

# Leveraging Public Policy to Influence Modal Shift

# Table of Contents

2	○	<b>I. Public Transport as a lever for environmental, social, and economic ambitions</b>
5	○	<b>II. A ground-breaking offering to shift road transport</b>
7	○	<b>III. Many financing solutions are possible</b>
8	○	<b>IV. List of recommended measures</b>

# Introduction

*How can public policy measures advance a shift from private cars and road freight to public transport and rail freight, and enable governments to realise their climate ambitions and obligations?*

## **Private transport, a major challenge for reducing emissions**

Road transport emits the largest share of the European Union's transport greenhouse gases, responsible for 25% of total emissions, with passenger cars and heavy-duty vehicles being the leading contributors. Public Transport is a potent lever for reducing the use of private vehicles and cutting their share of emissions, but its share of the EU's transport market is low. In terms of road transport, 82.9% of all journeys in the EU were completed by passenger cars, whereas only 9.3% were completed by buses and coaches, and even less for trains, at just 7.9%.

## **A whitepaper to highlight how public policy measures can drive modal shift and cut emissions**

There is a growing, successful, shift towards Public Transport and demand for these services that can be observed through projects across the EU. Sia Partners have identified several public policy measures that governments and local authorities can implement to advance the shift from private cars and road freight to public transport and rail freight. These measures can enable governments to realise their climate ambitions and obligations while also providing significant additional societal gains.

# I. Public Transport as a lever for environmental, social, and economic ambitions

## A. Public Transport as a decarbonisation instrument

Road transport emits the largest share of the European Union's transport greenhouse gases (GHGs), responsible for 25% of total emissions, with passenger cars and heavy-duty vehicles (HDVs) being the major contributors. GHGs for passenger cars and HDVs have increased by more than 20% since 1990<sup>(1)</sup>. Public Transport can significantly reduce the number of vehicles on a road; for example, in urban areas, a single bus can replace 36 cars<sup>(2)</sup>. In a suburban area, a metro train can replace the equivalent of 2,500 cars<sup>(3)</sup>, while one freight train can replace 30 to 40 trucks<sup>(4)</sup>.

Rail transport can significantly reduce GHG emissions - passenger and freight rail transport generate 50 times less CO<sub>2</sub> than a car (passengers x KM travelled)<sup>(5)</sup>, and rail freight produces 9 to 14 times less CO<sub>2</sub> than road freight<sup>(6)</sup>. Switching to Public Transport represents one of the most effective policy levers for transport decarbonisation<sup>(7)</sup>.

Putting a spotlight on France – the French Government passed the Energy and Climate law on the 8th of November 2019<sup>(8)</sup>, which set a target to “divide 2019 GHG figures by a factor greater than 6, instead of a factor of 4 previously established”<sup>(9)</sup>.

To meet such substantial targets, France Stratégie recommended reducing the number and length of journeys that are harmful to the environment by encouraging modal shift and active mobility<sup>(10)</sup> to reach “complete decarbonisation in the land transport sector by 2050” (LOM law)<sup>(11)</sup>. One of the solutions to achieve these COP21 objectives and reach the complete decarbonisation of the transport sector by 2050 is to double the share of Public Transport and rail freight<sup>(12)</sup>. This should reduce the global carbon footprint of the transport sector to 51MtCO<sub>2</sub> by 2050, representing 53.2% of all sectors combined<sup>(13)</sup>, compared to 205 MtCO<sub>2</sub> today<sup>(14)</sup>.

(1) Statistica, Distribution of transportation greenhouse gas emissions in the European Union in 2019, by mode

(2) Sia Partners analysis, based on Eurostat 2018 data

(3) Montaigne Institute, Mobilités en Île-de-France : ticket pour l'avenir (Mobilités in Ile-de-France : a ticket for the future), November 2021

(4) Société du Grand Paris, Gare Bry – Villiers – Champigny: 11,500 camion évités grâce à l'ITE (11,500 trucks avoided thanks to the ITE)

(5) From ADEME, Base Carbone: The calculation is based on the CO<sub>2</sub>e emission of a shared car (average occupancy rate of 2.2 passengers) from ADEME's Base Carbone, i.e. 88g of CO<sub>2</sub>e/ km/passenger, divided by the average CO<sub>2</sub>e emission of high-speed trains (TGV, Lyria, OUIGO) resulting from energy consumption based on the year 2019, i.e. 1.73g of CO<sub>2</sub>e/km/passenger. (Source: Electricity transmission network (Rte), 2019) and attendance in 2019), 2019.

