CEDR

Conférence Européenne
des Directeurs des Routes

Conference of European
Directors of Roads

Funding formulas for roads: Inventory and assessment

March 2017

This report was drawn up by Task Group S4 “Optimising the financial resources available for roads”. The Group’s task was to identify the most adequate and appropriate scope for each of the available formula for road funding, in accordance with CEDR’s Strategic Plan 2013-2017. The output was an inventory of road funding formulas and their assessment, incorporating as well new and innovative approaches like “user pays principle” and “value capture”.

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Executive Summary

The road is a public property infrastructure asset whose main purpose is to provide a public service and contribute to the economic development of each state, while also benefiting the interrelation and development of Europe as a whole and its regions. In this sense, the road, as a general concept, generates benefits both to nations, road users and the inhabitants of the regions through which they transit.

Levels of investment are quite different among countries; the OECD estimated land-based transport investments in c. 1.0% of Gross Domestic Product (GDP) for 2011; and PIARC indicated an expenditure of 0.4% only for road maintenance in 2005.

From this basic premise, there are two main approaches for funding the construction and maintenance of our roads. One implies that governments and the general public should pay (through general taxation); and the other is that those who directly benefit from roads should pay.

This report includes a complete catalogue of the different funding formulas currently available for roads and an assessment on which ones are more suitable regarding certain criteria defined in the document.

The main categories described in the catalogue are the following:

- All Purpose Taxes
- Special Purpose Road User Taxes and Fines
- Road User Charges
- Development cost charges (value capture)
- Grant Funding
- Private Donations
- Hybrid funding mechanisms

With increasing and varied demands on national exchequer budgets, new ways of funding are required for the development of new road construction, and for the refurbishment and maintenance of the existing ones. This needs to be achieved in an equitable and transparent manner, whilst ensuring that our objectives are sustainable and to contribute to national and international goals (safety, transport efficiency, competitiveness, and economic growth).

Nevertheless, not every formula suits every situation (e.g. economic cycle or maturity of the road network). It is very important to adequately select which formula use in each situation, ensuring that legal framework allows its usage, and that this decision will be the most efficient one in terms of public budget and effectiveness for investing.

In conclusion, a balance needs to exist between the cost of road infrastructure, and society's (and the road user's) willingness to pay for its use. The wider benefits of the road network may need to be highlighted more strongly by road authorities in terms of greater safety, economic development and competitiveness, greater journey time savings and more efficiency.

1. Introduction

Roads are a crucial component of the nation´s infrastructure. It is unquestionable that their development and their operation and maintenance enhances the economy, improves productivity and generates employment. Society benefits from the nation´s roads, not only as direct users but also as consumers of shipped goods.

The OECD average investment levels in land-based transport were estimated to be about 1% of Gross Domestic Product (GDP) for 2011. Similar studies carried out by PIARC (Evaluation and Funding of Road Maintenance in PIARC Member Countries, 2005) would indicate a expenditure of about 0.4% of GDP on road maintenance alone. These are indicative of the levels of investment, which are required of governments in order to have adequate transport systems.

Inadequate infrastructure is a constraint on growth worldwide, particularly in developing countries but also in developed ones. In some countries, the level of infrastructure is often inadequate to meet demand, and the result is often congestion and lack of effectiveness. Infrastructure services are also frequently of low quality or reliability, while many areas are simply not served. This poor infrastructure supply and performance is both a problem and an opportunity for governments: first, most countries simply are not spending enough to provide the infrastructure needed to support the economy; secondly, poor planning and coordination, weak analysis underpinning project selection, competing political objectives, and other considerations, sometimes mean that limited resources are often spent on the wrong projects; finally, infrastructure assets are often poorly maintained, thereby increasing life cycle costs and reducing benefits.

The construction of this type of infrastructure requires high equity contributions, as they can be works of great magnitude, which require a high initial investment, as well as later reimbursements for the maintenance, and conservation of the road network.

The development and maintenance of an efficient road network requires a sufficient level of funding on an annual basis. This is a particular challenge in the current situation, when economic crisis and austerity in many European countries have severely constrained the availability of public funding. In addition, the development of all transport infrastructure, including roads, has become more challenging. There are more environmental concerns now, and the issue of sustainability has become more critical in the public and political domains.

Nevertheless, financial constraints and smaller government budgets are important factors that can hinder the completion of road investment programmes, as Governments may not be able to afford the whole investment.

In addition, road maintenance is a very important issue to be faced in order to maintain these assets in a satisfactory condition and continue to meet performance objectives. Therefore, some rationalisation of the existing funding formulas is needed; and also new methods of funding are also required to meet these goals.

There is certain confusion between Funding and Financing. Mainly, it happens in countries where the same word is used to referring to both terms, as in Spanish, German or Italian speaking countries, but Funding and Financing are different terms.

According to World Road Association (PIARC), “Funding refers to how the road is finally paid for, while financing refers to how to raise funds to pay for an infrastructure. Thus, funding answers to the question “where the money for the concession ultimately comes from” and financing answers to “where investment (or other cash necessities) comes from”.

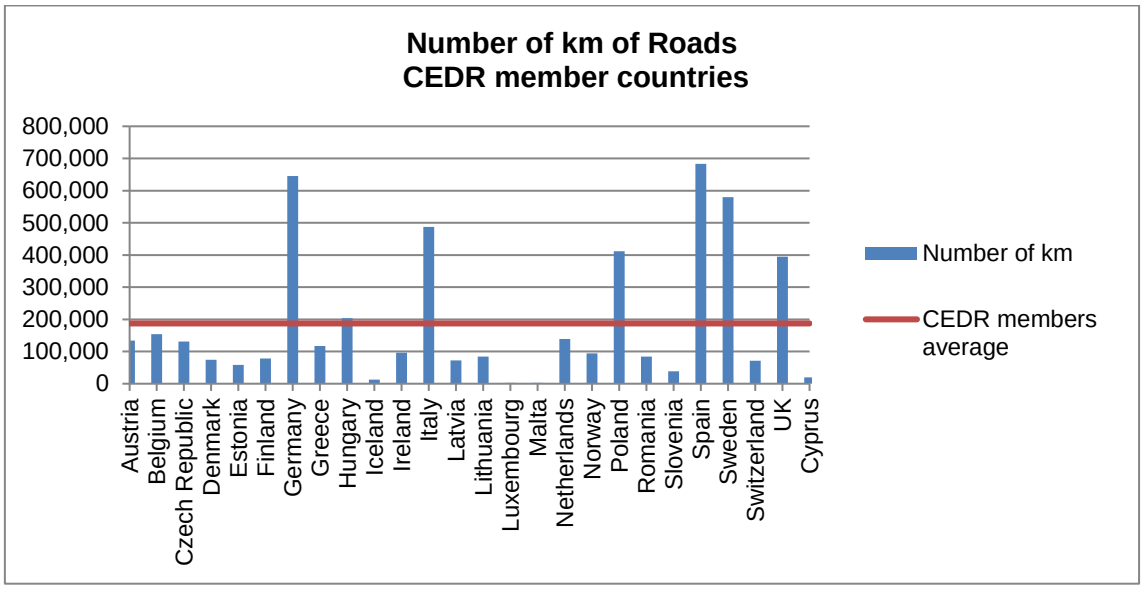
The economic characteristics and detailed design of the payment mechanism are central to the achievement of value for money. A payment mechanism may appear robust or even rigid - but if the rectification times are overly permissive, or the services are poorly defined, then it will be difficult for the client to enforce the mechanism.

In order to obtain an overview of the most important current and future funding instruments for road development, the Conference of European Directors of Roads, (CEDR), has commissioned this study.

