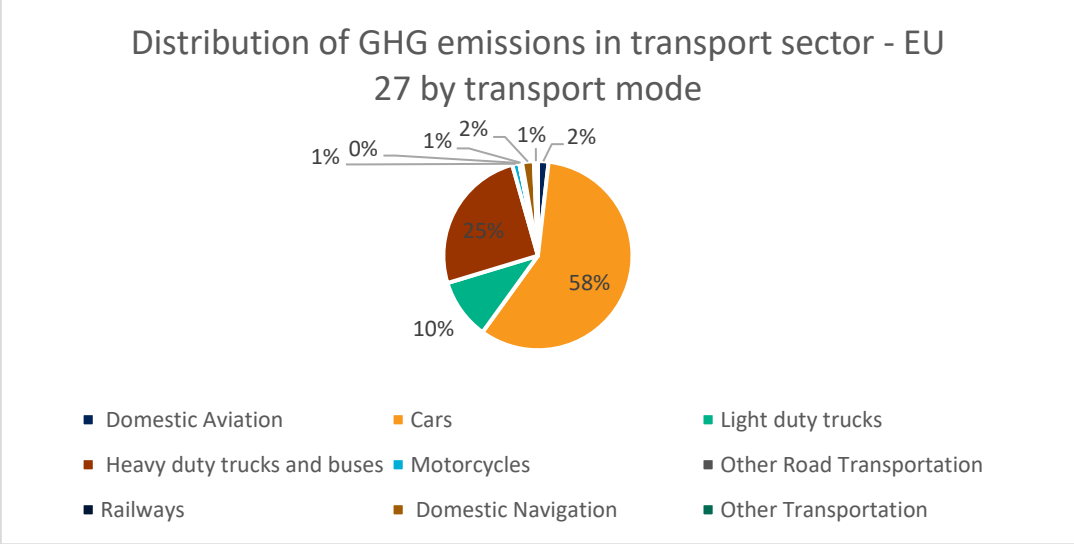
Source: EEA[13], 2022[14]

MS also report to the EU their current GHG emissions and projected emissions in the future under different scenarios. Based on the EEA data (**Figure 3**), where they submitted national projections, it is alarming that in projections with existing measures planned by the MS, emissions from the transport sector are expected to even increase until 2030 and only fall by 22 % until 2050 compared to 1990[15]. Even in projections with additional measures in MS, the emissions will be only 6 % below the 1990 level in 2030 and a substantial amount of emission will remain in 2040[16] making it challenging to reach a 90 % decrease in the sector by 2050 contributing to climate neutrality by 2050. Most common measures and policies to reduce GHG emissions in the sector (from national reported projections) focus on the promotion of electric cars and other alternative low-carbon fuels, as well as a modal shift to public transport.[17]

When going more into detail about transport sector emissions, it can be seen that the majority of EU-27 emissions in the sector in 2019 originated from passenger cars (58 %), followed by heavy duty trucks and buses (a share of 25 %) and then followed by light- duty trucks (see **Figure 4**). CO_2 emissions from passenger cars (EU-27) have increased by almost 6 % between 2000-2019. The main driver of increased emissions was more than 16 % growth in passenger transport volumes, which was combined with a dominant and ever-increasing share of car transport among transport modes.[18]

[13] Greenhouse gas emissions from transport in Europe, EEA, 2022. https://www.eea.europa.eu/ims/greenhouse-gas-emissions-from-transport
[14] Emissions include domestic transport
[15] EEA, Transport and environment report 2021.Decarbonising road transport — the role of vehicles, fuels and transport demand, 2022.
[16] Greenhouse gas emissions from transport in Europe, EEA, 2022. https://www.eea.europa.eu/ims/greenhouse-gas-emissions-from-transport
[17] Greenhouse gas emissions from transport in Europe, EEA, 2022. https://www.eea.europa.eu/ims/greenhouse-gas-emissions-from-transport
[18] EEA, Transport and environment report 2021.Decarbonising road transport — the role of vehicles, fuels and transport demand, 2022.

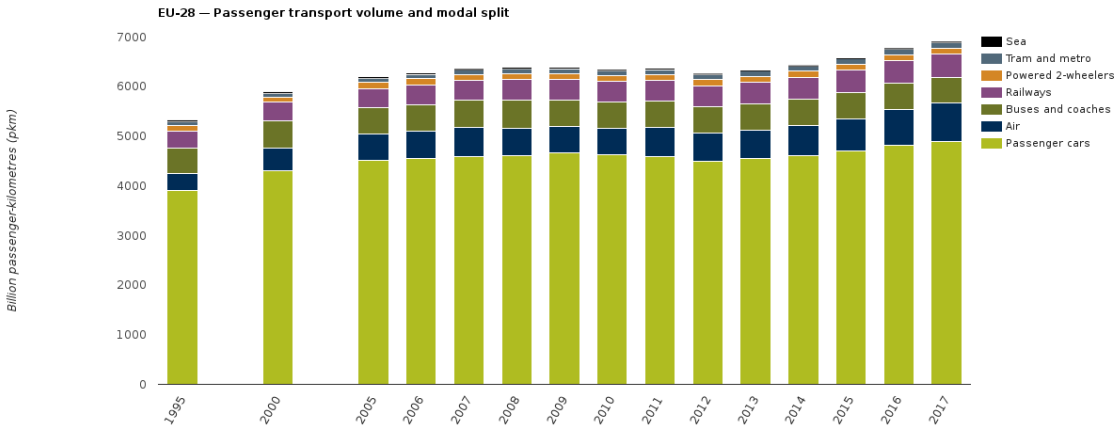
Figure 4: Distribution of GHG emissions by transport mode in EU-27 in 2019



Source: EEA, 2022

In the past EEA also calculated indicator Passenger transport demand in Europe and modal split, which is unfortunately no longer disclosed. The last data available is from 2018, when passenger transport demand in the EU-28 increased by 2 % between 2017 and 2018, reaching an all-time high of 30 % more than in 1995. In 2017, car passenger travel was also the dominant transport mode, which accounted for over 70% of total passenger transport. As can be seen from the **Figure 5**, passenger cars were the main mode of transport in the EU-28 since 1995. As can also be seen, the share of air travels has also increased during the years. In 2017, passenger cars and air transport were followed by buses and coaches, and railways.[19] The data from modal split also shows, that MS will have to focus on the reduction of emissions from passenger cars (as well as changing the modal split shares, with decreasing the passenger kilometres made by cars).