(6) Altermind, Study for 4F, les co-bénéfices du Fret ferroviaire (the co-benefits of rail freight), June 2020

(7) Ademe, Transitions(s) 2050 : Quatre scénarios et leurs feuilletons pour atteindre la neutralité carbone en 2050 (Four scenarios and their soap operas

to achieve carbon neutrality in 2050), March 2022

(8) Vie publique, law of the 8th November 2019 relative to energy and climate change

(9) CGEDD, France Stratégie, Prospective 2040-2060 des transports et des mobilités : 20 ans pour réussir collectivement les déplacements de demain (Prospective 2040-2060 for transport and mobility: 20 years to collectively succeed in the travel of tomorrow), February 2022

(10) Ibid

(11) Ministry of Ecological Transition and Territorial Cohesion, Ministry of Energy Transition, Mobility orientation law, October 2021

(12) Ministry of Transport, Rail freight: aid of €170 million per year until 2024, September 2021

(13) CGEDD, France Stratégie, Prospective 2040-2060 des transports et des mobilités : 20 ans pour réussir collectivement les déplacements de demain (Prospective 2040-2060 for transport and mobility: 20 years to collectively succeed in the travel of tomorrow), February 2022

(14) Sia Partners survey : 31% of the 663 million tons equivalent Mt CO<sub>2</sub> eq of all sectors in 2019

In the EU, the occupation rate for private vehicles is incredibly low (1.45 passengers/vehicle)<sup>15</sup> and converting all 292 million passenger cars will take decades. Therefore, to reach the significant reductions needed to meet member state GHG obligations, it is necessary to shift passenger car trips to Public Transport and, to a lesser extent, active modes of transport such as walking and cycling.

### B. Public Transport supports economic development and contributes to the social cohesion of territories

Public Transport supports economic development through direct employment (Public Transport jobs) and indirect employment (increased access to employment and education, access to goods and services, etc.). For example, Public Transport and freight rail provide 360,000 direct and indirect jobs in France<sup>16</sup>.

Additionally, reliable, efficient, and affordable Public Transport solutions

facilitate job access by widening the labour pool available for roles, benefiting both employers and employees and limiting the “paradox of unfilled jobs”<sup>17</sup>.

There is a proven correlation between travel time to the employment site and the ability to find a job. This effect is pronounced for low-income households living in outlying areas, unable to afford high fuel costs<sup>18</sup>. Studies in the UK indicate that low-income earners are 2.5 times as dependent on bus networks as other population categories (with buses accounting for 83% of their total trips)<sup>19</sup>. In the medium term, social cohesion also requires a review of town planning and a limitation of urban sprawl through more economical use of space<sup>20</sup> which should focus on creating clusters of economic activity that are accessible through active travel modes such as walking and cycling. This will ultimately create a more equitable and sustainable local economy.

### C. Public Transport improves people’s health and quality of life

Efficient Public Transport reduces traffic congestion and improves the sense of safety for pedestrians and cyclists in an area<sup>21</sup>.

Electrified passenger rail transport emits virtually no air pollution and has the best performance of all non-active mobility offerings in an urban environment, reducing fine particles PM2.5 and PM10 as well as NOx, VOC, O3, and SO2<sup>22</sup>. Each year, pollution is responsible for 800,000 premature deaths in Europe<sup>23</sup> and the European Commission estimates the cost of air pollution from land transport at €71.80 billion. Air pollution cost per traveller\*km is about 0.71€/km for a private car and only 0.01€/km for an electric train<sup>24</sup>. Bus efficiency has increased thanks to the application of the Euro 6 norm since 12/31/2013<sup>25</sup>, engine replacements, and filter deployments (switching to natural gas divides NOx emissions by 30)<sup>26</sup>.



