

CHARGING FOR HIGH CAPACITY ROADS

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EXECUTIVE SUMMARY

Road is currently the main mode of transport for both passenger and freight in the EU. In advancing towards a Single European Transport Area, the EU needs¹ to establish a coherent and standardised road charging model for EU Member States. A harmonised system, based on the user pays and polluter pays principles, will help creating the necessary price signals for an efficient and sustainable use of road infrastructure in Europe.

There is no such thing as a “free” road. The costs of road transport are multiple: construction, maintenance, congestion, pollution. These costs could be internalized either by the taxpayer or by the user. Current charging systems in EU countries use very different schemes and do not cover all costs. At a time where infrastructure investment is a must in order to boost the European economy and advance towards a real Single Market, optimising the use of infrastructure calls for a common approach. The private sector can contribute to the investment required, and road charging can be a useful means to transfer the demand risk associated with infrastructure projects. In the current context of heavy budgetary constraints, the European Commission priorities clearly underline these needs.

Tolling schemes are an excellent and efficient way to generate resources for funding infrastructure. Many countries throughout the world are increasingly using this system to fund road infrastructure. Not only they help liberating public resources from road maintenance, but they have proven experience in managing externalities through differentiated charging, allowing for the right price signals to manage demand and internalise costs. Toll roads can reduce significantly congestion,

and are also safer, and its traffic have less environmental impact than on other roads. Moreover, there are clear positive effects on competitiveness, not only by providing better transport conditions and improving accessibility throughout the EU territory, but also by establishing a coherent system where consumers are priced according to the use of the European network. Such system would also help putting in place Intelligent Transport Systems ITS and integrating technologies that will ultimately make road transport more efficient, safer and competitive.

The Eurovignette Directive has proven a much welcome first step. However, it needs to be revised² to introduce compulsory charging throughout the EU transport network, to achieve better financing for construction of new infrastructure and maintenance, and internalise external costs. Currently, road charging is applied through a variety of instruments: vehicle and fuel taxes, vignettes, tolls, etc. The case of Spain is specially telling: the Eurovignette is not applied and less than a quarter of the high capacity network is tolled, resulting in costs not being recovered and a heavy burden on public finances, leaving little space for the needed investments.

A compulsory EU harmonised modular toll system based on distance travelled and applied to all vehicles would prove the best system to achieve various needed objectives: a real single European transport space, the internalization of all road transport costs, the advancement towards a real EETS and free enough public resources for social needs. Moreover, it would give a much needed push for growth, jobs and a more efficient and competitive European economy.

INTRODUCTION

Road is, and will still be for many years, the main transport mode for both passenger and freight transport in the EU (chart 1). This alone should make it an investment priority. But as this paper will argue, additional investment will be needed to make road transport infrastructure more efficient, smarter and sustainable. Therefore, road charging emerges as the optimal solution to fund investment, to internalise negative externalities and to promote a more competitive Europe.

This paper will visit the different aspects of road charging to advocate the adoption of clear guidelines to implement the user pays and the polluter pays principle in the EU motorway network. It concludes that distance based tolling is the best system to both fund infrastructure and regulate transit, making the EU economy more competitive. No other road charging system generates as many public resources for investment in infrastructure and creates better incentives to maximise social benefit. This paper is based on research and academic literature, and on the experience of EU Member States, international organisations and toll road operators.

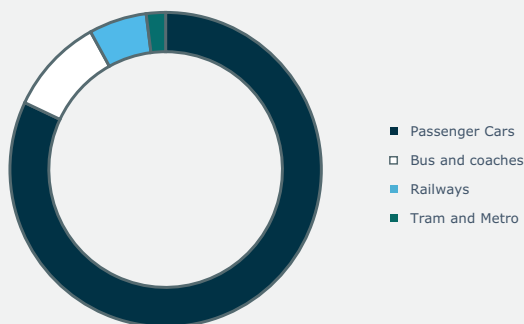


Additional investment will be needed to make road transport infrastructure more efficient, smarter and sustainable

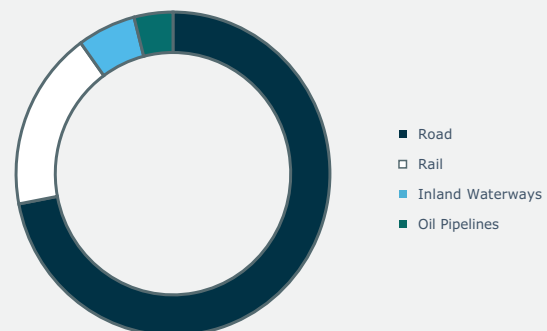


CHART 1. MODAL SPLIT FOR ALL EU COUNTRIES

Modal split of passenger transport on land (%) - 2011



Modal split of freight transport on land (%) - 2012



SOURCE: DG MOVE

THE COSTS OF ROAD TRANSPORT IN EUROPE



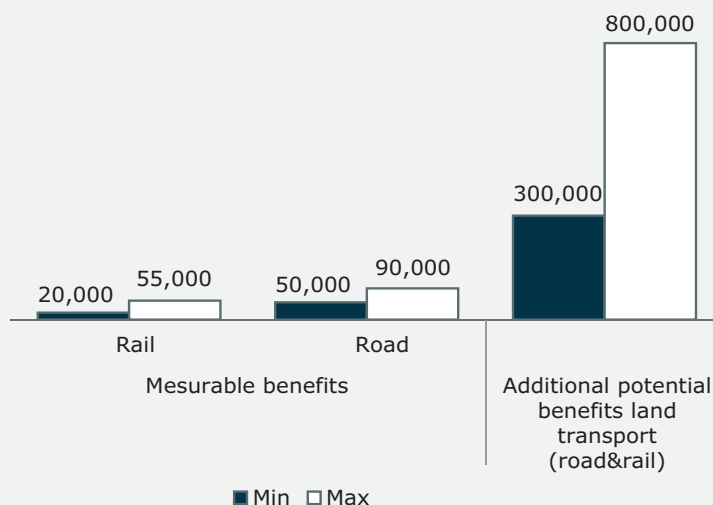
The Cost of Non Europe Report defends that the lack of harmonisation in the type of charges levied should be addressed at the EU level