Figure 5: Passenger transport volume and modal split in EU-28



Source: EEA, https://www.eea.europa.eu/data-and-maps/indicators/passenger-and-freight-transport-demand/assessment-1.

[19] EEA, Passenger and freight transport demand in Europe, 2019. https://www.eea.europa.eu/data-and-maps/indicators/passenger-and-freight-transport-demand/assessment-1

To reach climate neutrality by 2050 and to reduce GHG emissions from transport sector faster, the European Commission presented **Sustainable and Smart Mobility strategy putting European transport on track for the future**[20], with the emission reduction goal of 90 % by 2050, adopted in 2020, which identifies 10 flagship areas as well as various milestones such as:

Table 1: Flagship areas and milestones of the Sustainable and Smart mobility strategy

10 flagship areas and milestones of the Sustainable and Smart mobility strategy
by 2030:
• at least 30 million zero-emission vehicles will be in operation on European roads.
• 100 European cities will be climate neutral.
• high-speed rail traffic will double.
• scheduled collective travel of under 500 km should be carbon neutral within the EU.
• automated mobility will be deployed at large scale.
• zero-emission vessels will become ready for market
by 2035:
• zero-emission large aircraft will become ready for market.
by 2050:
• nearly all cars, vans, buses as well as new heavy-duty vehicles will be zero-emission.
• rail freight traffic will double.
• high-speed rail traffic will triple.
• the multimodal Trans-European Transport Network (TEN-T) equipped for sustainable and smart transport with high speed connectivity will be operational for the comprehensive network.

In addition to the Sustainable and Smart Mobility Strategy, the European climate law was adopted in 2021. However, no legally sectoral reduction targets were specified.

[20] Sustainable and Smart Mobility Strategy – putting European transport on track for the Future, 2020. https://transport.ec.europa.eu/system/files/2021-04/2021-mobility-strategy-and-action-plan.pdf

3 Comparative analysis

3. 1. 2050 emission reduction goals in the transport sector

According to the separate report by our project partners from Ecologic i.e. Velten et. al[21], at the time of their publication 20 LTSs covered emission reduction from transport[22]. Thirteen of them also include targets for transport emissions in 2050. According to the study, 13 countries provide an expected reduction in emissions in the transport sector as a whole by 2050 (Table 2). As Malta outlines the emission reduction given as a reduction against unknown baseline, the authors were not able to calculate the reduction of emissions against their reference year. For this reason, Malta is excluded from Table 2. Eight of them also described how the emissions reduction would be arranged over time where the trend is linear in almost all countries (Finland, France, Greece, Malta, Portugal, Spain). In the case of Slovenia, the emissions are expected to increase until 2030 which will be followed by a sharp decrease by 2050. In the case of Croatia, emissions will be reduced by the end of the 2050 period. The report also states that Finland, Malta, Portugal, Slovenia and Spain are countries which provide quantitative information about the reduction goals for more than one year (2040 and 2050), Estonia for 2035 and Slovakia for 2040 only.

Table 2: Expected emission reduction in transport in LTSs by Velten et al., 2022

Country	Emission reduction 1990-2050 (%)	Emission reduction pathway[23]
BE	100	
HR	28-55	late action
FI	~68-97 *	linear
FR	97	linear
EL	88/99,5	linear
HU	~78 *	
IT	100	
LT	90	
PT	84-84/98	linear
SI	99	delayed until 2030
ES	98	linear
SE	25% (*) (1990 vs 2045)	

*own calculation by Velten et al.
Source: Velten et. al., 2022, p.29.

[21] Velten, Eike Karola, Nick Evans, Deyana Spasova, Matthias Duwe, Ramiro de la Vega, Laurens Duin, and Harrison Branner (2022): Charting a path to net zero: An assessment of national long-term strategies in the EU. Ecologic Institute, Berlin.
[22] Authors of the report excluded Denmark and Hungary, which did submit their LTS
[23] For some countries there is an empty space, because countries did not provide the data how the emission reductions will evolve

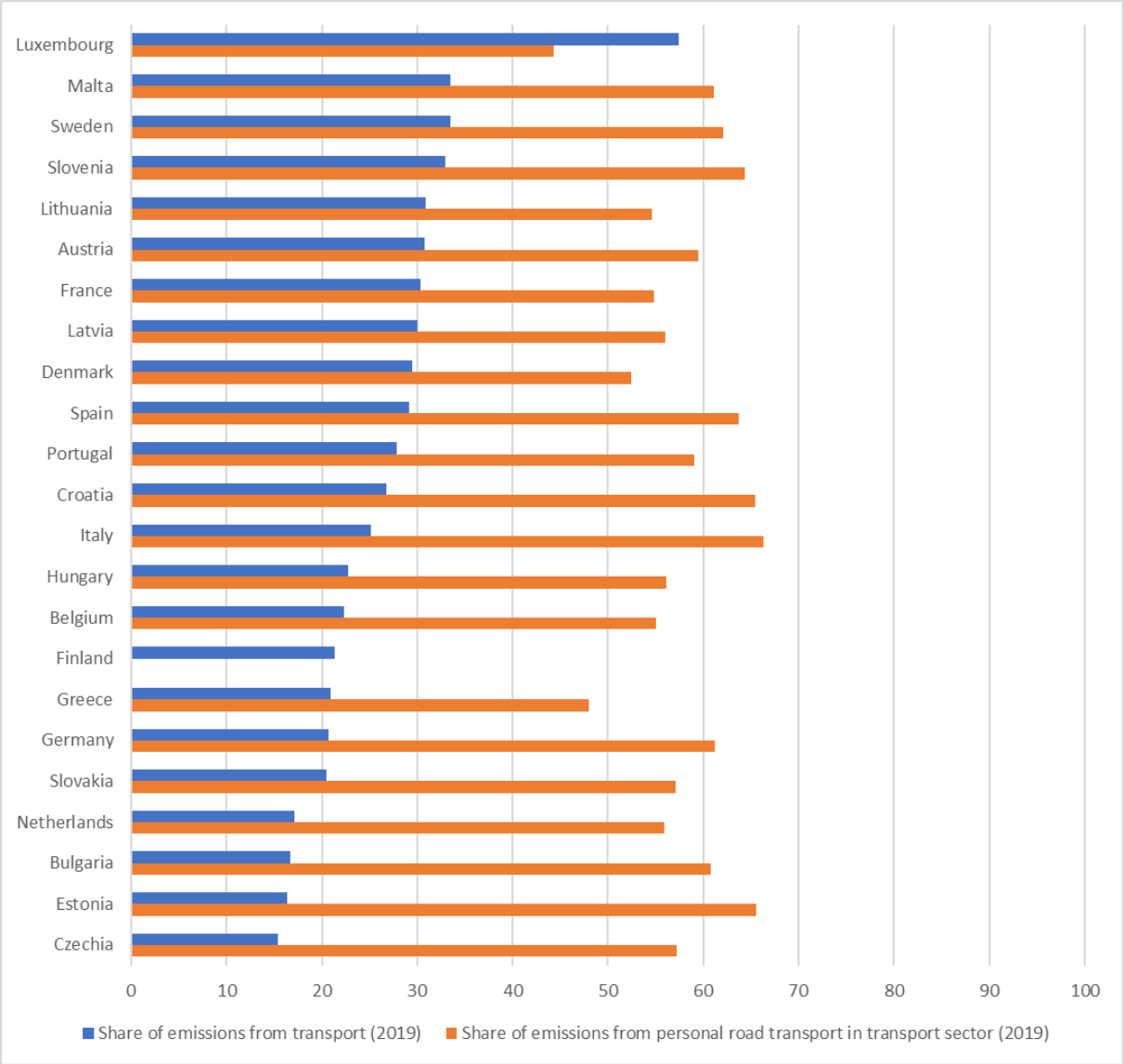
Evidently not many countries provided exact targets for transport in their documents and, as already mentioned above, the LTSs differ in their length, content and methodology which makes them difficult to compare. For this reason, we decided to look into the current emission status from the transport sector (i.e., individual mobility) based on the data and projections that MS report to the EEA. The year 2019 served us as a baseline year of WAM and WEM scenarios. [24]