(15) Europa, Occupancy rates of passenger vehicles, 2015

(16) UTP, Institutional brochure, Le transport public et ferroviaire. La mobilité partout et pour tous (Public and rail transport. Mobility everywhere and for everyone), october 2020

(17) CCI Paris Ile-de-France, Comment résoudre le paradoxe des emplois non pourvus ? Agir sur les politiques d'orientation, de recrutement et de l'emploi (How to resolve the paradox of unfilled jobs? Acting on orientation, recruitment and employment policies), july 2022

(18) Jeroen Bastiaanssen, Does better job accessibility help people gain employment? The role of public transport in Great Britain

(19) IFT, C40 Cities, Making COP26 Count, How investing in public transport this decade can protect our jobs, our climate, our future, november 2021

(20) Ministry of Ecological Transition and Territorial Cohesion, Ministry of Energy Transition, Fight against urban sprawl and preservation of biodiversity,

July 2022

(21) European Commission, Directorate-General for Mobility and Transport, Essen, H., Fiorello, D., El Beyrouy, K., et al., Handbook on the external costs of transport: version 2019 – 11, Publications Office, 2020

(22) European Commission, Directorate-General for Mobility and Transport, Essen, H., Fiorello, D., El Beyrouy, K., et al., Handbook on the external costs of transport: version 2019 – 11, Publications Office, 2020

(23) European Heart Journal, Air pollution causes 800,000 extra deaths a year in Europe and 8.8 million worldwide, February 2019

(24) Commission européenne, Handbook on the external costs of transport, January 2019

(25) Ministry for Ecological Transition and Territorial Cohesion, Ministry for Energy Transition, Euro pollutant emission standards for heavy vehicles - Clean vehicles, March 2017

risk of a fatal accident up to 200 times lower than car transport<sup>27</sup>. Accident-related costs in the transport sector amount to €282 billion across the EU<sup>28</sup>. 75% of those costs relate to private car accidents, which are 40 times higher than bus or coach accident costs<sup>29</sup>.

For example, 29% of French citizens using Public Transport daily perform an average of 27 minutes of additional daily physical activity<sup>30</sup> by walking between their origin point (home, work) to a train or bus station. Cycling is also developing as a complement to public transport<sup>31</sup>.

#### D. Public Transport is the most accessible mobility solution for the majority of trips

Providing affordable transport options is a social equity issue. For example, in the EU, the average portion of a household's monthly budget devoted to transport is 13.2%<sup>32</sup>, with households highly dependent on private cars (0.53 passenger cars per person in the EU<sup>33</sup>). In France, among the 10% of the poorest households, transport accounts for 21.3% of disposable income<sup>34</sup>.

With this in mind, freedom of movement is a right granted to EU citizens, which provides access to other fundamentals such as work, education, housing, and health care. However, those with lower incomes tend to have the least access to transport which in turn results in lower access to the rights listed above.

A significant issue exists whereby private vehicle owners do not currently pay for the full cost of their vehicle's usage. Today, drivers only incur the capital and operating costs of vehicle ownership (purchase/leasing, maintenance, and fuel). Whereas the externalities caused by the vehicle (GHGs, congestion, noise and air pollution, accidents, and infrastructure damage) are not directly paid for and are instead subsidised by the general public through taxes (with tolls as an exception). Additionally, Public Transport riders also do not pay the full costs of their journey, as the majority of Public Transport modes are subsidised by the Government, again through taxes. However, comparing the two, Public Transport is a far greater use of public funding due to the significant societal gains it creates.