As the Cost of Non Europe Report³ shows, closing the gap in road transport could bring about many benefits for the EU economy (chart 2.1). According to the report the variety of road charging arrangements in Eu-

rope results in users receiving neither consistent price signals nor incentives to a more sustainable use of the infrastructure across the EU. It also claims that vignette schemes do not provide incentives for minimising distance travelled, and tolls that differentiate by vehicle-type but not by infrastructure-use fail to reduce congestion. The same paper states that congestion costs in the EU are estimated to be in the order of €100 billion per year, close to 1% of EU GDP. Moreover it defends that the lack of harmonisation in the type of charges levied should be addressed at the EU level, allowing progress towards pricing schemes that best address the “user pay” and “congestion/polluter pay” principles, in order to make free movement of goods and passengers easier.

CHART 2.1 SUMMARY OF EXPECTED SAVINGS BY ADDRESSING EXISTING GAPS IN THE EU LAND TRANSPORT (NPV 2015-2035 - € MILL)

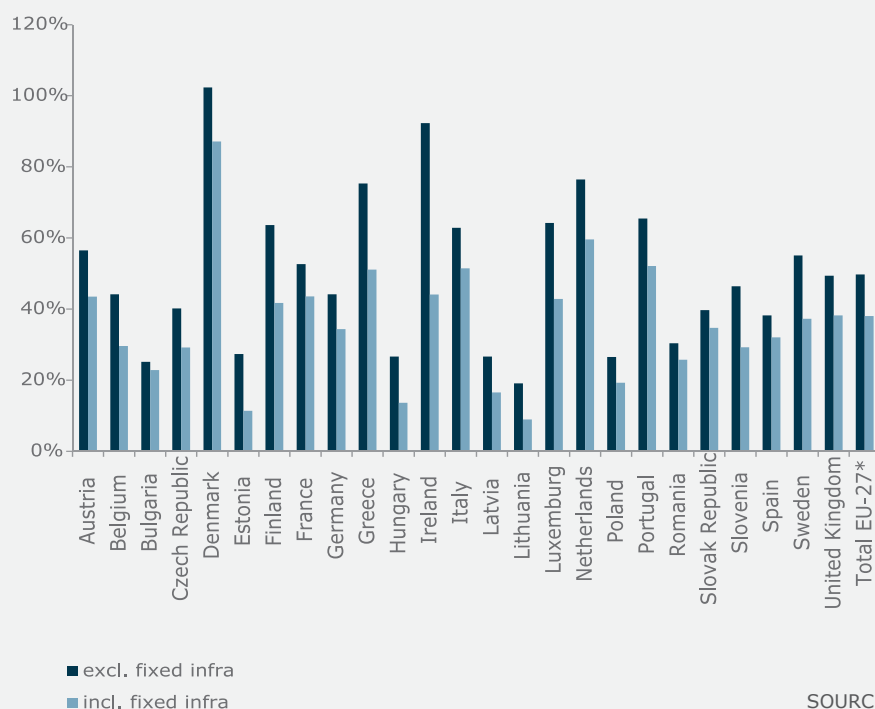


SOURCE: DG PARLAMENTARY RESEARCH SERVICES

The cost of having a network of high capacity roads is also examined in other studies (see appendix references i.e. 13,19,23,24). They examine not only the construction cost, which by itself is very large, but also the need for maintenance, which grows over time up three or four times the cost of construction, as well as the associated external costs such as congestion, pollution, etc.

A general overview⁴ of cost coverage ratios of transport infrastructure was provided in a study that considers total revenues deriving from all road transport related taxes and charges (i.e. registration taxes, ownership taxes, infrastructure charges, insurance taxes and fuel taxes) and total external costs (i.e. accident, air pollution, climate change, emissions from fuel production, biodiversity

CHART 2.2 INDICATIVE COST COVERAGE RATIOS FOR ROAD TRANSPORT



SOURCE: RICARDO-AEA

losses, nature and landscape, soil and water pollution, urban effects). The attached chart shows an indicative ratio for cost coverage in road transport infrastructure, including external costs in EU countries. It is clear that cost recovery is far from being achieved: only Denmark covers for 100% of the costs, while most EU countries do not even reach the 50% benchmark.

EU transport policy is aiming to achieve consistent competition conditions amongst the various modes of transport making sure each of them assumes its related costs. In

this regard the EU is in favour of a pay-per-use infrastructure model whereby users assume all externalities produced by road transport.