3. 2. Emission reduction paths in EU member states

We started the analysis by looking into share of current GHG emissions in the transport sector in MS as a whole in 2019 and then analysed how much of these emissions comes from personal road transport (cars and motorcycles). **Luxemburg** is the country with the highest share of GHG emissions coming from transport in the EU, and also the only country whose emissions from transport account for more than 50 % (57 %). Over quarter of country emissions are coming from transport in **Croatia, Portugal, Spain, Denmark, Latvia, France, Austria, Lithuania, Slovenia, Sweden and Malta**. The lowest share of emissions coming from transport sector has **Czech Republic** (only 15 %), followed by **Estonia** (16 %). Emissions from transport that are lower or equal to 25 % can also be observed in Bulgaria, the Netherlands, Slovakia, Germany, Greece, Finland, Belgium, Hungary and Italy. Since in the report we are focusing on the role of individual mobility (emissions from personal road transport and excluding freight transport), we also looked into the share of emissions coming from personal road transport (cars and motorcycles) in the whole transport sector. In all countries, except Luxemburg, personal road transport emissions account for more than 50% of the total country's transport emissions. The highest share of personal road transport emissions has **Italy** (66 %), followed by **Estonia** (65 %) and **Croatia** (65 %). As already mentioned above, Luxemburg is the only MS country where the majority of transport emissions come from heavy duty trucks and buses (2019), which is due to lower petrol prices than in the neighbouring countries.

[24] Emissions in 2019 from transport (including international aviation and maritime transport) in EU-27 were 33,5 % higher than in 1990 (baseline year). At the same time, 2019 is the year with one of the highest emissions coming from transport in EU-27. The year 2019 was also used for reference scenario on the EU level, which was the backbone of the Green Deal and other EU documents.

Figure 6: Share of transport emission by country and share of emission from personal road transport (without freight transport) in 2019