(26) AIRPARIS and IDFM, , Study on the measurement of air pollutant emissions from buses in real operating conditions, January 2021 and Sia Partners, Study on the establishment of a biofuel sector in France, April 2022

(27) European Railways Agency for Railways (Safety overview 2017-EU-27; 2011-2015), 2015

(28) European Commission, Handbook on the external costs of transport, January 2019

(29) Ibid, page 45

(30) CEREMA, Modes actifs, intermodalité : quelles solutions ?, Journée de partage à Albi (intermodality: what solutions?, Sharing day in Albi), October 2019

(31) NSERM and IDFM (STIF), Study on public transport in the Paris region, champions of daily physical activity, September 2016

(32) Eurostat, <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20200108-1>

(33) Eurostat, <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220727-1>

(34) Mairie Info, Consommation : les transports représentent 14% du budget des ménages français (Consumption: transport represents 14% of the budget of French households), April 2021



# II. A ground-breaking offering to shift road transport

Public Transport has clear benefits, but its share of the EU's transport market is low. In terms of road transport, 82.9% of all journeys in the EU were completed by passenger cars, whereas only 9.3% were completed by buses and coaches, and even less for trains, with just 7.9% of all journeys<sup>35</sup>.

In France, the 75 billion euros invested in urban public transport over the past 30 years<sup>36</sup> have only made it possible to maintain the offering, counterbalanced by massive investments in road infrastructure, and a continuation of urban sprawl (urban planning, deindustrialization, spike of real estate prices in urban areas). France's current Public Transport offering is insufficient – although around 40 million inhabitants are served by a Public Transport network<sup>37</sup>, 3,000 stations and coach lines<sup>38</sup>.

However, supply generates demand. As private carriers know and already practice (in the airline, long-distance rail, coach, and maritime industries) increasing the frequency of an essential line does not dilute demand, nor does it reduce occupancy. On the contrary, it

can attract new demand and can even improve the occupancy rate if operators are flexible and quickly adapt to the services offered<sup>39</sup>.

Public Transport users rank frequency as the most principal factor for increasing ridership (84%), this was followed by increased serviced catchment areas (77%), and extended service hours (64%)<sup>40</sup>. Travel time is also decisive: for example, if travel time is more than 50% longer than the equivalent car journey, the user would prefer to use their car<sup>41</sup>. There are also other considerations such as price, accessibility, quality of information available, attention to the customer, comfort, safety, and environmental impact<sup>42</sup>.

Furthermore, a significant portion of people would like to use Public Transport in favour of their car (33% in France<sup>43</sup> and 77% in Germany<sup>44</sup>). Notwithstanding this sentiment and the significant investment from the EU and Member States (€16bn in funding<sup>45</sup>), people are still favouring their private cars due to the ability to complete quicker journeys despite growing congestion.

There is, however, a growing successful shift towards Public Transport and the continued demand for these services which can be observed through the results of projects across the EU:

- *High speed trains have led to the removal of air routes*<sup>46</sup>,
- *The tramways and bus rapid transit routes introduced in France have been an immediate success*<sup>47</sup>,
- *Demand has resulted in the reopening of regional lines in Germany*<sup>48</sup>,
- *The Vorarlberg coach network in Austria has reduced car traffic*<sup>49</sup>,
- *The strengthening of the Public Transport offering in Switzerland has caused a doubling of the Public Transport modal share between 2005 and 2020*<sup>50</sup>.

Of course, the increase in supply must be well-designed. When a service is to be improved, the new offering must meet the needs and the quality of service expected by investments in infrastructure and vehicle fleets.

(35) Europa, Car travel dominates EU inland journeys, 2020

(36) Forum Vies mobiles, according to source CTN / SDES, "We need a major shock of public transport offers and constraints on the car to reduce our emissions by 60% within 10 years", October 2020

(37) UTP, Key figures 2019, annual publication, December 2021

(38) Intercommunalités de France ADCF, Inscrire les 3000 gares de France dans les projets de territoire : une ambition partagée (Including the 3,000 stations in France in regional projects: a shared ambition), February 2019

(39) DREAL Pays-de-la-Loire, Study report, The offer of freely organized transport services in Pays-de-la-Loire, January 2019

(40) Banque des Territoires, Observatoire de la mobilité 2021 : Mobility Observatory 2021: public transport still affected by the health crisis, November 2021