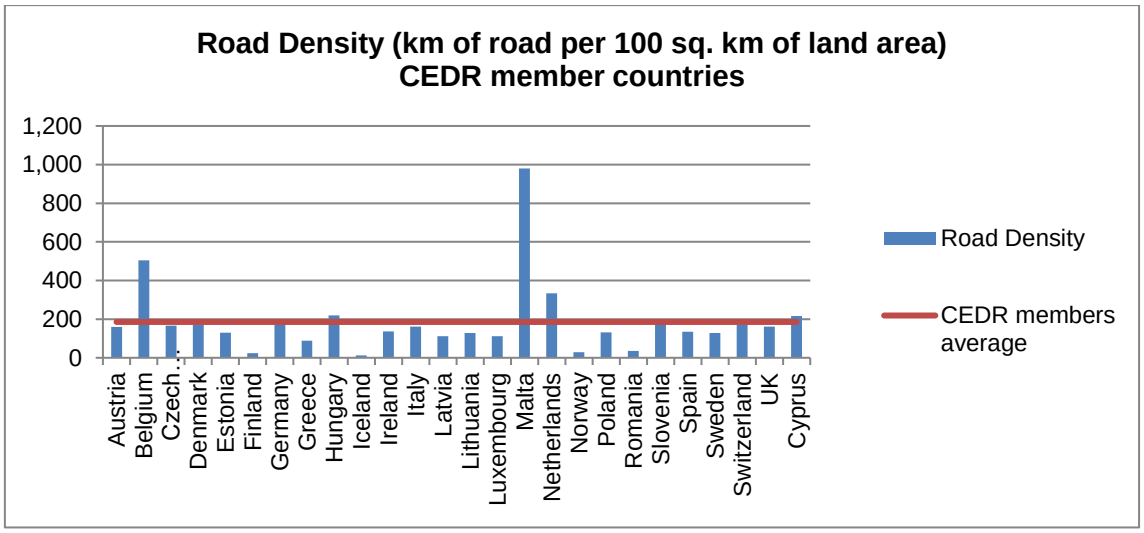
The countries that currently have their NRA as CEDR members (hereinafter, “CEDR member countries”) are indicated in the following figure. As can be seen, they include almost all of the Western European countries, and are characterised predominantly as developed member countries, with mature road networks.

CEDR member countries (November 2016)

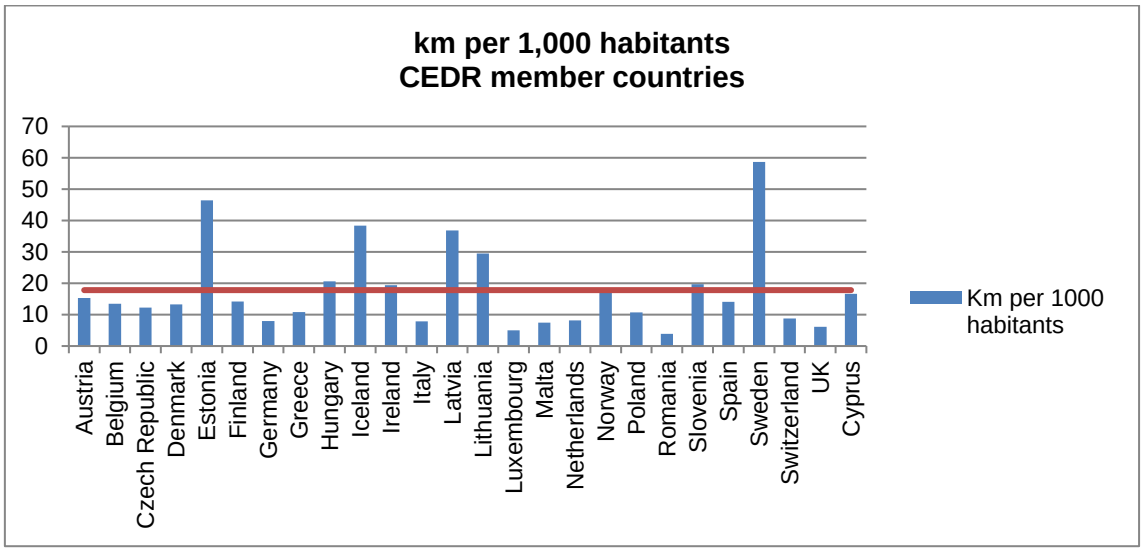
We can see in the following graphics the main statistics of their road networks within CEDR Member Countries, in terms of road net length, road density related to surface area, and road concentration related to population.



Source: CIA Factbook, 2016



Source: CIA Factbook, 2016



Source: CIA Factbook, 2016

The objective of this report is to list and describe a comprehensive catalogue of the available funding formulas for roads. Within the complete task, which is to identify the optimum scope for each of the available formulas, this initial report will lead to a full catalogue of those funding formulas and options that are available for use by CEDR members.

The report will have an initial chapter in which all these formulas will be identified and described; this chapter will be the core content of this report. After that, there is a brief chapter regarding the means by which these formulas may be used for infrastructure provision.

2. Roads funding catalogue

Category	Funding mechanism	Characteristics
All Purpose Taxes	General taxes	Charges applied to salaries, goods and services purchase, companies´ incomes, etc. Generally earmarked to feed Government´s General Budget, but in some countries earmarked to specific road funds.
Special Purpose Road User Taxes and Fines	Vehicle taxes	Payments per vehicle on a one-off and on an annual basis. Variable payment depending on vehicle characteristics. These fees can be charged in the purchase and/or in the periodic vehicle examination or licensing of the vehicle for road use.
	Fuel taxes	Payments applied to the oil and diesel products that are consumed by the vehicle.
	Green taxes	The charge depends on the distance driven and/or the pollutant emissions features of the vehicle.
	Fines	Charges applied to penalize law violations.
Road User Charges	Distance based charges	Payments are applied strictly to the distance travelled varying with the vehicles features.
	Time based charges (vignettes)	Payments based on the amount of time that the infrastructure is available rather than the distance.
	Tolls	Payments made by users the concessionaire who operates a road built or maintained using public-private finance initiative.
	Road pricing	Charges applied to users within a certain area, so demand can be regulated with these pricing schemes.
	International transit fees	Transit charges can be imposed taking into account the transit distance, quantity of goods and other aspects.
Development cost charges (value capture)	Commercial areas access contribution	Payments imposed to new commercial areas where the infrastructure has been developed.
	Urban development contribution	Payments imposed to municipalities or new residents where the infrastructure has been developed.
Grant Funding		Non-repayable funds disbursed by one party. Aims to strengthen economic and social cohesion by correcting imbalances between different countries or its regions.
Private Donations		Individuals, organizations or businesses can help maintaining roads, having the option to participate as volunteers or hire a maintenance service provider to perform the work on their behalf.
Hybrid funding mechanisms		For instance, subsidized toll roads, partially granted funding, etc.

Most of these funding mechanisms have been used in CEDR member countries. Traditionally, European roads have been funded mainly by taxes and user charges, with the money being allocated through the central Exchequer. However, over the last number of years, competing political pressures have reduced the overall allocations to road construction and maintenance. Therefore there is a new trend now emerging to get

funds through a “pay per use” concept, that is to say, users are held responsible for funding the roads they are using. This concept may be seen to be the fairest one for the development and maintenance of roads, but it does not acknowledge the contribution that transport investment makes to the social and economic fabric of the state. Poor quality or non-existent infrastructure increases the cost of moving goods, services, and people, and erodes the competitiveness of a country.

Some countries have also benefited significantly from European grants, especially the least developed members of the European Union, who have received funding to develop their road networks to meet EU policies and objectives.

As a general approach to funding mechanisms, hereby we provide two examples that may give a good introduction to different policies used by non-CEDR administrations.

Firstly, the case of Australia:

Case study - Funding formula used in Australia

Under Australia’s federal arrangements, state and local governments are responsible for road construction and maintenance. However, the federal government provides funding assistance under various programmes. The federal government also collects a fuel excise tax, a Goods and Services Tax (GST) on fuel and vehicle sales, and a road user charge that applies to heavy vehicles based on fuel consumption; while state governments collect vehicle registration fees and vehicle stamp duties. Federal revenue from road transport-related activities is added to the general revenue pool and is not earmarked for road infrastructure expenditure. Rather, expenditure under the various funding programmes is appropriated as part of the annual budget process. In addition to federal, state, and local revenue, private sector investment through Public Private Partnerships (PPP) is also a source of funding for some roads, and three states maintain networks of toll roads. The main funding mechanisms are summarised in the table below.