**Finland doesn't distinguish between types of transport*

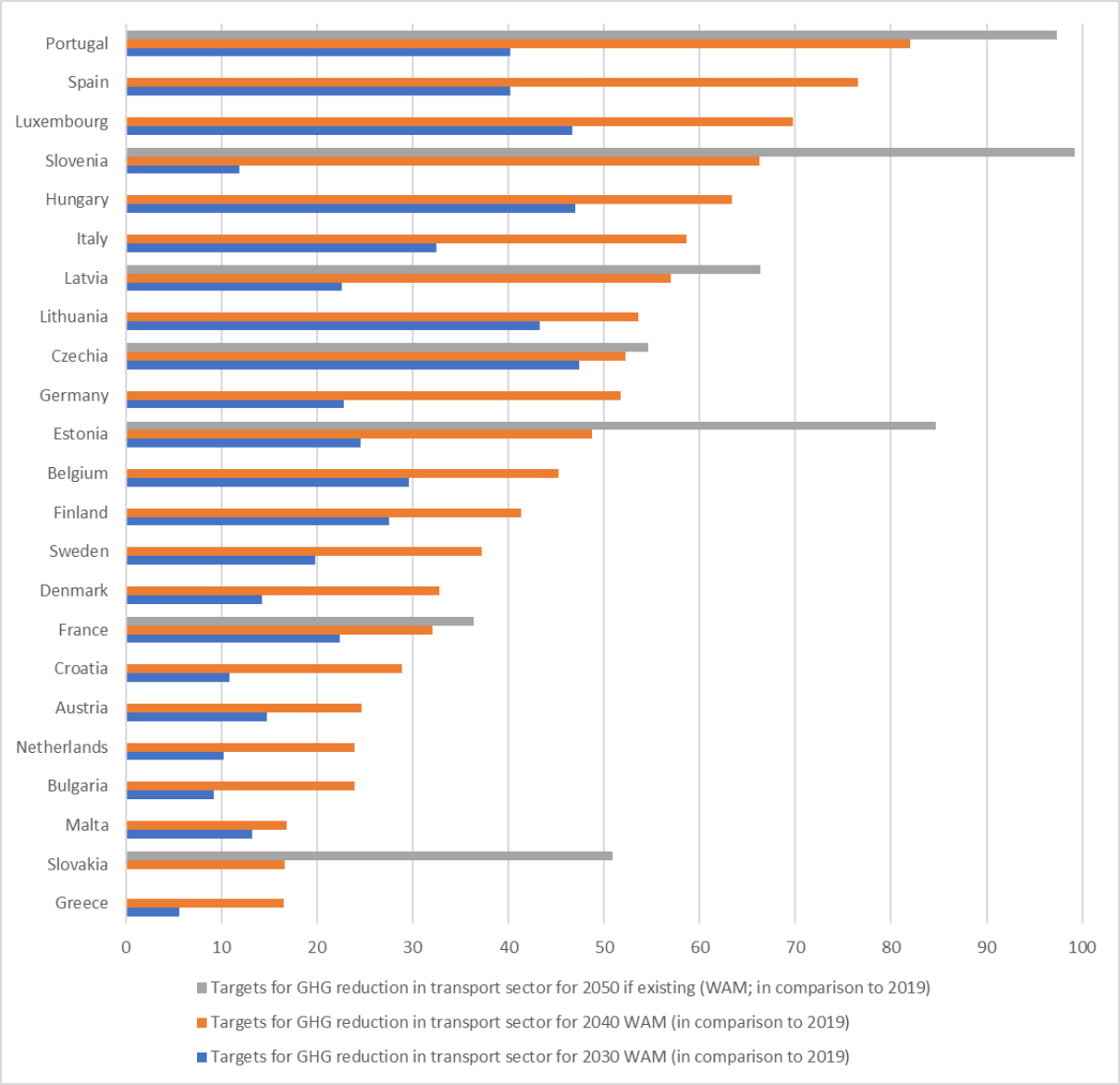
Source: EEA, 2022; own calculation JSI

According to the reported emissions and projections by MS we also looked into proposed GHG emissions reductions under scenarios with additional measures (WAM) for years 2030, 2040 and 2050 (if available). As can be seen in **Figure 7**, only 7 countries reported the WAM projections for the year 2050. For **Portugal** and **Slovenia**, the projected decrease is in line with the goals in their LTS. In comparison to the year 2019, the reduction of emissions in **Estonia** is predicted to be 85% (goal in the LTS is 98 % compared to 1990). Although **France** plans to completely decarbonise transport by 2050, the gap between reported scenarios and mentioned goal in the strategy is still large. Czech Republic, Latvia and Slovakia also reported emission reduction under WAM scenarios. Emission reduction from transport sector is predicted to be 51 % in Slovakia (compared to 2019), 55 % in Czech Republic and 66 % in Latvia. All three countries aiming to become climate neutral by 2050. Czech Republic and Slovakia also had the smallest (Czech Republic) and one of the smallest shares of transport emissions compared to all emissions in 2019 (**Figure 6**).

Nevertheless, in the countries with WAM scenarios, more progress until 2050 is necessary to reach the GHG emission reduction of around 90% in the transport sector compared to 1990.

Compared to year 2019, 10 countries forecast emissions reductions of more than 50 % by the year 2040. Also based on the year 2019, all countries intend to lower emissions by 2030 according to the WAM scenario. Given the fact that emissions from the transport sector in the year 2019 were one of the highest in the observed period from year 1990 and the predicted emission reduction by 2030 in none of the countries exceed 50 %, a lot of work will be needed to reach the goal of reducing the emissions by 90 % (compared to year 1990) in just two decades.

Figure 7: Reduction of GHG emissions in transport sector under WAM scenario for years 2030, 2040 and 2050



Source: EEA, own calculation JSI

From the reported projections of MS, we also analysed the emissions reduction of only road transport and railways (excluding domestic aviation and navigation). According to projections reported in a WAM scenario, the expected reduction of road transport and railways emissions in 2050 (compared to 2019) are 100 % in Portugal, 99 % in Slovenia, 85 % in Estonia, 65 % in Latvia, 50% in Slovakia and only 38 % in France. Projected GHG reductions within WAM scenario that are below 50% by 2040 (compared to 2019) are in Estonia, Belgium, Finland, Sweden, Denmark, France, Croatia, Greece, Austria, Bulgaria, Netherlands, Malta and Slovakia. In 2019, the emissions from road transport (including freight transport) accounted for over 90 % in all countries except Greece (85 %), more effort will be required to lower the emissions.

3.3. Role of electricity in individual mobility

As expected, all countries are emphasizing the role of electricity in the future mobility. However, to lower the emissions the electricity will have to come from renewable sources or from other sources with no (or minimal) GHG emissions released during the production of the electricity.

Only electric (or green hydrogen) cars getting the electricity from renewable sources are to be met on the roads by 2050 in **Austria, Belgium, Luxemburg**. In Luxemburg, a 49 % share of all electric and rechargeable vehicles is anticipated by 2030. **Czech Republic** described in detail how the cars would be charged (they are describing differences between charging for the shorter distances and longer distances) and which type of batteries they would include. **Denmark** will place a ban on the sale of all new diesel and petrol cars as of 2030 and enhanced low emission zones. **Malta** also intends to impose a full ban on internal combustion engines after 2030. In Denmark the Commission for Green Transition of passenger cars, will issue a report based on which the political agreement will be achieved providing the message to the industry and car owners, to ensure that green transition can be undisturbed. According to the projections in France, all new personal cars are to be 100 % electric from 2040 onwards. In 2030, the share of electric cars will be 35 % and 10 % of hybrid plug-ins in the share of car sales. The **German** government aims to achieve significant reduction of GHG emissions from cars by 2030. They see a major potential in electrification, so this subject should be given the priority. Although aiming for climate neutrality in 2050, **Hungary** still sees a small share of fossil fuel in the transport sector, but it does not specify whether this will be in the freight or personal transport. Several countries are also emphasising the efficiency of electric vehicles (EV), compared to vehicles with internal combustion.

Latvia also sees that EVs will become the most dominant way of transport and emphasises the importance of charging infrastructure, stating also that fast charging stations are widely accessible.

In **Portugal**, EVs are expected to represent 70 % of total transport energy consumption by 2050. Electricity is expected to meet 30 % of the mobility demand in 2030 and probably 100 % by 2050. Electrification, which is to be based on renewable sources of energy, is expected to allow for the rapid transition from the current use of internal combustion engine vehicles to EVs.

Some governments motivate change by leading by example. **Malta** wants to set out the example of the governmental fleet, and will replace 1800 governmental vehicles with the electric ones, with installation of charging points to be deployed at ministries and governmental departments. Also, **Luxemburg** wants to lead by example with public authorities purchasing e-vehicles.