(41) Transdev usage study

(42) AQST, Autorité de la qualité de service dans les transports, Qu'est-ce que la qualité de service ? (Transport Service Quality Authority, What is service quality?), August 2022

(43) IFOP, Observatory of shared mobility and multi-modality, IFOP survey for

Sixt, April 2019 (Prospective 2040-2060 for transport and mobility: 20 years to collectively succeed in the travel of tomorrow), fébruary 2022

(44) European Cyclists' Federation 2022 survey

(45) Special report 06/2020: Sustainable Urban Mobility in the EU: No substantial improvement is possible without Member States' commitment

(46) Géoéconomie 2010/1 (n° 52), Stéphane Dubois, TGV : un quart de siècle de bouleversements géoéconomiques et géopolitiques (a quarter of a century of geoeconomic and geopolitical upheavals), 2010

(47) Urban transport 2017/2, Mathias Cureau, Étienne Trubert, Feedback on the choices between tramway & BRT in French cities, 2017

(48) BMDV, German Ministry of Digital and Transport, Starke Schiene – Timeline, April 2021

(49) VMobil, Transports of Vorarlberg, «Nachhaltige Mobilität können wir nur gemeinsam gestalten. Jeder Weg zählt», 2022

(50) LITRA, La répartition modale du transport de voyageurs en Suisse, Synthèse et enjeux pour les transports publics, (The modal split of passenger transport in Switzerland, Summary and challenges for public transport), 2014

Efforts to improve Public Transport must be concentrated where carbon emissions are currently highest (beyond city centres within which travel represents less than 2% of transport-related emissions), and where the massification of flows is possible (outside rural areas, even though they represent 20% of total emissions). It is, therefore, necessary to target travel in urban areas and peripheral rings<sup>51</sup>, not only on «radials» (connecting the metropolis and the urban area to the city centre, representing 25% of current emissions), but also «tangential» routes running around the periphery<sup>52</sup>.

The context is different in the freight transport sector. The share of rail freight in the EU is approximately 20%<sup>53</sup>. The European Green Deal established an objective of transferring 30% of freight from road to rail or river over distances greater than 300km by 2030, and 50% by 2050. Doubling the modal share of rail freight entails tripling the combined rail-road transport capacity and increasing conventional transport capacity by 50%<sup>54</sup>. To achieve this goal Member States not only have to invest in new infrastructure, but also must update existing infrastructure which has been underfunded and inadequately maintained for decades.

A positive feedback loop should emerge and lighten the burden on public finance, as more passengers and goods transported along public roads and rail networks will generate more revenue for operators and organising authorities. In parallel, reducing car and HDV volumes results in less public spending required to maintain road infrastructure and fuel subsidies. Additional sources of financing will be freed up to maintain the transport offering and consolidate its development for the common benefit of citizens, employers, communities, carriers, and shippers. The initial step remains to be taken. Public authorities must begin the cycle by correcting under-investment in the rail network<sup>55</sup> and improving the quality of offerings. This will set favourable conditions for modal shifts and achieve their CO2 reduction targets<sup>56</sup>.

(51) ADETEC, Transport and travel design office, Expert report MODAL SHARES AND SHARING OF SPACE IN MAJOR FRENCH CITIES for the Association Qualité Mobilité, July 2021

(52) FColdefy Jean, Mobilités : changer de modèle, Solutions pour des déplacements bas carbone et équitables (Mobility: changing the model, Solutions for low-carbon and fair travel), april 2022

(53) Ministry of Transport, Rail freight: aid of €170 million per year until 2024, September 2021

(54) Altermind, Study for 4F, the co-benefits of rail freight, June 2020

(55) Senate, SNCF Network-State performance contract: a project that must imperatively be modified to achieve our rail objectives, February 2022

(56) CGEDD, France Stratégie, Prospective 2040-2060 des transports et des mobilités : 20 ans pour réussir collectivement les déplacements de demain (Prospective 2040-2060 for transport and mobility: 20 years to collectively succeed in the travel of tomorrow), February 2022





# III. Many financing solutions are possible

To establish this change, Public Transport will need long-term holistic planning and ambitious financing through a green fund. Financing will be necessary both for initial investments and ongoing operations.