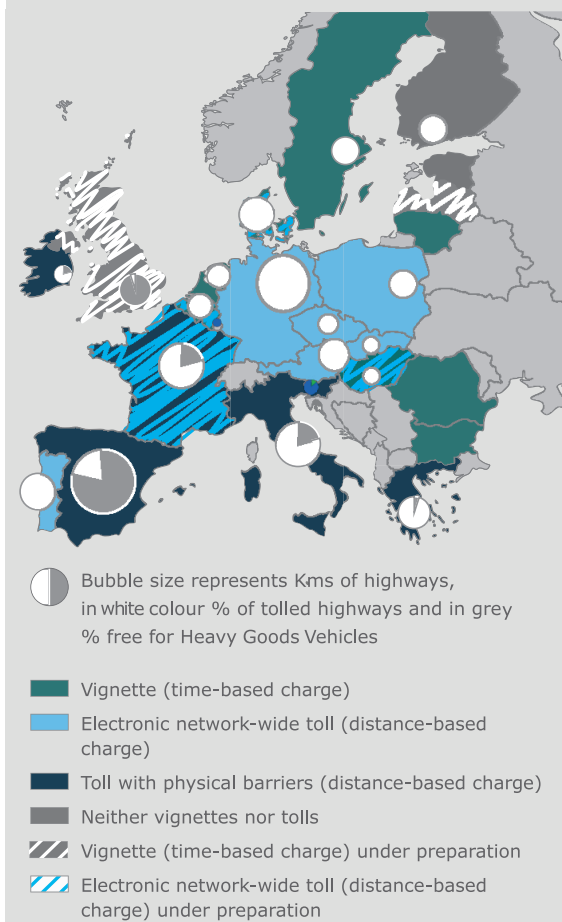
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The Commission and the European Parliament have stated that a road pricing system should be introduced in order to improve the transport system and contribute to the needed funding of infrastructure. In its 2015 priorities⁵ to deliver jobs, growth and investment, the EC “highlights the importance of optimising the use of infrastructure along the corridors, notably through intelligent transport systems, efficient management and the promotion of future-oriented clean transport solutions”⁶. Previously, the 2014 New EU transport infrastructure policy⁷ recognised the need to put in place a powerful European transport network across the 28 member States to promote growth and competitiveness, which

is a necessary instrument of the Roadmap to a single European transport area defined in the European Commission 2011 White Paper on Transport.⁸

One of the most important legislation pieces on this subject is the so called Eurovignette Directive. Measures of this kind aim to avoid an inefficient transport system by standardizing all competition conditions amongst the various transport modes through taxes. Directives such as the Eurovignette and the EETS go in the right direction, but have been implemented in very different ways across EU countries, with variations going from the type of vehicles included to the systems applied by toll operators. A report⁹ evaluating the degree of implementation of the Eurovignette Directive concludes that, despite the apparent fragmented nature of road user charging in Europe (Chart 2.3), significant progress has been made since 1995. The study also highlights that Member States have earmarked revenues for transport, even though there is no established methodology to relate charges to costs, and charges are frequently set by political decisions. The study also recommends the shift from vignettes to electronic distance-based tolls, to ensure better recovery of infrastructure costs, as well as to improve consistency and compatibility of pricing systems across Europe. In the context of its work programme beyond 2015, the Commission is assessing whether revised measures on road charging should be proposed¹⁰.

CHART 2.3.
MAP OF PAY PER USE IMPLEMENTATION FOR HEAVY GOODS VEHICLES IN THE EU



SOURCE: OWN ELABORATION
(WITH DGMOVE AND INECO DATA)

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Directives such as the Eurovignette and the EETS go in the right direction, but have been implemented in very different ways across EU countries
”

THE ADVANTAGES OF TOLL ROADS

This paper strongly recommends harmonizing road charging for all types of vehicles throughout the EU, and promoting private investment for growth. Private toll operators should play a key role in this competitive environment. Toll road concessions offer a model where the risk distribution is clear, and principles of reasonable profit and efficiency are respected through compliance with EU directives¹¹. Many governments worldwide

have already turned to the private sector to implement and run tolling schemes. Main reasons for awarding concessions lie in the lack of public funding; the internalisation of external costs; better risk distribution between the public and the private sector; the ability by concessionaires to master technical innovations; the possibility of delivering cross-border services to road users; and others.

FUNDING INFRASTRUCTURE AND GENERATING PUBLIC SAVINGS

The traditional objective of road user charges is to finance the construction and/or maintenance of road infrastructure. Worldwide a majority of the tolling systems on interurban motorways seek to cover the financial costs of concession contracts signed with operators to build and maintain a motorway.

Tolling has a superior potential for generating income for infrastructure financing, and it is being implemented in High Capacity Roads worldwide, the number of which is globally growing. In the US, there have been many examples of construction of toll roads in Virginia, California, Texas, and others since 2000. In Japan, several toll highways have

been constructed since 2009, in order to complement a 9.000 km tolled network. In Quebec, the new A25 highway between Laval and Montreal will be tolled. Australia has been a very successful country promoting new construction thanks to privatisations¹² of highways. New Zealand also opened in 2009 its first toll highway, the Northern Gateway Toll Road. In Mexico, several highways were concessioned in the past years. It is also worth noting that several developing countries choose to charge for their infrastructures too, including for roads already built. In Morocco, new highways were opened, like the Tanger-Port Tanger Med and the Marrakech bypass, contributing to extend one of the main toll networks in Africa. Mali, for instance, has chosen to introduce a kilometric toll that will vary depending on the type of all motor vehicles that use the country's paved network. Financial backers, especially from the European Union, are strongly involved in its implementation, and in some cases they have made tolling one of the requirements to continue financing projects.

In the EU there are many known examples of countries with a long tradition in tolling, such as France, Italy and Spain. As the EU



Tolling has a superior potential for generating income for infrastructure financing, and it is being implemented in High Capacity Roads worldwide



is funding and financing transport infrastructure, private sector participation becomes more necessary. In 2010, €23 billion of tolls were collected in Europe. On average, 48% of Europe's 60.000 km motorways are tolled. This percentage, however, covers very different realities. Some countries have a long-standing tolling tradition, whereas others have only few toll roads. In Italy, for instance, 85% of motorways are tolled, but only 1.5% of them in the UK. This shows a lack of homogeneity that hinders EU mobility objectives. However, this must be seen as an opportunity for public budgets; tolling 20% of the currently un-tolled highways would roughly yield between €4.9 in tolls and more than €20 billions in the long term from the maintenance that will be funded by private operators through the toll road incomes.