To support electrification, the development of charging infrastructure will be needed, both public and private. Several countries are highlighting the infrastructure issue (key issue to address), but, for example, **Luxemburg**'s LTS clearly states what needs to be done on the public support side: improving the attractiveness of EVs by increasing the density of public charging points, improving the availability, charging power and charging price for the users. Among those is also establishing a "fast-charging infrastructure" which will make long-distance journeys possible. Further, they emphasize cross border collaborations to make cross-border travel with EV possible - e.g., Benelux initiative for a single electromobility space, ensuring that new residential and functional buildings are also accommodating the new trend by making sure that buildings are designed and equipped with devices for EVs. For example, buildings with more than 10 parking spaces will have to install a minimum number of charging points. Some larger buildings will have to install a collective intelligent load management system. **Lithuania**, on the other hand, stated that by 2023 all petrol stations, bus and railways stations, airports and seaports must have at least one public charging point for EV with high or very high capacity.

Not many countries were highlighting the use of financial measures in the LTS to facilitate e-mobility. Again, **Luxemburg** set an example with incentivising the purchase of EVs through purchase bonuses, favourable vehicle taxation and other financial aids for private charging stations. Other examples that Luxemburg mentions are offering the right to park EVs for free in paid public spaces or benefiting from free public charging stations. Also, **the Netherlands** mention measures to stimulate purchase and use of zero-emissions vehicles, but does not specify them.

With transformation to e-mobility, there will also be an opportunity for new jobs, research and innovation. **Bulgaria** is highlighting the promotion of research and development in the field of green

vehicles and road systems, also **Malta** recognised the opportunity by upscaling the workforce and collaboration/partnerships with educational institutions and automotive companies. Another country that has foreseen an opportunity for home industry is **Croatia**.

Main findings

- Extensive electrification is foreseen, countries are counting on high level of electrification in the transport sector, especially on car fleets
- Only few countries are specific i.e. providing details about the infrastructure needed for the development of e-mobility
- More attention should be given on how to decrease number of cars or at least think about it. Only changing the fuel going from internal combustion engine on fossil fuels to electricity is not enough or sufficient. E-cars still use space, they do not solve the problem of congestions, public transport is also safer option regarding road crash, e-cars are also not solution for PM pollution. Material efficiency in car manufacture should also be addressed and other possible pathways and measures to reduce GHG emissions in individual mobility.

3.4. Role of hydrogen in individual mobility

In this study, the role of hydrogen has mainly been assessed as an alternative combustion to fossil fuels. Hydrogen is not so widely seen as a future fuel in personal cars, as countries more rely on electrification. **Belgium** does not exclude hydrogen, and is seeing its importance in possibilities to save electricity. Hydrogen production requires necessary infrastructure, which is also recognised by **Croatia** which perceives hydrogen as an important player in the field of transport, but again more in the freight transport and buses, trams and railway than in cars, so does **Czech Republic. Finland** used the numbers from projections, where 250 000 cars on electricity, hydrogen or plugin hybrids was predicted by 2030. Finland also counts on hydrogen as fuel in 2050. **Germany** is also not specifying whether they are counting on hydrogen to be used in cars; in the strategy they are referring more to ships and aircrafts that will be potentially fuelled with hydrogen. **Greece** is "holding back" in its scenarios when it comes to hydrogen; if the costs of hydrogen cells will lower, they see a possible penetration of hydrogen in the road transport (cars, buses, trucks). **Hungary** recognizes hydrogen as a replacement for natural gas, also in the transport sector. **Malta** is recognising the importance of hydrogen fuel cells and other alternative fuels, but it is also stating that such alternatives must still be further" studied and looked" internationally before being adopted and modelled into the local scenario, so no hydrogen is modelled in the scenarios. **Luxemburg** recognised hydrogen as a fuel that could become competitive on a medium to long run. In the short run, at least one hydrogen supply station is planned in Luxemburg. The **Netherlands** see its significant role, but in heavy and long-distance transport, the same is for **Portugal** (where hydrogen will account for 4 % of the final energy consumption in 2050, but it will prevail in heavy passenger and freight transport). **Latvia** foresees hydrogen in rail transport. **Italy** foresees growing use of green hydrogen. In **Bulgaria** hydrogen will play an increasingly important role from 2030 onwards. However, appropriate infrastructure will have to be developed. They do not specify in which segment of vehicles.

Main findings

- Hydrogen is in a long run mainly seen as a future fuel for freight transport and busses.
- Some countries (Malta) are sceptical about the use of hydrogen due to technological immaturity.

3.5. Role of public transport

Efficient public transport can help minimise GHG emissions and can be perceived, together with the active mobility, as a backbone of our future mobility. All countries in scope of this report, except **Estonia**, **Greece** and **Finland** address the issue of public transport in their documents.

Belgium, France and **Slovenia** are the only countries which provide exact numbers related to public transport in the upcoming years (until 2050). Belgium aims to increase the relative share of public transport in individual mobility from 13 % to 50 %, in France public transport will increase by 26 % (in 2015-2050). In Slovenia public transport will have to more than double until 2050 (increase by 120 %).

Other countries provided data and directions in descriptive forms when it comes to the role of public transport. The public transport will have to be modernised in the future with the use of new technologies (e.g. decarbonised and digitalised). Some countries also recognise that public transport will need to become more attractive (**Lithuania, Sweden, Luxemburg**) and comfortable (**Slovakia).** Other strategies emphasised more efficient rail system (**Bulgaria, Slovenia**), and see the biggest potential to shift from cars to public transport in rails (**Italy, Latvia**) and light rail in the country's three largest cities (**Denmark**). Efficient rail connections are also seen as possible substitution for plane travels (**Spain**).

As many countries highlighted in their strategy, to have an attractive, efficient public transport, it is necessary to enable interconnection of different modes of public and private transport including harmonised time tables. Interesting case is **Luxemburg**, which has free public transport since 1st March 2020, but until 2050 needs to ensure great travel times and punctuality, service quality and user comfort, communication of real-time information and stops/stations and transport hubs.In **Malta** public transport is also currently free (free public transport is expected to be prolonged to bring necessary modal shift in the future).