The overall level of annual funding for road infrastructure in Australia has been increasing steadily from a level of AUS$16bn in 2009 to approximately AUS$20bn by the end of 2013. Their objective has been to achieve a rationalised, equitable, and transparent system of user charges across the network, and to have a more efficient use of the overall transport system. However, a recent consultation document by Infrastructure Australia (July 2014) has questioned whether there is an adequate return on the investment in the road sector, and whether this level of funding is sustainable.

Overall, it would appear that the funding mechanisms in place in Australia are broadly similar to that of CEDR administrations.

The funding mechanisms are summarised in the following table:

Funding Mechanism	Implemented By	Comments
Goods & Services Tax	Federal government	Applied to most goods, including transport fuel, and vehicles
Fuel tax	Federal government	Applied to transport fuel. A new Bill in 2014 proposed that fuel prices would be linked to the Consumer Price Index (CPI).
Luxury Car Tax	Federal government	Imposed on the GST value of certain cars over a threshold value
Heavy vehicle charges	Federal government	Owners of heavy vehicles are required to pay a registration charge, and fuel based road user charges
Vehicle registration charge	State & Territory	Annual Registration fee for private motor vehicles
Stamp Duty	State & Territory	Payable on new vehicle registration or sale of a vehicle to another person
Tolls	State	Primarily used in New South Wales, Victoria, and Queensland; in urban areas

Also, Canada is worth knowing their funding mechanisms:

Case study - Funding formula used in Canada

Under Canada's Constitution Act, the provinces and territories have exclusive jurisdiction over the building and maintenance of national highways. Local and municipal roads are under the jurisdiction of municipal governments. The federal government administers a number of federal funds to assist with road infrastructure projects, many of which are structured through bilateral cost-sharing agreements with specific provinces, territories or municipal governments for specific projects. Most of the monies for these various funds come from consolidated revenue, which is then allocated through a budgetary process. However, part of the

federal gas tax revenue is earmarked for municipal infrastructure projects under the Federal Gas Tax Fund.

Provincially, the general practice is not to tie fuel taxes to highway or road infrastructure projects. In most provinces, expenditure on highway infrastructure projects is allocated under a government budget from the general revenue rather than from a particular tax source. Public-private partnerships have also been utilised to fund major road infrastructure projects. Under the current P3 programme, about $1.25bn has been allocated for public private partnerships. The principal sources of federal funding are summarised below:

National Road Infrastructure Funding - Federal Funding

There does not appear to be a dedicated federal tax that only supports building and/or maintenance of national highways or roads.

As noted above, although highways are the responsibility of the provinces and territories, the federal government has a long history of providing assistance for highway construction in Canada. Federal taxes, including the excise tax on gasoline and diesel fuel, go into the general coffers and help sustain a number of federal programs. Federally funded infrastructure programs that assist in funding highways and roads, as detailed below, are primarily structured through bilateral cost-sharing agreements with specific provinces and territories. The majority of these infrastructure funds are administered by Infrastructure Canada (IC). IC has just announced a new $120bn plan over a ten year period, which covers all modes of transport.

In 2007, the federal government of Canada launched a Building Canada Plan, which aimed to provide $33 billion in stable, flexible and predictable funding to provinces, territories and municipalities, allowing them to plan for the longer-term and address their ongoing infrastructure needs. A new Building Canada Plan was launched in 2014, with a budget of approximately $14bn over a ten year period. The main sources of federal funding are described herein.

1. Federal Gas Tax Fund

Two billion of the approximately five billion dollars in revenue the federal government receives annually from the Federal Gas Tax is allocated to the Federal Gas Tax Fund. The Fund, which is permanent, supports municipal infrastructure projects, which can include building and maintaining local municipal roads. According to Infrastructure Canada, every municipality in Canada receives a portion of the Fund. The funding allocation is determined at the provincial or territorial level based on population. Funding is provided up front, twice a year to provincial and territorial governments or to the municipal associations which deliver this funding within a province, as well as to Toronto. Projects are chosen locally and

prioritized according to the infrastructure needs of each community. Municipalities can pool, bank and borrow against this funding, providing significant financial flexibility.

2. Building Canada Fund

The Building Canada Fund works by making investments in public infrastructure owned by provincial, territorial and municipal governments, and in certain cases, private sector and non-profit organizations. Funding is allocated to each province and territory based on population. The Building Canada Fund is a cost-shared contribution program with a maximum federal contribution to any single project being 50 per cent. The Fund's aim is to build a stronger Canadian economy by investing in infrastructure projects that contribute to increased trade, efficient movement of goods and people, and economic growth. One of the categories of investments that support economic growth includes the National Highway System.

3. Provincial-Territorial Base Fund

The Provincial-Territorial Base Fund is a Can$2.275 billion fund that provides predictable funding to provinces and territories to address core infrastructure priorities. It also requires the recipient to sign a Provincial-Territorial Base Fund Agreement with the Government of Canada. According to Infrastructure Canada, to receive funding, provinces and territories must submit a capital plan containing a list of initiatives for federal cost-sharing. The plan includes a brief description of each initiative, the eligible category of investment and the total eligible cost. The federal government will contribute up to 50 per cent of the plan's eligible costs for provinces and up to 75 per cent for territories.

2.1. All Purpose Taxes

2.1.1. General taxes

General taxes are payments compulsorily collected from individuals or companies by central, regional or local governments. The tax system in a country has a crucial importance, as it is a powerful instrument that may be used by the government to regulate state economical processes in order to achieve the desired goals.

There are different categories of taxes depending on the country one lives in, and also depending on the region in the same country, as they are often imposed by a variety of authorities. It has to be noted that most of CEDR member countries are also members of the European Union and European Economic Area. The legislation of these countries is harmonized in accordance with the EU provisions that ensure free movement of goods, capital and services within the internal market of these countries.

The most common general taxes include such measures as income, sales, property and service taxes. General taxes ensure several functions:

- provision of revenues in the state consolidated budget to fund much of the countries' needs, such as the Health System, Education, National Defense, Transportation and Infrastructure Development, etc.
- redistribution of revenues.
- facilitating or limiting certain types of businesses and protection of certain sectors of national economy.
- limiting of activities harmful for public health.

Depending on the mechanism of payment and calculation, taxes may be classified in the following groups:

I. Direct taxes. They are levied on the income or capital of an individual or company.
II. Indirect (non-direct) taxes. These are levied on sales on goods or services.

There are also some uncommon cases where incomes coming from these taxes are aimed at a specific road fund, like in Yemen, where in 1995 a fund was created by the Government for the maintenance of their road network. Historically the first road funds of this type were established in the following countries:

- Japan Road Improvement Special Account. This special funding system was introduced in 1954 to meet the needs of the post-war road improvement programme. It was "based on the concept that road users who enjoy the benefits of improved roads should bear the burden for their improvement". It includes an elaborate system for earmarking national and local taxes, both supplemented by general revenues, to finance the maintenance, improvement, and construction of roads.
- U.S. Federal Highway Trust Fund. It was introduced in 1956 to finance construction of the interstate highway network. The fund revenues derive from a variety of highway user taxes, including motor fuel taxes on gasoline, diesel, a graduated tax on tyres weighing 40 pounds or more, a 12% retail tax on selected new trucks and trailers and heavy-vehicle use tax on all trucks with a gross vehicle weight more than 55,000 pounds. Tax rates are adjusted as part of the regular budgetary process.
- New Zealand National Road Fund (NRF). The original road fund was established in 1953, although the latest version, the National Road Fund, was created in 1996. The fund derives revenues from a fuel excise tax, weight-distance charges on diesel vehicles purchased as distance licenses and approximately proportional to gross wheel-load (and hence more closely related to damage imposed to the road pavement) and motor vehicle registration and license fee.