In the case of Spain (detailed in the last section of this document), the income generation opportunity of applying a toll system in the whole network is very high. An academic study¹³ shows how the privatization of the network for 30 years could amount to €100bn, counting the income and the public savings generated by this measure. At this time of fiscal consolidation it seems wrong not to foster an infrastructure funding mechanism which would guarantee needed investments to preserve and develop the high capacity road network whilst at the same time freeing up much-needed public resources to meet other social needs.



At this time of fiscal consolidation it seems wrong not to foster an infrastructure funding mechanism which would guarantee needed investments



INTERNALIZATION OF EXTERNAL COSTS

“Transport externalities refer to a situation in which a transport user either does not pay for the full costs (e.g. including environmental, congestion or accident costs) of his/her transport activity or does not receive the full benefits from it”¹⁴. The internalisation of external costs means making such effects part of the decision process of transport users. According to economic welfare theory, internalisation of external costs through the use of market-based instruments may lead to a more efficient use of infrastructure, reduce the negative side effects of transport activity and improve fairness between transport users and tax payers. Costs included are wear and tear for the use of infrastructure, congestion, accident and environmental.

Fair and efficient transport pricing has also been advocated in a number of policy documents issued by the EC, notably the 2011 White Paper on Transport. A substantial number of research projects, some funded by the European Commission, suggest that implementing market-based instruments such as toll-roads could yield considerable benefits. In the European Conference of Ministers of Transport (ECMT, 2003) work was undertaken to model and appraise the impacts of optimal prices for transport infrastructure. The results presented in the ECMT 2003 suggested that, taking together Britain, France and Germany, net welfare gains to society are in excess of €100bn per year.

Toll concessionaires are experienced in managing several of the externalities. Pricing variables that can be considered in toll systems include congestion (improving travel time and travel reliability). For instance, some French motorways raise or lower the toll rates on sections leading to Paris with differentiated peak and off-peak-hour's rates. There are also examples of toll-roads promoting modal shift; for instance, some tolls in Barcelona have financed car parks to access public transport. A policy to deter trips was implemented in the Barcelona metropolitan area by promoting discounts for High Occupancy Vehicles with more than 2 passengers in the car. Another way of promoting car sharing in the motorways has been the creation of reserved car parks for drivers sharing cars in the "last mile" into Paris.



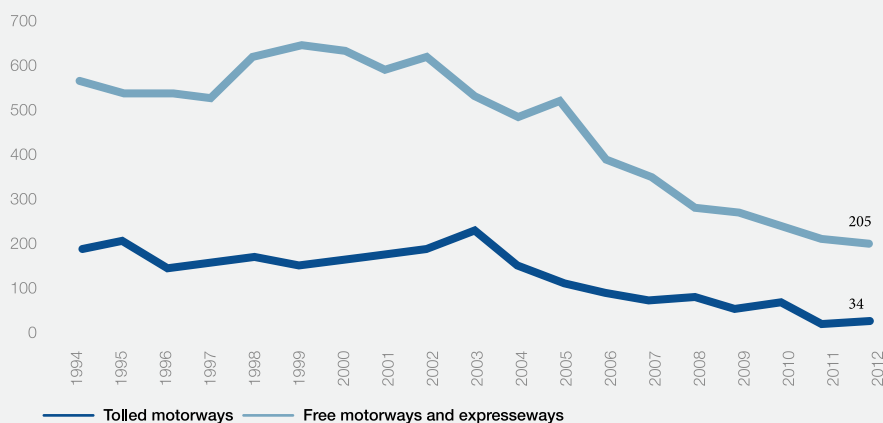
According to economic welfare theory, internalisation of external costs through the use of market-based instruments may lead to a more efficient use of infrastructure



Demand management for road use is an issue that is gaining importance. Pricing is seen as an efficient instrument for managing demand. Even from a political point of view, pricing has become more and more attractive. While tolling of motorway networks has a long tradition for financial purposes, the use of differentiated pricing is increasingly seen as an effective way of managing traffic. Measures used are pricing of urban areas and single lanes on motorways in urban agglomerations, the modulation of toll rates by time of day or depending on vehicle's emissions. The experiences in London, Stockholm, Singapore, and others, are mostly presented as successful.

Tolls can also be easily used to price vehicle's pollution levels. There are many examples of differentiated tariffs, with toll discounts for low emission vehicles. The Heavy Vehicle Fee is a successful example of road charging¹⁵, having certainly had a positive effect in modernising fleets. Noise externalities can be treated in a similarly, though its benefits are more difficult to measure as agents are less sensitive to its variations. Negative impacts on landscape can also be mitigated with better maintenance and more funding for infrastructure, with generally better standards in toll roads. Moreover, traffic on motorways have lower marginal

CHART 3.1. EVOLUTION OF TRAFFIC ACCIDENTS FATALITIES IN THE SPANISH ROAD NETWORK ACCORDING TO THE TYPE OF ROAD (1994 - 2012)



Source: Anuario Estadístico 2012 Ministerio de Fomento

SOURCE: ASECAP

costs of externalities than other types of roads¹⁶.