Phasing out of fossil fuels will also happen in public transport with the emergence of alternative fuels. **Portugal, Malta and Czech Republic** are counting on electrification and Portugal **Malta** sets its goal to electrify 370 buses by 2030 and to deploy necessary infrastructure. **Denmark**, on the other hand, does not specify the fuel of the future but, just mentions greener options for public buses. In addition, it states that across the country low or zero emission busses are prioritized. **Hungary** envisages deployment of hydrogen buses and other clean EVs, together with charging infrastructure. Only **Slovakia** and **Austria** highlighted public transport in the countryside. In low-populated areas Slovakia will support flexible public transport system (bus on demand, flexible routes), and **Austria** will enable micro public transport systems.

Other specific measures related to public transport are: dedicated bus lanes **(Malta**), promotion of sustainable mobility (**Bulgaria**) and **Spain** which highlighted the increased financing of public transport (although it did not mention whether from public or private sources) as well as integration of private transport with public transport through smart and connected mobility solutions that will facilitate mobility.

Main findings

- Majority of countries are focusing more on rail transport
- Only three (3) countries provided quantification of the expected change (share) in public transport in the upcoming years
- Modernisation of public transport is needed; interconnectivity, synchronised schedules, digitalisation

3.7. Decrease of mobility needs/transport demand

Only 12 countries (out of those that have submitted LTS) are directly mentioning decrease of mobility needs or decrease of transport demand, which consequently results in fewer travelled kilometres and fewer emissions if the journey will be made by car or another vehicle fuelled by fossil fuels.

Decrease of transport demand is closely connected with spatial planning as well as digitalisation where new technologies improve access to services from home. **Slovenia** is specifically addressing the improvements of city locations with local supplies of food, health services and schools, as well as localising sports venues/activities, cultural activities and enabling local jobs. **Spain** and **Luxembourg** are also addressing reduction of need for mobility through spatial planning. For example, Luxemburg addresses the role of shared coworking spaces in border areas that will shorten the journeys of workers. Almost all countries also stressed out in their LTS the use of digitalisation and modern technologies enabling people to work remotely from home, videoconferences, electronic administration, and online shopping (Spain, Italy, Latvia, Malta, Luxemburg, Slovakia, Slovenia).

However, increased digitalisation and services from home, especially online shopping, increases the need for delivery services which some countries also addressed in their LTSs. For example, **Sweden** is addressing transport efficiency with measures such as optimisation and coordination of goods transport that can cut goods transport costs and increase competitiveness. **Belgium** is also addressing this issue in indirect way as it intends to decrease the need for mobility linked with goods supply and services in urban areas. They plan to transport goods to the cities with vehicles that are not personal cars, with reasonable costs, and also with the rationalisation of transported goods. **Czech Republic** is tackling the same issue by addressing the growth in e-commerce, which now replaces the traditional “shopping on the way from work” and recognising that the newly created distribution transport of consumer goods needs to be streamlined from an energy and environmental point of view. They are also emphasising the appropriate regulatory framework for such vehicles to be emission free or low emission.

*O*ther measures that are specifically mentioned in LTS on this topic are car sharing (**Bulgaria, Croatia, France**) and higher use of vehicle capacity (**Sweden, Belgium**). Although we are aware that some countries are considering these measures in their national scenarios/projections, they are not specifically mentioned: Austria is just mentioning that costs of mobility on a personal level will decrease without hindering mobility.

Main findings

- Only 12 countries are specifically mentioning reduction of transport demand
- Digitalisation (remote work, teleworking, online shopping, e-administration) are most popular measured to reduce the need for mobility

3.8. Role of cycling

Cycling is an important part of active sustainable mobility or part of so-called active mobility. The role of cycling as a mode of transport has especially increased in the densely populated areas (cities).

Out of all countries who submitted their LTS, 16 countries are include cycling. As already mentioned, there are different approaches and different ways how countries refer to cycling. Some countries provide specific targeted values. For example, Austria is relying on The Cycling Mater

Plan[25], which aims to double to share of bicycle traffic in country's modal share from 7% (in 2010) to 13 % by 2025. Belgium stated that the relative share of bicycle trips will increase to 10 % by 2050. Also, **Portugal** used quantified approach that by 2050 between 8-14% of short-distance mobility is expected to be made by using low-impact modes, but not specifically stating the mode of movement. Another country that quantified cycling in their LTS is **France**, whose goals are in line with cycling plan from 2018 to increase the share of cycling from 3 % to 12 % (in short distance travels) until 2030 and to 15 % by 2050.

The measure that came up in most countries, which mentioned cycling in their strategies, is the improvement of cycling infrastructure: increasing the length of cycling paths (to double them in Luxemburg within a few years), making cycling pathways safe (**Luxemburg, Slovakia**), countries also mentioned bike parking facilities (**Slovenia, France, Luxemburg**), some also mentioned e-charging facilities for bikes. Only **Belgium** mentioned cycling highways which would connect city centres, working hubs and public transport hubs so the cycling can be seen as an important part of mobility in the future.

Some countries (**Slovenia, Germany, Spain, Luxemburg, Lithuania**) also emphasised that cycling needs to be integrated with other modes of transport for the people to be able to shift from one mode of transport to another, especially with connection to public transport.

Cycling in most countries in 2050 is still seen as the mode of transport in cities (**Slovenia, Croatia, Slovakia**) or it is seen as important part in densely populated areas (**Sweden**). Three countries (**Slovenia, Belgium and Germany**) are also mentioning cargo bikes in their strategies, that could be used for small express parcel courier service and other small-scale transport services.

Another soft measure mentioned in the strategies is awareness raising and different campaigns to promote cycling in (urban) areas (**Malta, Spain, Bulgaria, Slovakia**). In Malta promotion will also encourage social shift and in Luxemburg cycling will be promoted as an everyday mobility solution.

Among countries, that have included cycling in their LTS, **Latvia's** description of cycling is the most basic/general one stating that cycling will be increased and bikes will be used and available. Italian strategy is briefly mentioning cycling when discussing the reduction of transport demand and listing acceleration of cycling as an option.