Other countries like the USA, are now considering introducing new taxes aimed at collecting money for road and bridge maintenance. For example, last February 2014, a proposal was carried out by the Republican Party to earmark the current $61 million

collected from the Division of Motor Vehicles, and additional taxes from gun and ammunition sales, for road and bridge maintenance in the State of Rhode Island. Rhode Island´s roads are the second worst in the USA, only bettered by Alaska, according to the Reason Foundation´s 2013 Annual Highway Report. With the allocation of these taxes, the State will be able to receive a new way of funding their road maintenance.

In its essence, every tax system is efficient and has to be supported and endorsed by taxpayers, given that the taxpayers want to see that taxes are used in an effective and transparent manner. Earmarked taxes (special purpose taxes) may be mentioned as an example of an efficient tax, as they have a definite purpose to their use. Speaking of road funding such taxes might be indirect (non-direct) taxes, e.g. excise duty on fuel. In some countries, part or even 100% of this duty are allocated to specific purposes - i.e. road maintenance. As many countries have experienced a shortage of funding for road maintenance that may not be compensated from general taxes, this is one way to motivate taxpayers to pay earmarked taxes.

There is a problem however that the transport sector indirectly influences other sectors of the national economy, which theoretically would also have rights to receive a certain share from the excise duty on fuel. This is a separate subject reviewed in the section “Special Purpose Road User Taxes”. The general principle is that the distribution of the annual general budget is the task for each government, depending on its economic and political priorities. Problems usually arise in those countries where annual budget revenues do not cover or only partly cover the necessary expenses for infrastructure construction and maintenance, as well as the other general expenditures for long-term economic viability of the country, e.g. education, healthcare and social security. In such cases, the planning of annual general budgets and the rates of different taxes is often subject to political demands instead of the needs of a balanced national economy.

We can see pros and cons of this funding mechanism in the following table:

Advantages	Disadvantages
High level of funds give huge possibilities for investing policies	Usually these taxes are not exclusively aimed at funding roads.
Sources of income come from various ways, so economic cycle impact may be reduced	It is influenced by economic cycles, so in crisis or recession periods, revenues fall.
	Using general taxes for road investing avoids their usage for social expenditure or social investments, such as hospitals or schools; the latter are much more valued by citizenship

2.2. Special Purpose Road User Taxes and Fines

2.2.1. Vehicle taxes

Vehicle taxes are normally of two main types:

1. Taxes which are applied at the purchase of the vehicle,
2. Taxes that are associated with the ownership of the vehicle and its use on public roads.

The first type of vehicle tax is usually applied when the vehicle is new, and is commonly referred to as a Vehicle Registration Tax (VRT). The VRT is chargeable on registration of the vehicle in the state when it is purchased by the owner. It is a one off tax which is calculated as a percentage of the vehicle's price. In Ireland, the VRT is determined as a percentage of the vehicle's Open Market Selling Price (OMSP), which is the expected retail price of the vehicle as calculated by the Revenue. In the case of vehicles which are purchased second hand, a vehicle sales tax can be applied.

The second type of vehicle tax is associated with the ownership of the vehicle, and usually takes the form of annual payments. This category of taxes includes the road tax (motor tax) or license which is required to operate and use the vehicle on public roads, and to charges associated with vehicle testing for road worthiness. The road tax or license is payable annually, and in the case of cars is usually determined based on CO2 emissions. This form of tax favours the ownership of vehicles with smaller and/or more efficient engines, such as diesel engines. In Ireland this road tax commences at around €170 per annum for small engines, but can increase up to €2350 per annum. This type of assessment was introduced in Ireland for new private cars in 2008. Cars which were registered before this date are still taxed on the basis of engine displacement. In the case of Goods Vehicles, the basis of assessment for road tax is usually the unladen weight. For example, in Ireland, a goods vehicle with an unladen weight of 10 ton would be liable for an annual tax of €1,886.

Sometimes, as happens in Australia, owners of heavy vehicles are required to pay a registration charge in order to ensure that heavy vehicles "pay for their fair share of road spending."

The amount of revenue generated from transport taxes is considerable. Figures published by Eurostat would indicate that approximately €63billion was generated in 2011, and the figure has been increasing on an annual basis. There was a decrease in these taxes following the economic crisis in 2008.

While these figures are mainly due to taxes related to the ownership and use of motor vehicles, they also include taxes generated from aircraft, ships and railway stock. These transport taxes are usually "one-off" taxes related to the import or sales of transport equipment (registration or import taxes) or recurrent taxes such as annual road tax.

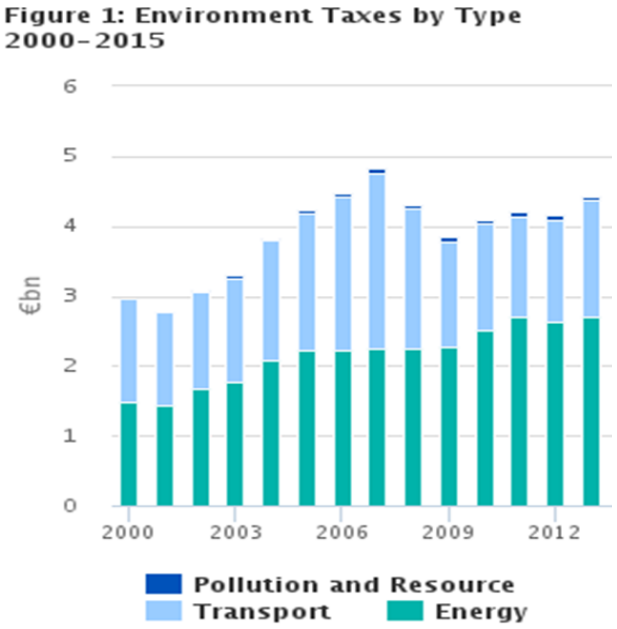
EU-27 Transport Taxes (environmental taxes), 2000 – 2011 (billion EUR)

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
49.3	49.6	50.2	50.9	55.4	58.7	62.0	66.7	63.9	57.8	60,2	63.3

Source: Eurostat (Environmental taxes, 2013 edition)

In Ireland, the revenue generated from the VRT is approximately €380m annually; the corresponding figure for annual motor taxes for private vehicles is approximately €750m. These annual revenues for Ireland are indicated in the table below.

Environmental tax revenue 2008-2012 (Ireland)					*€million*
Tax type	**2011**	**2012**	**2013**	**2014**	**2015**
Energy taxes	2,694	2,621	2,704	2,804	2,995
Transport taxes	1,449	1,472	1,662	1,777	1,868
Pollution and Resource	61	66	64	57	45
Total	**4,204**	**4,159**	**4,430**	**4,638**	**4,908**



Source: Central Statistics Office, Ireland (www.cso.ie)

The registration of new vehicles is an important issue for any Road Administration, providing valuable information on vehicle ownership, growth trends, security, and reinforcing objectives such as sustainable energy and other key issues related to fuel use.

The amount of vehicle registration tax paid can vary depending on the following features:

Variables
Registration date
Car age
Engine capacity and type
CO_2 emissions
Others

The EU is currently aiming to minimize the problems that arise from international borders and inconsistent regulation on vehicle taxation (principally registration and circulation).

We can see pros and cons of this funding mechanism in the following table:

Advantages	Disadvantages
Wealthier households tend to own more valuable vehicles and so contribute more in registration fees	As they are usually imposed as a “one-off” charge or fixed annual fee, vehicle taxes are not directly related to use
Vehicle registration provides a means of identifying vehicles, confirming ownership, ensuring that insurance has been paid and enforcing traffic and roadworthiness regulations	Tax payments can be avoided by users if neighbouring countries haven´t charged the appropriate vehicle registration fees
It applies to every vehicle that uses the country´s roads	The sale and registration of new vehicles is related to economic activity and spending power
It gives possibilities for an ecological regulation	Usually these taxes are not exclusively aimed at funding roads, so users perceive that their taxes are being used for funding several Administration needs
	It is influenced by economic cycles, so in crisis or recession periods, revenues fall in line with reduced vehicle sales

2.2.2. Fuel Taxes

These taxes are classified as non-direct taxes and are not homogenous among the different countries.