The impact of pricing on road safety has been difficult to assess. However, it is proven that motorways are safer and getting safer than the rest of the road network. In the EU, between 2004 and 2013 the number of people killed on motorways decreased by 8% per year on average, compared to 6.5% on other roads¹⁷. Moreover, several studies show that in many countries toll motorways are often the safest roads of the high capacity network. In the US, tollroads are a 36%

safer than freeways according to an IBTTA study¹⁸. Another study¹⁹ by PWC confirms that safety is duly taken into account by the concessionaires in every stage of a motorway's life cycle, i.e. planning, construction and operating stage. For instance, this latter study analyses the Spanish case, where the reduction of fatalities in the State toll road network has been 82.4%, compared to 64.1% in the free motorway system (see Chart 3.1), and with a total dangerousness rate approximately half of that in free motorways.

THE IMPACT ON COMPETITION

The transport system is one of the cornerstones of EU competitiveness, social cohesion and sustainable development and a key factor in achieving free movement in the Single Market. Road transport projects improve the accessibility of a given area or region by reducing travel time or increasing the potential to travel. A better level of accessibility may increase the market size for manufacturing, tourism and/or labour activities, leading to increased competition. Time and cost savings allow the industry in a given region to improve its production and distribution activities to create new business opportunities and to increase internal competition, leading to further increases in profitability.

Road transport projects properly implemented improve the accessibility and mobility of those regions suffering from economic and social problems. In this sense, the introduction of specific pricing schemes influences vertical (by income group), horizontal (by interest group) and geographic (by area) distribution of costs and benefits. When implemented fairly through all the groups, tolls have the potential to be more accepted than other charging systems. This has been recognised by many differently positioned associations, such as the road users ERF²⁰ defending the pay-as-you-drive principle, or the environmentalist group T&E²¹ defending

the use-based pricing for roads.

The lack of harmonisation in infrastructure financing criteria across the EU, results in some EU consumers being charged twice, as they must contribute to funding their country's infrastructure in countries where costs are assumed by State budget, while also funding the infrastructure of other countries when paying tolls abroad. This would not happen if all Member States adopted a pay-per-use model.



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One of the arguments most frequently used against implementing pay-per-use schemes is the potential impact on the prices of transported goods and the consequent competitiveness loss. Various studies²² have evaluated the impact of implementing the Eurovignette on price indexes. The findings

point out to small one-time increases, depending on the size of the network on which charges are applied. Hence, competitiveness would not necessarily suffer, as it would

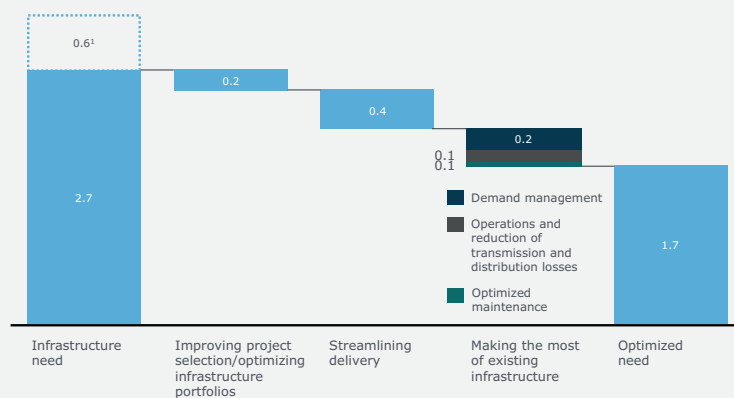
bring road transport legislation into line throughout Europe. And, it would entail road operators assuming externalities as per EU's standards.

ADAPTABILITY TO FUTURE NEEDS

Road networks should adjust to each country's specific characteristics and be sustainable over the long term. Many reports point out at the increasing investment gap²³ in infrastructures, and defend the need to count more on private participation not only in terms of funding, but also in managing

existing infrastructure²⁴. Ensuing productivity gains (see chart) could reduce the funding needed, for instance by extending the use of intelligent transport systems (ITS) as a way to double or triple the capacity use of existing assets, and at a fraction of the cost of adding the equivalent in physical capacity.

CHART 3.2. THE \$1 TRILLION-A-YEAR INFRASTRUCTURE PRODUCTIVITY OPPORTUNITY
GLOBAL INFRASTRUCTURE INVESTMENT NEED AND HOW IT COULD BE REDUCED
(YEARLY AVERAGE, 2013-30. \$TRILLION, CONSTANT 2010 DOLLARS)



SOURCE: MCKINSEY GLOBAL INSTITUTE

The evolution and convergence of different technologies (Electro Mobility, Smart Technologies, Big Data, Shared Economy, Connected Car, Autonomous Driving, etc.) is bound to have a big impact on the infrastructure and transport sectors. It is expected that technology will make all private vehicles more energy efficient in the not so distant future (see chart). The reduction of fuel consumption is welcome news in terms of pollution, but it may have an impact on infrastructure financing through reductions in tax collection. Tolls will become more appealing as a funding source, as these trends get