Main findings

- 16 countries include cycling in their LTS
- Cycling is seen as a way of movement in urban areas
- There is a need for interconnected travels
- Secured bike infrastructure is one of the most important listed measures

3.9 Role of walking

Walking is also a part of active mobility. Many short distance travels, that could be done on foot or on bicycles are often done by car. Especially in the densely populated areas (cities) walking can be seen as an important part of sustainable mobility. Although it cannot be viable for long-distance journeys, we looked at how countries addressed walking in their LTSs. 12 countries recognised the role of walking in decarbonisation of the transport sector. Austria even has its own Master plan for walking[26], that creates incentives for walking. The greater potentials to shift people from car to

[25] Cycling master plan 2015-2025. https://www.klimaaktiv.at/dam/jcr:b12274b7-5813-4c7e-b1f6-8ff72c33f136/MP-Radfahren_2015-2025%20englisch_web.pdf

[26] BMVIT. (2015). Walking Master Plan – Strategy for promoting foot traffic in Austria.

walking are seen on short distance travels up to 1 km, although walking can be seen as a mode of transport up to 5 km distance. Other countries are addressing walking either in the context of promotion of walking activities (**Spain, Germany**), or when discussing the improvement of the conditions and infrastructure for walking. **Malta** is specifically mentioning improved infrastructure, wider sidewalks, pedestrianizing areas, building footpaths, investing in traffic management systems and associated signage to give pedestrians priority, and by promoting active modes through marketing and other incentives that might result in a behavioural change (e.g., implementation of safe routes for students). **Luxemburg** is also raising the issue of secure pathways (also Latvia) and user-friendly spaces, Latvia is adding green infrastructure. **Portugal** and **Latvia** also roughly quantified walking (in Portugal 8-14 % short distance mobility is expected to be made by using low-impact modes by 2050 and in Latvia at least 60 % of urban travel will be made by walking, cycling or public transport). Latvia also states that at least 600 km of new or reconstructed pathways for walking and cycling will take place.

Main findings

- Improved infrastructure is needed to increase walking
- Walking in suitable for short distance travels
- Countries are more focused on soft measures such as campaigns to promote walking

3. 10 Role of spatial planning

Spatial planning reduced the transport demand and therefore produced GHG emissions by planning living and working environment in a way that facilitates active sustainability mobility. Eight countries explicitly mentioned the role of spatial planning in the transport sector and lowering GHG emissions (**Spain, Luxemburg, Latvia, Slovenia, Sweden, Austria, Belgium, Netherlands**-is referring to the spatial planning strategy). Integration of spatial planning within transport sector is important and can result in reduced mobility needs. **Luxemburg** is pointing out that decarbonisation of mobility system can be supported through territorial and urban planning, that will result in the reduced mobility needs. For example, housing, work, leisure and supply can be brought together with spatial planning and in that way shortens citizens' journeys.
Slovenia is moving in the same direction as Luxemburg describing that it needs to improve location of cities with local supply of food, health and school. Furthermore, more space should be given to other modes of transport than cars, decreasing the numbers of parking spaces in the city (priority given to park and ride systems). Also, in **Latvia** cities are predicted to be planned in a way that citizens will reach final destination with public transport, shared vehicle, bicycle, on foot and leaving private cars at sites. **Sweden** also highlights the importance of housing and workplace locations and increasing transport efficiency, which implies that stakeholders at the local, regional and national levels will need to coordinate their planning processes to a greater extent. **Belgium** is of opinion that spatial planning will be a major driver in decarbonisation of transport, with reduced mobility need, which will also improve air quality as well as health and micro managing of public spaces.

Main findings

- Only few countries are specifically addressing spatial planning as a tool to reduce GHG emissions
- Efficient spatial planning can help reduce mobility demand and should be included to a greater extend in the LTSs, although changes is spatial planning might need longer time to implement
- Giving more space to other types of mobility than personal cars improves health as well as quality of life in cities, it also results in more space that can be used by citizens.

3.11 Specific measures to reduce GHG in individual mobility

As mentioned in the introduction, LTSs differ by country. Some provide exact measures contributing to the reduction of emissions, some even instruments, while others just indicate which direction the sector should move in and what needs to be done to reduce GHG emissions. In this section, other specific measures resulting in the reduction of the individual mobility emissions, mentioned and described in different LTSs, were gathered.

One of the specific measures, that countries rely on, are optimisation and better efficiency of vehicles. Also, biofuels are mentioned in strategies as alternative fuels, but in the short term, rather than on a long run.

One of the more frequently mentioned measures that are taxes. In **Latvia,** the tax system will completely conform the polluter pays principle, which will reduce fossil fuel use to the minimum. **Slovenia** anticipates to incorporate external costs in the price, which will reduce (in particular) transport from individual cars. Moreover, changes in recompensation for traveling to work (which are specific for Slovenia) will be made in line with sustainable mobility. **Spain** is suggesting increased tax on diesel, **Sweden** mentions carbon tax as well as energy tax.

Spain and the **Netherlands** are both mentioning the importance of research for development of new business models and changes in the transport habits of the society. Innovation programmes will play a bigger role in the future mobility, also **Slovenia** anticipates that technological improvements (mobility as service, car sharing and digitalisation) will decrease the pressure on roads.

Only **Malta** is also recognising pedicels as a mobility solution, and category L vehicles (mopeds, motorcycles, tricycles and quadricycles), which makes sense since Malta is a Mediterranean island country with a climate suitable throughout the year for that mode of transport.

Luxemburg is also specifically mentioning pursuing a “technologically neutral policy”, keeping technological openness with regard to alternative fuels and closely following the developments of zero-emission vehicles due to the present technological uncertainties.

Portugal recognises the role of the circular economy (i.e., increase in public transport use) for the decarbonisation of the transport and mobility sector in addition to shared mobility models (e.g., new business models that provide services and ownership through use) that leverage the technological changes in mobility such as autonomous vehicles.

Bulgaria is putting a lot of effort on awareness raising, **Slovakia** is specifically mentioning raising awareness on eco driving.