Potential funding sources have been identified by several reports<sup>57</sup> and can be broadly divided into two categories:

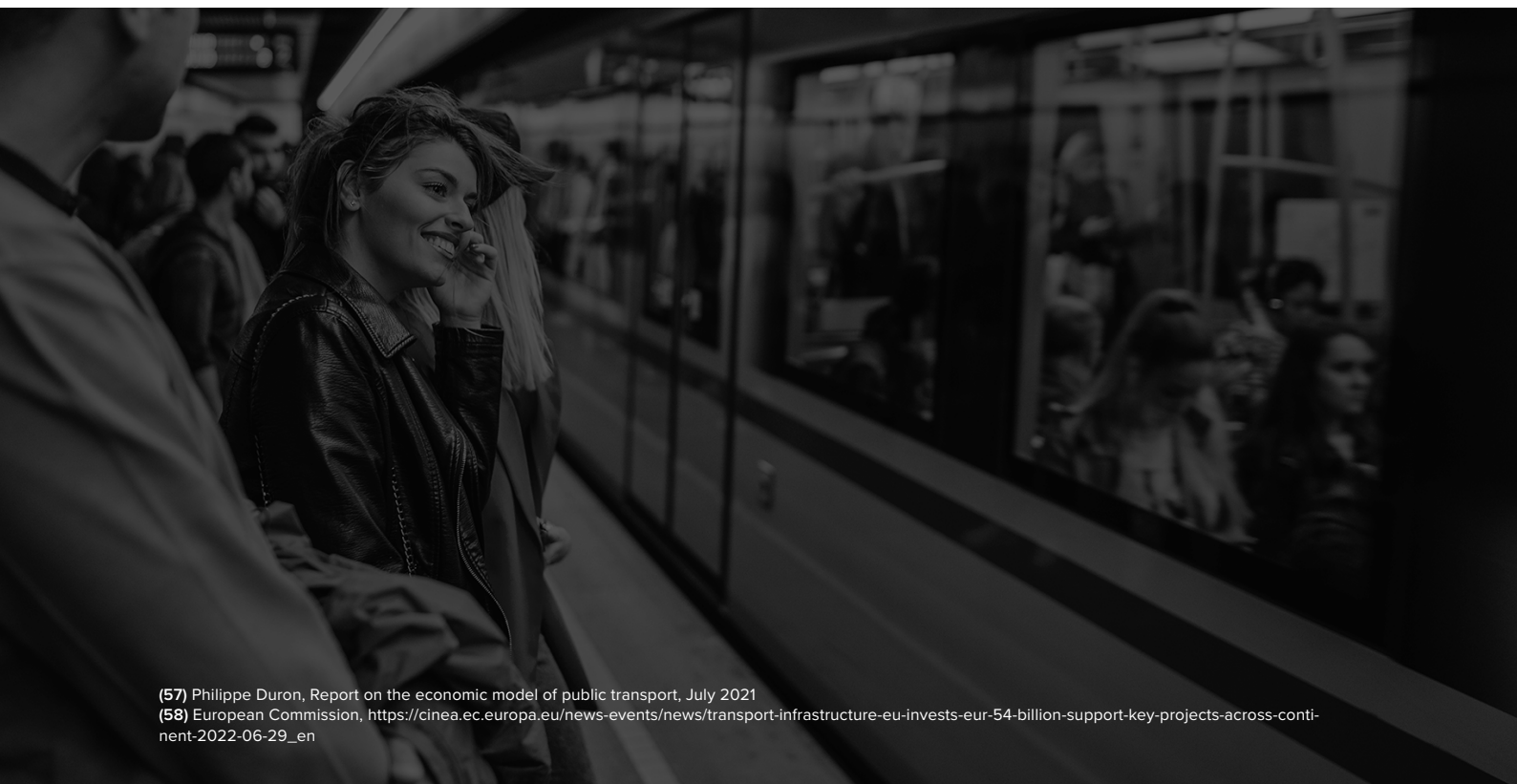
- *Existing funding to be maintained, and*
- *New funding to be created in the short term as well as the existing funds to be reinforced or changed mid-five-year period subject to their social acceptability.*