Almost since the inception of motorized transport, fuel or “gas” tax has provided an important source of revenue for local and national governments. Indeed, in the US, such levies are a main source of finance for the entire highway infrastructure.

However, as vehicles become more fuel-efficient, this income is falling each year in real terms, creating a widening funding gap. The emergence of electric and hybrid cars is only accelerating the decline.

Fuel taxes generally apply on:

- domestic consumption of products (mineral oil, leaded and unleaded gasoline, diesel oil, liquid natural gas) – consumption tax
- domestic production and import of products (mineral oil, leaded and unleaded gasoline, diesel oil, liquid natural gas) – fuel excise
- import or authorisation of products (e.g. environmental surcharge on lubricant oils) – product surcharge
- domestic sales – Value Added Tax

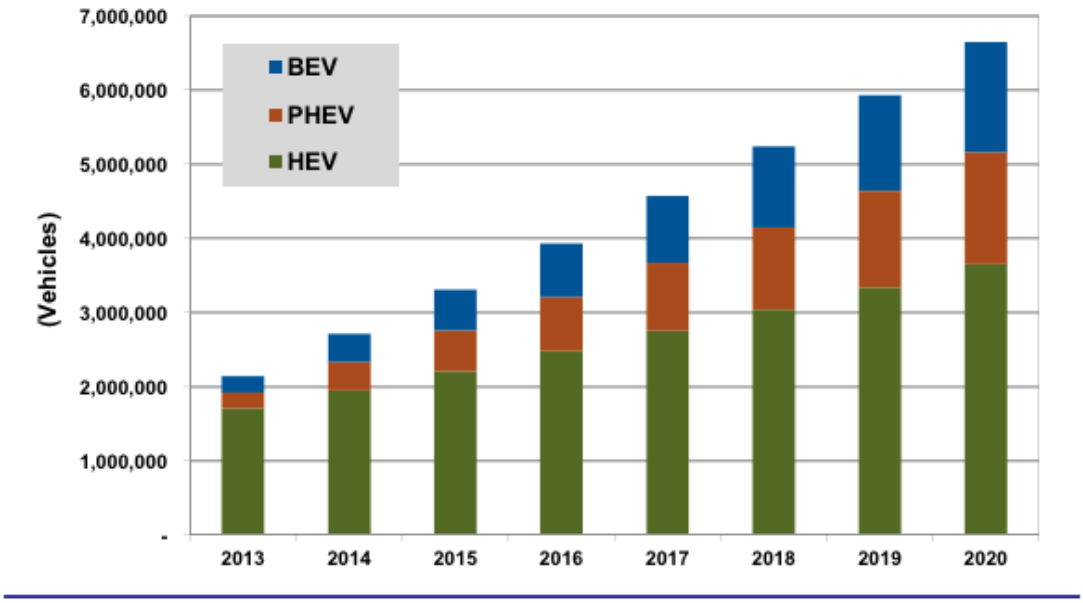
VAT cannot be categorised clearly as a fuel tax. Since intermediate consumers of the production-marketing chain can claim its amount to be reimbursed, VAT as a fuel tax only burdens end-user individuals with private cars. Revenue of VAT on fuel can only be estimated and the amount is insignificant in comparison with total fuel consumption.

There are places, like Australia, where owners of heavy vehicles are required to pay a fuel-based road user charge in order to ensure that heavy vehicles “pay for their fair share of road spending.”

The excise duty collected from the sale of petroleum products can be significant. As can be seen from the previous table of environmental tax revenue in Ireland (section 2.2.1), the amount of duty has been in the region of €2bn each year over the period from 2008 to 2012. This revenue is likely to reduce over the coming years with the introduction of electric vehicles. If the number of electric vehicles grows to a stage where they are greater than the number of conventional engines, this will lead to a significant loss of excise duty revenue, and some consideration may be necessary to consider an alternative form of duty on the consumption of electricity for driving.

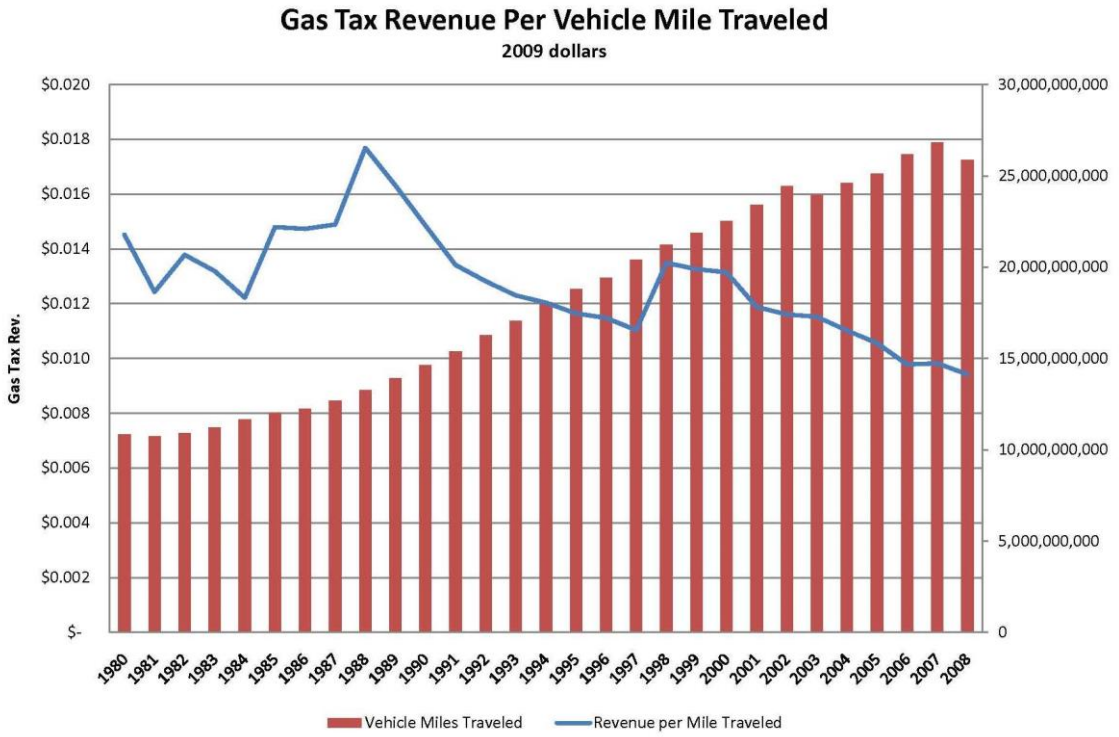
The figure below indicates the growth in light electric vehicles up to the year 2020. It is forecast that there could be up to 6.5m light duty electric vehicles in the world by 2020. This is made up of hybrid (HEV), plug-in hybrid (PHEV) and battery electric vehicles (BEV). Navigant Research have reported that plug-in electric vehicles could reach 2.4% of global light duty vehicle sales by 2023.

Chart 1.1 Annual Light Duty Electric Vehicle Sales by Drivetrain, World Markets: 2013-2020



(Source: Navigant Research)

An additional issue in the coming years will be the reduction of vehicle operating costs (i.e. the reduction of fuel costs per km because of more efficient combustion engines). This will lead to the situation that excise duty on fuel will cease to be a reliable indicator of road use and kilometres travelled. This will lead to a further reduction in the revenue available to governments for road construction and maintenance. The USA may be mentioned as an example where historically the major share of road development and maintenance funding came from excise duty on fuel.