4. Discussion and conclusions

Compared to other sectors in the EU-27, where emissions have decreased, emissions from the transport sector have increased in 2019 and 2020 compared to the base year 1990. Emissions reached its peak in 2007, and decreased during the economic crisis (in 2008 and 2009) but started to increase again after 2013. In 2020, emissions significantly dropped due to the Covid-19 pandemic, but in 2021 it is expected that emissions will bounce back. According to the EU Reference scenario 2020[27], the number of passenger kilometres by road/rail is also forecasted to increase to around 13 % by 2030 and to more than 27 % by 2050 and overall transport activity will

[27] EU Reference Scenario considers broader aspects of existing policies; it includes MS and EU policies adopted by the end of 2019.

still be on the rise[28] making it challenging for the transport sector (and especially individual mobility) to achieve the overall goal of climate neutrality by 2050. According to our analysis, individual mobility is a part of the transport sector that needs to be carefully monitored and planned to be in line with climate goals. Also results from the project "Decarbonising Transport in Europe[29]" indicate that current transport decarbonisation policies (the current ambition scenario) will not be sufficient to reduce Europe's transport emissions by 90 % by 2050. Report further states that the EU will never reach this target based on current ambitions.

Based on the analysis, most countries swear by **the electrification of transport (personal cars) to lower their emissions by 2050**. In most countries, e-vehicles are seen as a solution for a decarbonisation of the personal transport. Several countries are also raising the issue of infrastructure, which can be seen as a bottleneck for the electrification of personal vehicles. However, if a completely electrified transport is to become environmentally friendly, the electricity would need to be produced from renewable sources or other low-carbon alternatives. This highlights another possible barrier to achieving ambitious goals as the decarbonisation of individual mobility is linked with the decarbonisation of the power sector. Sadly, none of the analysed countries highlighted the possible bottlenecks in e-vehicles manufacturing, together with the materials needed to produce personal vehicles, especially batteries.

Currently, EVs are still expensive and to be able to change all personal vehicles with internal combustion with e-vehicles, significant amount of finance will be needed. As it was already discussed in the report Transport and environment report 2021 by EEA in addition to more efficient vehicles and fuels other measures contributing to sustainable road transport are necessary.

In the public transport sector, several countries are relying on rail transport in the future. To make rail transport efficient and comfortable, cross-national rail routes are necessary and it would be crucial for the EU to play an important part in their development. For example, Rail Baltica is already under development. Furthermore, the interconnectivity of different modes of transport also needs to be improved in addition to the establishment of efficient transport hubs.

In in assessed LTSs, 12 countries mentioned the role of reduced transport demand. All are expecting higher shares of teleworking, remote work, as well as improved digitalisation resulting in a reduced transport demand. Although remote work/teleworking can be seen as an efficient solution, it can also result in an increase of transport demand for other purposes (e.g., tourism or leisure), so in line with the reduction of transport demand, efficient and comfortable public transport is also of crucial importance.

Although efficient urban planning can take longer to implement (it is a bit more difficult to completely change the urban design of settlements), it should play more significant role, to improve connectivity and accessibility within settlements due to the threat of future urban sprawls.

Besides motorised means of transport, cycling and walking also have a potential to decarbonise transport sector, as mentioned in MS LTSs, especially in the urban areas. Giving more space for active sustainable mobility has also other benefits, besides the reduction of GHG emissions, such as reduction of noise pollution, reduction in air emissions, reallocating more space to citizens.

The primary focus of the LTSs in individual mobility was the electrification of the vehicles fleet. However, to achieve a goal of net zero (on the EU-27 level) all other options and measures need to take place and be included in the planning of sustainable transport.

[28] EEA, Transport and environment report 2021.Decarbonising road transport — the role of vehicles, fuels and transport demand, 2022.

[29] OECF, International transport Forum, 2021. Decarbonising transport in Europe. The way forward.

Therefore, some policy recommendations can be derived from our analysis and observation, that could also be included in the future updated LTSs. Time for efficient climate action is running out, so MS should act now and start to implementing their directions and policies.MS should connect within their transport planning, especially in the field of public transport (railways, bus routes), and also when selecting the locations of the larger regional transport hubs. By doing so, MS can become more interconnected and make public transport more time efficient and attractive.

Individual mobility is strongly interlinked with other sectors, especially e-vehicles, which are dependent on energy power sector. For this reason, the actions have to be interlinked and ensure that the electricity used for e-vehicles comes from low emission sources. There is also strong interlinkage with digitalisation, especially with efficient and attractive public transport, as well as in opportunities for teleworking, shared mobility, among others. Walking and cycling have greater potential in urban areas. Sustainable solutions should not only be seen as climate mitigation solutions, but should also improve health and wellbeing of citizens. Countries should not forget about the rural areas and also develop solutions for citizens in those areas where people might be more car dependent.

In our analysis we did not focus on carbon pricing, which is also an important narrative in transport decarbonisation. The EU is planning to expand EU emission trading system (ETS) on transport sector. While doing so special attention should also be given to mobility poverty and to mobility in rural areas, where alternative (e.g. public transport) solutions should be implemented in order to decrease car usage.

As mentioned before, the decarbonisation of individual mobility solely focusing on technological solutions (i.e., electrification) is not enough. MS should focus on other mobility solutions that contribute to the lower dependence on cars.

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Annex I - methodology

Methodology of the analysis Role of individual mobility in the National Long-term Strategies of EU Member States

The assessment was made on these bases:

- Only countries who submitted their LTS by December 2022 were analysed (either they submitted the strategy to the UNFCCC portal or to the EU portal)
- We analysed only submitted LTSs, we did not analyse any NECPs or other similar documents for any of the missing country, since the approaches and scopes of other documents are different than LTSs
- We focused on individual mobility (meaning excluding freight transport, as well as aviation and maritime transport)
- Within analysis of current and projected emission in transport sector, based on the data countries report to the EEA and UNFCCC, we had to use different categories, which is clearly stated, since not all the indicators we were using are using the same categories of different types of transport
- We compared reported emission projections to the year 2019, since it was the last “normal” year before Covid19 as well as emissions coming from transport sector were one of the highest
- When we looked into the role of electricity in individual mobility, we only focused on what was written within the transport sector, we did not analyse how and from which sources the electricity will be generated in countries
- The same criteria as for electricity we used for hydrogen; we did not analyse how countries are treating hydrogen per se, we focused on the use of hydrogen in transport sector, to be specific in individual mobility
- When assessing countries details we looked into: date of submission of LTS, share of GHG emissions coming from transport in year 2019, 2020, share of emission form personal road transport (excluding freight transport) in 2019 and 2020. Targets for GHG reduction in transport sector for WAM in comparison to 2019, specific targets for personal road transport in 2030 compared to 2019, Specific targets for personal road transport for 2050 if existing for WAM scenario.

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