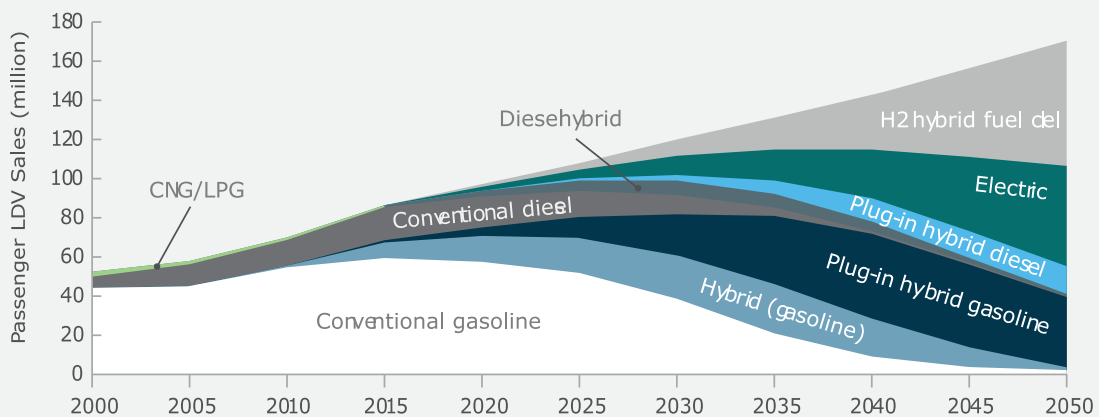
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consolidated in accordance with the Commission's decarbonisation goals for 2050 in the transport sector. Technologies used for charging systems across Europe should also be standardized to make them interoperable²⁵. The European Commission is actively working on this process.

Trends also point to an increase in GHG emissions derived from transport infrastructure, and, vehicle manufacturing and disposal. Currently, GHG emissions from road infrastructure are not negligible but far from being the main contributor to the road transport system total. Studies²⁶ show that emissions related to road construction, maintenance, operation and end-of-life vary a lot.

From just a few percentage points to 15% of total road lifecycle GHG emissions, but it can climb up significantly according to some sources. For instance, academic studies²⁷ claim that depending on the mode of transport it could represent an additional 63% for roads, 155% for rail, and 31% for air systems over vehicle tailpipe operation. Overall, it seems likely that the indirect GHG emissions associated with transport infrastructure will become increasingly important and more significant, as direct GHG emissions from vehicles decrease. In these scenarios, the use of tolls to ensure a more efficient and sustainable use of the existing infrastructure appears to be even more necessary.

CHART 3.3. ANNUAL LIGHT-DUTY VEHICLE SALES, BLUE MAP SCENARIO, 2000-2050



SOURCE: INTERNATIONAL ENERGY AGENCY

AN OVERVIEW OF ROAD CHARGING SYSTEMS

Policy instruments should be evaluated taking into account the problem to be solved and the objective pursued. Road charging systems can be used to change behaviour, improve the environmental situation, reduce congestion, or simply create additional revenue for better maintenance or extension of the infrastructure network. They can be modulated geographically. Charging can be implemented in an urban area or on the interurban network. It can be applied to single infrastructures or a wider network of

roads. Finally, charges can be set as an entrance fee or applied depending on distance or time, for all users or only certain types of vehicles (e.g. heavy vehicles). All these aspects have also to be looked at taking into account the technical systems available and the operating costs. Here is an overview of the most common pricing schemes for road transport, defined by PIARC²⁸.



VEHICLE TAXES/INSURANCE:

Vehicle registration provides a means of identifying vehicles, confirming ownership, ensuring third party insurance is paid and enforcing traffic and roadworthiness regulations. As an annual fixed fee, vehicle taxes are not directly related to use. But depending on their specification (as a function of size and/or pollution level) they will indirectly influence an efficient and environmentally friendly use of the infrastructure.



FUEL TAXES:

The most usually applied charge consists of a flat rate excise tax on every litre of fuel consumed. The cost of their collection is therefore very low. The rate of the tax applied may vary between fuel types but does not normally vary for different types of vehicles (in a few countries exemptions are given e.g. for exclusive agricultural use). Fuel taxes do not reflect the difference in the level of road damage caused by heavier axle loads, or the difference in emissions caused by older cars. The trend towards more fuel efficient cars means also that less funding will come from this tax. Fuel tax is incapable of reflecting the different costs caused by use of the road network at congested time periods. But the level of fuel tax might influence car owners to drive less or use vehicles with less fuel consumption. In this respect the fuel tax can be seen as an instrument for environmental regulation. If in a small country the fuel price is too high, road users might avoid buy petrol there, make the refills abroad and thus not pay for infrastructure use in the home country but in the neighbouring one.



VIGNETTES:

The sticker system represents a user charge that provides those who pay/buy the vignette with the right to use selected roads or a whole network for a given period of time. The vignette however is not use related, and frequent users will obtain more travel for a given fee than occasional users on the same roads or road network do. In spite of this many countries, primarily in Europe, use vignette systems. This pricing system is simple to manage but commonly criticized for its rigidity and incapacity to regulate traffic and, more generally, the demand for road transport, as it is a non-incentive system in terms of controlling the number of journeys. It also brings less funding for the public coffers, as it cannot differentiate for the amount of kilometres driven by the vignette holder, hence the level of tax cannot be too high. Moreover, the application of vignette systems show the disproportionate pricing of short-term vignette products, as foreign users are more likely to buy these products it can be considered a form of discrimination.



TOLLS:

Generally they are a form of charging that approaches the real price for travel. In most instances the toll paid reflects the class of vehicle being used for the journey and it can also be varied by the time of day, the cost of expensive infrastructure elements (viaducts, tunnels), environmental sensitivity of areas, the emission class of the vehicle or the level of congestion. In countries that practice concession, the principle for calculating tolling levels remains the one by which infrastructures' construction, and/or maintenance, and/or operation costs, as well as the capital invested by the concessionaire are recovered and remunerated in such a way that pricing enables to recover all or part of the expenses on the infrastructure.