In the medium term (2024-2026), it will be necessary to establish green taxation on transport to disincentivise pri-

vate car travel, particularly of diesel and petrol cars, and divert revenue towards incentivising public transport, making it more affordable and increasing the level of service. Many cities and countries in Europe are now seeking to introduce road user charging as a means to offset declining revenues from fossil fuels and to disincentivise the use of private cars in urban centres. Cities such as London have used road user charging as a means to reduce the number of private cars entering the city centre, while using the revenue generated to increase the frequency and quality of service of the bus and cycle networks, to make them a more enticing alternative. Similarly, London, Milan, and other cities in Europe have introduced more stringent access charges which focus on the emissions

of the vehicle (low emission zones, LEZ) rather than simply access. The purpose of these LEZ is two-fold, to reduce the emissions (GHG and PMs) in the locality, and to generate revenue for Public Transport and other public good initiatives. With the shift to the electrification of private cars, the associated revenue generated from fuel and taxes will diminish significantly, so alternative avenues need to be exploited, such as road user charging.

Under the Green New Deal and post-pandemic economic recovery activities, the EU has made billions of euros<sup>58</sup> available to Member States to support key transport infrastructure projects to create more sustainable, safe, green, smart and connected transport networks across the EU.



(57) Philippe Duron, Report on the economic model of public transport, July 2021

(58) European Commission, [https://cinea.ec.europa.eu/news-events/news/transport-infrastructure-eu-invests-eur-54-billion-support-key-projects-across-continent-2022-06-29\\_en](https://cinea.ec.europa.eu/news-events/news/transport-infrastructure-eu-invests-eur-54-billion-support-key-projects-across-continent-2022-06-29_en)

# IV. List of recommended measures

There are several public policy measures that governments and local authorities can implement to increase their shift from private cars and road freight to public transport and rail freight to enable them to realise their climate ambitions and obligations in the short and medium term. These measures are broken into:

- Governance measures and common measures for all transport modes,
- Railway measures, and
- Urban measures.



## A. Governance measures and common measures for all transport modes

**Measure #1.** Implementing a grant for the purchase of electric buses or extending the use of energy-saving certificates will promote the replacement of the vehicle fleet to a higher euro classification.

**Measure #2.** In the interim before fleet conversion and to avoid any temporary drops in the Public Transport offering, it is necessary to protect the accessibility of the Public Transport offering against price increases of energy. This can be achieved with a shield on tariffs by reducing taxes related to electricity and natural gas.

**Measure #3.** Reducing VAT<sup>59</sup> for public transport: follow the lead of other OECD countries (the United Kingdom at 0%, Luxembourg at 3%, rate of essential services applied in Germany, Sweden, Portugal, and Norway<sup>60</sup>), recognising daily transport as an essential service by reducing or removing the VAT.

**Measure #4.** Financially supporting network accessibility: the EU has introduced a series of policies to benefit those with disabilities and improve their access to mobility, such as Regulation 1300/2014<sup>61</sup> and the Accessibility Act (Regulation 291/2019). Despite updates since then, 30 million French people<sup>62</sup> find themselves in a fragile situation in

(59) Philippe DURON, Report on the economic model of public transport, July 2021

(60) Senate, Social Affairs Committee, Purchasing Power Bill, July 25, 2022

(61) Technical Specifications on the Interoperability of the Union's Railway System for Persons with Disabilities (TSI-PRM)

(62) According to Observatoire Keoscopie, KEOSCOPIE, AN OBSERVATORY TO IMAGINE THE MOBILITY OF TOMORROW, 5 lessons to be learned from our latest study to question ourselves, 2021

terms of mobility. This includes motor, sensory, and mental disabilities, but also difficulties in reading or understanding digital tools.