Because of the use of more efficient vehicles the allocations to road maintenance are diminishing in the USA. As a result of this, they are developing an alternative to this road funding model, with the introduction of a new payment for every driven mile (~1.5 US cents). This system in the USA has been developed in the last 10 years. Two pilot programs were launched in 2017 and 2013 and their results are available here: http://roadchargeoregon.org.

Advantages	Disadvantages
Costs of collection and enforcement are low because taxes are collected directly from fuel distributors through service stations	If implemented in a single state or province consumers can avoid the charge by purchasing fuel across borders
Non-road users can be exempted	Road costs are not directly determined by fuel usage or type
Instrument for environmental regulation	They impose a larger relative burden on low-income than on high-income households
Easier to prevent from fraud (i.e. colouring untaxed fuel)	Rural households at all income levels spend more on gasoline and diesel fuel than is spent by comparable urban households because their journeys tend to be longer and more frequent, and their vehicles tend to be less fuel efficient
	Electric cars and new vehicles are more efficient in fuel consumption, hence they contribute less to fuel taxes

2.2.3. Green Taxes

These taxes charge cars for causing air, water and noise pollution externalities. There are different types of taxes, like pollutant emission charges or ecotaxes (environmental taxes).

As the implementation of emissions meters is too expensive, a more feasible alternative is usually implemented that is a per-mile emission charge, based on average values for each vehicle class, or periodic testing of individual vehicles, increased by roadside sensors to identify gross polluters.

A current example is the Ecotax, that is under analysis to be implemented soon in France. Despite the fact that the funds collected will gross the French Infrastructure Financing Agency (AFITF), an important percentage of the incomes are estimated to be earmarked to develop and refurbish the existing roads.

The French Ecotax is being studied to be implemented over free-toll roads and will apply to some heavy vehicles (more than 3.5 tonnes).

Advantages	Disadvantages
Encourages drivers to reduce emissions by driving less or using a lower emission vehicle.	Road costs are not directly determined by emissions
Fairer than a fixed pollution charge	Implementation costs
Lower income households usually own old and therefore relatively high polluting vehicles	Difficult to implement in foreign vehicles
Drivers are encouraged to drive less; therefore, congestion can be reduced and so does fuel consumption and pollution	

Case study - Congestion Taxes: Area charges in Sweden

In 2006, a congestion trial was conducted in Stockholm for 6 months aimed at reducing traffic in the city centre by 10-15%, enhancing the flow of traffic, reducing the level of emissions and improving the inhabitants' view of their city.

The charge was collected upon arrival in and departure from a restricted area from all vehicles other than taxis, buses, emergency vehicles, motorcycles and "green vehicles". The level of charge depended on the time of day.

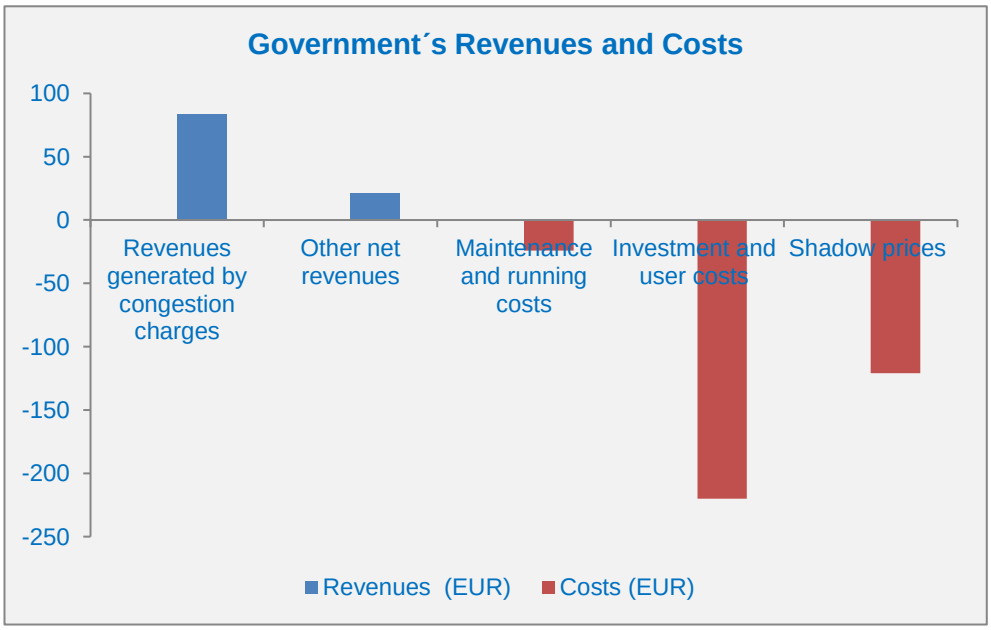
The congestion charge was collected electronically through an on-board unit, or by identifying the vehicle's registration plate.

The impacts of congestion charging in Stockholm were more significant than expected, and they were felt fairly quickly after the system was introduced.

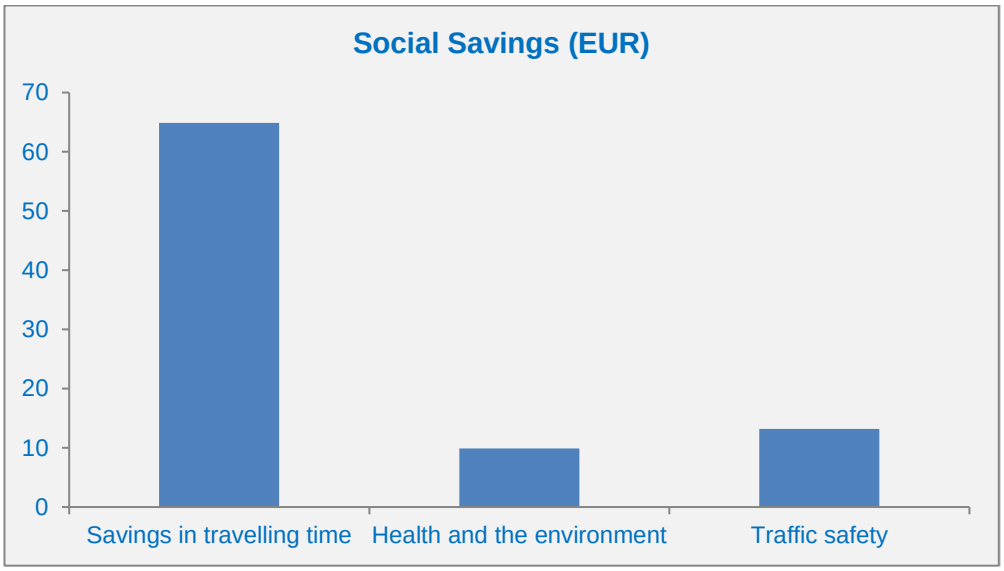
RESULTS			
Max. charge collected/day/vehicle (€)	**Decrease of traffic**	**Decrease of rush hour waiting times**	**Decrease of emissions**
6.6	20-25%	30-35%	14%

Half of the changes came about as a result of drivers choosing public transport instead of driving because of the congestion charges, increasing the use of public transport by 5%. The other half resulted from fewer car journeys taken and from altered routes and destinations.

The trial did not result in significant car-pooling (sharing car) or increased numbers of people taking up remote work. Nor did it result in people setting off earlier in the mornings.