In most instances the toll paid reflects the class of vehicle being used for the journey and it can also be varied by the time of day, the cost of expensive infrastructure elements (viaducts, tunnels), environmental sensitivity of areas, the emission class of the vehicle or the level of congestion



THE EUROVIGNETTE DIRECTIVE²⁹

Over the last few years, the European Commission has issued a series of Directives aimed at pricing the negative impacts of road transport (e.g., damages, congestion, pollution, etc.). The goal was to ensure that transport costs - direct as well as indirect - are properly accounted for before users choose to travel by car, bus, rail, boat or plane. To that end, the Eurovignette Directive tried to incentivise Member States to implement charging schemes that take into account these externalities for heavy goods vehicles (HGV). At the onset, only certain externalities were priced (such as the damages caused by heavy loads). More externalities were then progressively added to the "tolling list". The latest additions included noise and traffic congestion.

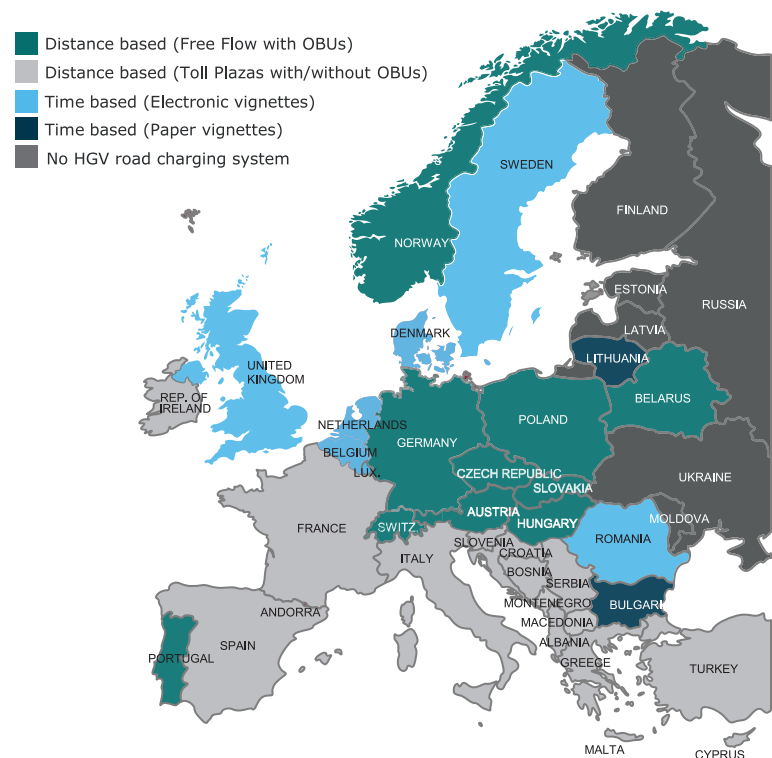
The aim was to improve the efficiency and reduce the environmental impact of road freight transport. To this end, the Directive establishes a general framework that enables member states to calculate and modulate the pricing scheme for infrastructure charging so that all external costs are internalised.

The Eurovignette Directive envisages the possibility of implementing tolling systems for HGV as a first step, with the idea to later extend it to the rest of the vehicle fleet. Subsequent EU documents have set out the lines of action with regard to charging, with European legislation in this respect continuing to evolve. Directive 2011/76/UE includes a number of amendments to the Eurovignette directive. The new text contains several significant changes, mainly in relation to environmental costs. These include the possibility of incorporating environmental and noise pollution costs. Another significant

modification relates to the use of toll revenue, envisaging the possibility to earmark funds collected for financing a range of other initiatives directed to transport competitiveness and new infrastructure.

Member States had two years to transpose the Directive into their national legislation. Although the decision whether or not to charge for infrastructure use lies with the national governments, the Directive provides guidelines to guarantee the proper functioning of the common market. In accordance with these guidelines, several Member States, such as Austria and Germany, have applied a modifiable pricing system. Other countries are expected to implement it in the near future. The current situation in road payment systems for HGVs is summarised in the following graph:

CHART 5. ROAD USER CHARGING FOR TRUCKS (HGVs) IN 2015



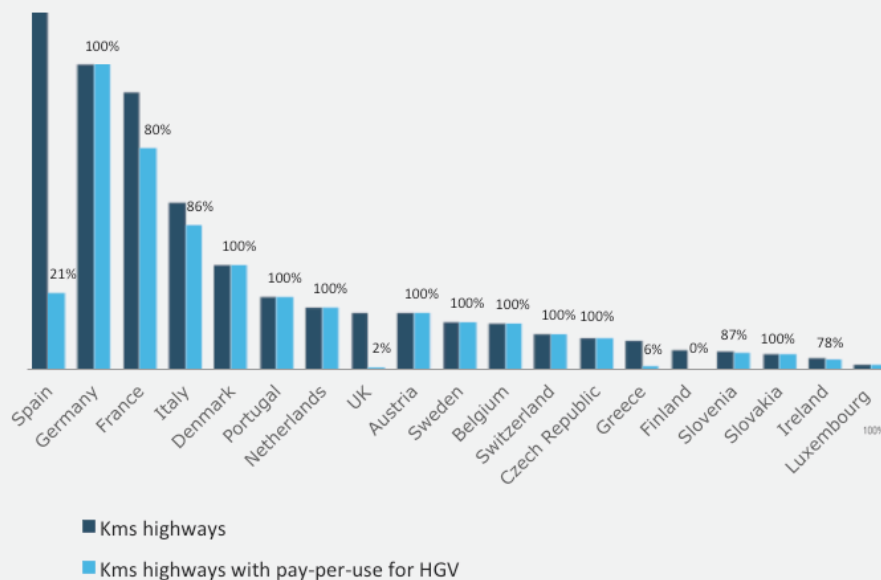
SOURCE: OWN ELABORATION
(WITH DGMOVE DATA)

ROAD CHARGING SITUATION IN SPAIN

In Spain, the road network under concession is less than a ¼ of the national high capacity road network (see chart below). This is an anomaly compared to other EU countries, as countries tend to choose on charging or not homogeneously within their borders. Even though Spain has the highest number of high capacity roads, only a small portion of

the network is tolled. For historical reasons, the tolled network is distributed unevenly, creating regional/social conflicts. This two-tier situation is increasing with the construction of new free highways often running in parallel to toll roads.