**Measure #5.** Providing the Organising Authorities of Urban Mobility with all necessary mobility-related scope (roads, police powers, parking with the transfer of responsibility and state ownership of infrastructures (Regional, Intermunicipal, Metropolitan). This measure will make it possible to design roads considering the prism of public transport, active mobility (cycling, walking), shared mobility (carpooling, car sharing) and solidarity (mobility platform, solidarity garage) as the leader in urban planning.

**Measure #6.** Providing an implementation margin to Urban Mobility Organising Authorities and local authorities. Circular no. 2001-51 of July 10, 2001, relating to State aid for the implementation of urban transport plans and Public Transport in the provinces has enabled the development of urban transport networks.

**Measure #7.** Supporting the deployment of a common ticketing standard as part of a national scheme for ticket interoperability on all transport networks.

**Measure #8.** Limiting the use of private cars and road freight when a greener/public transport solution exists. The flagship measures are coded in different schemes (Eurovignette scheme, congestion charging, toll points, etc. in dense areas subject to freight and car traffic) or are being implemented at a European level (inclusion of transport in the emissions quota market by 2026). To influence usage and garner public support, these measures must take social realities into account as well as existing public and rail alternatives<sup>63</sup>. Otherwise, they would become “an umpteenth tax without any real ecological impact”<sup>64</sup>.

(63) Pour l'analyse des mesures potentielles : Pour le climat : une taxe juste, pas juste une taxe (For the analysis of potential measures: For the climate: a fair tax, not just a tax), Dominique Bureau, Fanny Henriot and Katheline Schubert, note 50 from CAE, March 2019 ; Les effets de la fiscalité écologique sur le pouvoir d'achat des ménages : simulation de plusieurs scénarios de redistribution (The effects of ecological taxation on household purchasing power: simulation of several redistribution scenarios), Thomas Douenne, focus CAE, march 2019.

(64) Olivier Blanchard, Jean Tirole, Rapport de la Commission internationale, Les grands défis économiques, (Report of the International Commission, The major economic challenges, June 2021



## B. Railway measures

**Measure #9.** Creating additional capacity on the current transport infrastructure: Renovating existing infrastructure, setting up new signalling equipment, centralising controls, relieving rail bottlenecks, and upgrading the current vehicle stock. These measures could lead to a capacity increase of 20% to 35%<sup>65</sup>.

**Measure #10.** Creating additional capacity by introducing additional transport infrastructure: building new lines to serve more catchment areas and/or connecting activity hubs to provide those with more access to work/education/healthcare, etc.

**Measure #11.** Building new multimodal platforms for combined rail-road transport. Creating park-and-ride facilities outside of central areas will enable those who have less access to public transport to travel to hubs by car/bicycle, which should remove the need to drive into the central areas.

**Measure #12.** Establishing rail access in the creation or modernisation of any new logistics or industrial zone. This measure would mandate the presence of a branched terminal installation

in logistics or industrial zones under construction or development.

## C. Urban measures

**Measure #13.** Building an ambitious Bus Plan to increase the commercial speed<sup>66</sup> of buses (attractiveness and productivity factor) through the creation of high-level service Bus lines (Bus Rapid Transit), the development of dedicated lanes (Quality Bus Corridors), the deployment of intersection priorities (using automatic vehicle location and traffic management software), the creation of exchange hubs, the connection with peri-urban and rural mobility, and urban logistics.

According to London's AOM TfL, “1% more commercial speed generates 1% more attendance”<sup>67</sup>. Acting on the commercial speed of buses requires access to Public Transport roads or soft modes and limiting the number of parking spaces in public spaces.

This measure must be coordinated with the need for bus electrification.

(65) Sia Partners, Study of feedback from operators of rail driving automation solutions (DAS, CDAS, CBTC), September 2019

(66) The theme of the speed of these components is perfectly documented in the thesis of Aurélien Bigo, Institut polytechnique de Paris, as part of the Doctoral School of the Institut polytechnique de Paris, Thesis Transports facing the challenge of energy transition. Explorations between past and future, technology and sobriety, acceleration and slowdown, November 2020.

(67) Testimony of Tom Cunnington (Commercial Director of TfL) collected by Stéphane Bonnaud (Development Director of Groupement Lacroix-Savac), 2022

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