Source: Pricing as a tool for funding and regulation in an equity´s perspective. PIARC Technical Committee

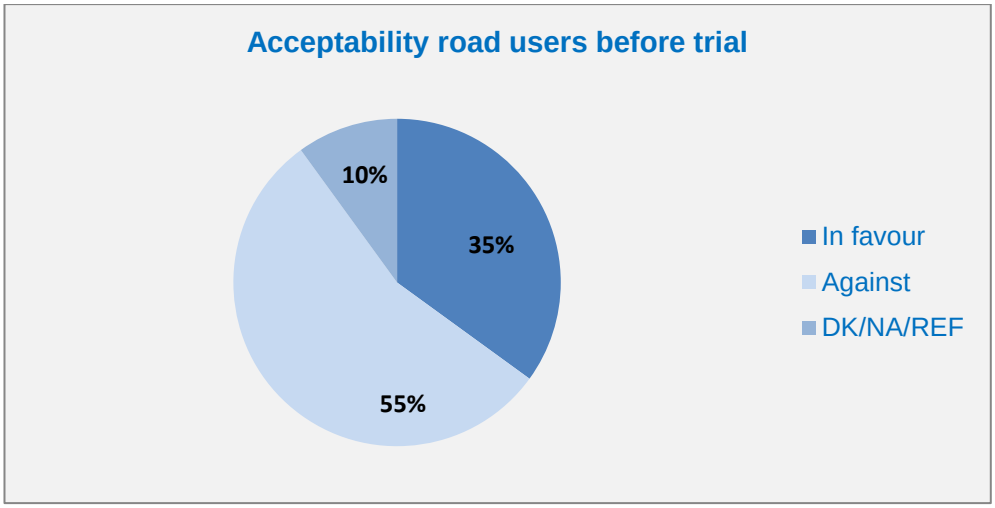


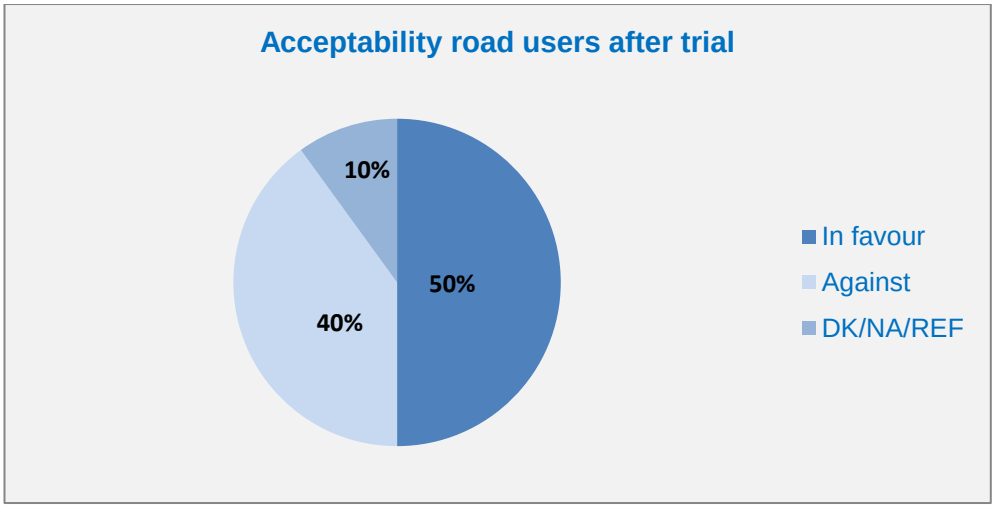
Source: Pricing as a tool for funding and regulation in an equity´s perspective. PIARC Technical Committee

GROUPS WHO GAINED THE MOST BENEFIT FROM THIS CHARGE	
User	**Reason**
People who were already using public transport.	Level of service was increased.
Car drivers, whose routes didn't contain payment points.	They benefited from a better flow of traffic.
Car drivers, who assessed their time, and paid the congestion charge.	Better flow of traffic saved them time
Cyclists.	Lower volume of traffic gave them a safer environment to cycle in.
Those people whose jobs involve driving.	Lower traffic flows created a better working environment for them.

GROUPS WHO WERE ADVERSELY AFFECTED BY THIS CHARGE	
User	**Reason**
Drivers who didn't consider their time in such a high way.	*They are forced to pay despite they feel it isn´t worthy.*
Drivers who couldn´t afford the charge.	*They had to give up using their cars.*

According to the surveys, the attitude of road users towards congestion charges became noticeably more positive during the trial.





Source: Pricing as a tool for funding and regulation in an equity´s perspective. PIARC Technical Committee

2.2.4. Fines

A fine (penalty) is money paid usually governmental authority, as a punishment for an offence. The amount of a fine can be determined case by case, but it is often announced in advance.

One common example of a fine is money paid for violations of traffic laws. The common practice is that the collected fines are transferred to general or municipal budgets but their share is very insignificant. It is of course possible that fines for traffic violations (e.g. exceeding speed limits) as earmarked taxes are used to improve traffic safety in the road network.

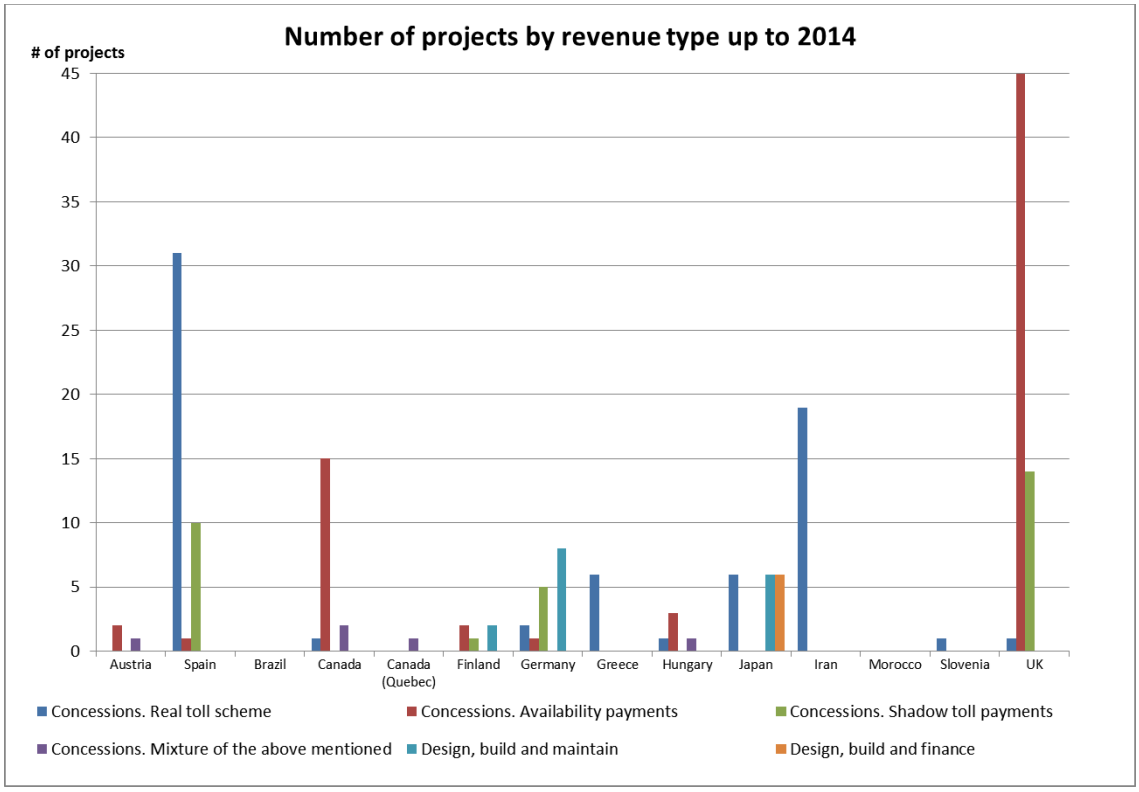
2.3. Road User Charges

In order to satisfy growing needs of road users and road transport, countries aim to provide a safe, reliable and sustainable transport system. The lack of funding for road construction, maintenance, and operation has led to the more widespread use of road user charges, in this way charges can be directly related to the use of the road, it is a suitable solution for vindication of “the user pays” and “the polluter pays” principles as well as for modulation of toll rates in respect of time and of infrastructure elements.

Incomes from user charges are handled differently in CEDR member countries, it could be contributed to the state budget, or could be collected and used by a road manager company (e.g. Asfinag in Austria).

Private funding is mainly referred to collect money from users to fund the road, with some exceptions explained in these documents. Private funding requires an adequate legal framework and a proper and fair contract scheme.