CHART 6.1 HIGHWAY NETWORK IN EUROPE



SOURCE: INECO

Despite EU's regulatory framework, public authorities³⁰ in Spain have repeatedly stated that the Eurovignette Directive would not be applied. Despite transposing the Directive in 2009, through a National Decree³¹ that established the criteria for determining tolls, it only applied to the highways already under concession included in the Trans-European Network, and did not envisage any extension of the pay-per-use principle. In 2014, at the request of the Ministry of Public Works, the Council of Ministers approved a Royal Decree³² which maintained the mandatory toll payment for freight transports over 3.5 tonnes only on toll roads, ratifying the intention not to apply a new tax or toll for the use of the State's road network. Regional governments (Catalonia and Basque Country) were stopped in their intentions to introduce the Eurovignette on part of their

road network in 2014.

The situation in Spain is becoming increasingly unsustainable, with public spending inevitably being cut to meet the public deficit reduction targets. Spain has one of the highest road maintenance budgets in the EU, given that most of its network is toll free and does not include maintenance arrangements. Over the coming years the State must spend €1.4bn a year on maintenance of the toll-free network, on top of shadow-tolls existing in several roads. Quality in Spain's road network will inevitably diminish in the medium term if maintenance expenditure continues to be cut. Several studies have noted the potential revenue that the government could obtain if a uniform pricing system was implemented in Spain:

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TYPE OF STUDY	ETSICCP thesis Barcelona	CEDEX Project	Notebook no. 4 of the Building and Infrastructure Finance	Economic Survey of the road infrastructure charging of Spain (TRANSyT)
DATE	2004	Novembre 2007	Updated 2010	2012
VEHICLES	> 12 Ton	> 3.5 Ton	> 3.5 Ton	All kind of vehicles
CRITERIA	Main road network (including tollroads)	High capacity roads and connecting roads	High capacity roads and connecting roads	High capacity roads and connecting roads (as in META study)
LENGTH (KMS)	11,406	29,604	14,700	29,604
TARIFF (€/KM)	0.08 and 0.12 €/km (two scenarios)	Average tariff = 0.10 €/km	Average tariff = 0.10 €/km	Average tariffs = 0.0313 €/km light vehicles and 0.0793 €/km heavy goods vehicles
ESTIMATED INCOME (M€)	1,239 (tariff 0.08 €/km) 1,859 (tariff 0.12 €/km)	3,300	2,700	4,400

SOURCE: OWN ELABORATION

The study presented in 2012 by Professor José Manuel Vassallo of the Polytechnic University of Madrid, estimates Eurovignette annual revenue at between €1.6bn (if only applied to heavy vehicles) and €4.4bn (if also applied to light vehicles). The same study assessed that around €14bn of non-budgetary resources could be generated from the concession (over a 30-year period) of certain segments and corridors of the high-capacity road network. It also evaluates at 100bn the accumulated potential savings in public spending on maintenance, resources that could be used to fund other needed policies.

Also the association of Spanish public works companies (SEOPAN) has made a proposal³³ to extend the payment to use the road network as a whole. Their 2015 report concludes that this would generate annual

incomes of 6 Billion €, while the initial investment would be of 627M€ and operating costs of 247M€ per year. This would provide sufficient resources to ensure proper maintenance of the existing network while managing demand and would rationalize the use of the infrastructure built.

Given the public budget restraints, a model which moves towards charging users to sustain the quality and safety of the road network, and frees resources for investing in boosting Spanish economic activity should be favoured. In designing future transport policy, the European Commission should consider making the pay per use and polluter pays principles compulsory throughout the EU, bringing coherence to the conditions in which European economic agents operate in an environment of heavy budgetary restrictions.

CONCLUSIONS

This paper shows how currently road charging is applied in the EU through a variety of instruments: vehicle and fuel taxes, vignettes, tolls, etc. As there is no such thing as a "free" road, costs have to be internalized either by the taxpayer or more fairly by the user, and tolls prove to be the most efficient way of achieving the latter.

In order to foster harmonization, the EU has established the Eurovignette as a framework for heavy goods vehicle charging to incentivize the internalization of costs by Member States. However, the system leaves Member States a large margin of discretion when transposing the Directive, resulting in a disparity of models throughout the EU. The case of Spain is specially significant: the Eurovignette is not applied and only 21% of the high capacity network is tolled, resulting in costs not being recovered and a heavy burden on public finances.

This paper shows how a compulsory EU harmonised modular toll system, based on distance travelled and applied to all vehicles would be the best possible system to achieve a number of key objectives namely: a real single European transport space, the internalization of all road transport costs, the advancement towards a real EETS and free enough public resources for social needs. It would eventually give a much needed boost for growth, jobs and a more efficient and competitive European economy.

In this context, the action item "Fair and efficient pricing for sustainable transport - revision of the Eurovignette Directive and framework to promote European electronic tolling" included in the Roadmap to the Energy Union Package³⁴ and due in 2016 represents a clear opportunity for the European Commission to foster greater levels of harmonisation across Member States by adopting a standard system of road charging related to the distance travelled, in application of the user-pays, polluter-pays principle.

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