In the following graphic, some examples of countries' private funding can be seen:



Source: Funding and financing of road infrastructure beyond the global financial crisis. PIARC Technical Committee 1.2

Revenues are principally reinvested in the transport sector, for new road projects, operation, maintenance and development of road network or even cross financing other transport modalities, such as railway (Switzerland) and public transport.

2.3.1. Distance based charges

These charges depend on the number of km/miles driven. Road users pay via different toll collection systems. First technology introduced was the toll gate/plaza system. This type of toll collection can still be found in case of concession type motorways in Mediterranean countries, but by reason of environmental issues and road user convenience, preferably "free flow" systems are being built since. License number recognition based video-tolling systems are widely used, in European electronic free-flow systems however, driven distance is measured by on-board units that use DSRC (Dedicated Short-Range Communications) or GNSS (global navigation satellite system) positioning.

By charging vehicles according to distance travelled, governments can reverse the decline in fuel tax revenue, and help ensure that drivers make an appropriate contribution to the safety and costs of a high-quality road network.

According to KPMG's Foresight "*Finding a new way to fund highway infrastructure*", the costs of using a highway -such as surface and pavement damage, safety, congestion,

accidents, air and noise pollution- are tied more closely to the number of miles travelled than to the amount of fuel consumed.

In countries using this method, mainly HGV's are subject to such charges.

In Germany, as of 1st Oct. 2015, vehicles and vehicle combinations with a gross vehicle weight of 7.5 tons and higher will be required to pay toll (formerly only vehicles over 12 tons were subject to toll).

In EU countries toll rates, thus the volume of toll revenues are to be determined by the principle of infrastructural cost recovery as well as to cover costs due to the air pollution caused by the vehicle, so that internalizing external costs of transport.

These tolls may be collected either directly by Public Bodies or by concessionaire companies, which also can be paid for the infrastructure by those tolls, or by Public Bodies, in which case concessionaire companies will just collect tolls to give them to the Public Administration.

There are several types of distance-based charges such as the following:

2.3.1.1. Vehicle-Miles-Travelled charges (VMT)

This charge is based on the number of km/miles driven by the vehicle. There are several ways of measuring the distance travelled, either manually or automatically.

Annual inspections and self-reporting with spot checks are some of the possible manual methods. Automatic recording can be done by internal devices that communicate odometer readings to a VMT billing system or by electronic vehicle identifiers read by gasoline or diesel fuel pumps.

Advantages	Disadvantages
Road user costs are directly determined by km/miles driven	High-mileage drivers could avoid this charge by registering their vehicles outside a particular jurisdiction
Studies have demonstrated that fraud rates are low	Governments pay the capital costs for collecting the vehicle data
If odometer audits were performed with other vehicle servicing, costs would be lower	Operational costs are higher than the costs associated with current fuel taxes and they have high start-up costs as well
Drivers are encouraged to drive less or to change to public transport; hence, congestion can be reduced as well as fuel consumption and pollution	Older vehicles have to be retrofitted with the equipment used to measure distance travelled and communicate the data

Advantages	Disadvantages
	Difficult to implement in foreign vehicles

Main goals of a VMT (vehicle miles travelled) fee model are:

- to generate sufficient funding to meet national road infrastructure investment needs and safety goals
- to reduce congestion, pollution, total vehicle trips and average journey distances
- to reduce commercial vehicle travel times, thus raising productivity
- to ensure that vehicle charges accurately reflect their environmental impact (i.e. congestion, air pollution, road and pavement damage)
- to satisfy data privacy requirements.

A full-scale transition may take several years, and requires collaboration between regional and national agencies and private investors and providers, as well as public understanding and acceptance of the rationale and benefits of VMT.

2.3.1.2. Weight-Distance Charges

This fee is a charge on heavy goods vehicles, which are those vehicles which cause the most damage to roads.

Weight distance charge = Vehicles' gross weight × Distance driven

It is aimed at covering the road maintenance costs imposed by each weight class of vehicle, taking into account the fact that bigger and heavier vehicles cause more damage in roads than smaller and lighter vehicles. The charge is lower with multiple axles and increases with gross vehicle weight.

This fee is used in New Zealand and Iceland to charge diesel vehicles and was used in Norway and Sweden until the early 1990s. This fee is administered separately from the general tax system and all revenues collected from the sale of the licenses are paid into a separate account to support spending on roads.

Switzerland charges a distance-based duty (HVF) on heavy good vehicles, based on the weight of the truck and its emission category. The system is implemented with stricter standards than proposed in Eurovignette directive. This duty is levied on the entire Swiss territory and Liechtenstein. All vehicles of more than 3.5 tones that are used to transport freight, are registered in Switzerland, or travelling on the Swiss road network are subject to this duty.

One-third of the income generated is transferred to the cantons; the remaining two-thirds are kept by the state. The cantons mainly use this funding to cover costs not met through other means. The state uses its share to fund rail projects such as the Rail 2000 (new

lines through the Alps, links to the European high-speed rail network, and rail noise abatement measures).

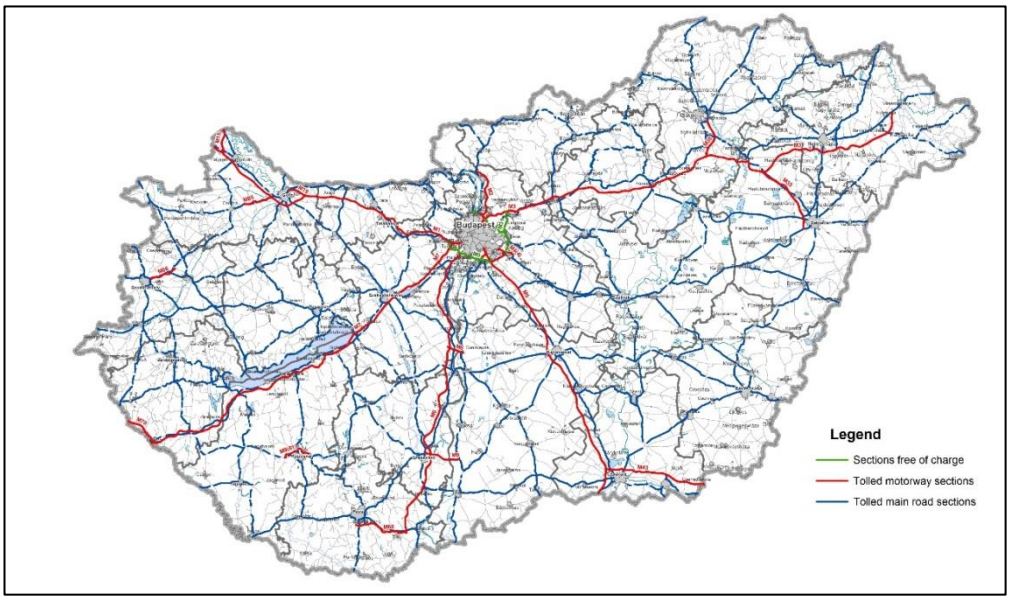
Advantages	Disadvantages
Charge related to road costs, and is imposed on vehicles depending on how they damage the road pavement.	It can cause negative impact on freight transport and increase goods transport costs.
Encourages the use of vehicles with axle configurations, which do less damage to the road pavement.	Implementation costs.
Drivers are encouraged to drive less – I am not sure if this applies in the case of Commercial Vehicles, therefore congestion can be reduced and so does fuel consumption and pollution.	

Case study: The distance-based electronic toll system in Hungary

On 1st July 2013, the electronic, distance-based toll system (DTS) has been introduced on a total of 6,500 km road network of the Hungarian public road network (motorways, highways, main routes).

The system complies with the European Union requirements and the directives of the European Electronic Toll Service (EETS) (Act LXVII of 2013 on distance-based toll payable for the use of motorways, highways and main routes).

This type of toll is required to be paid by all vehicles with a maximum permissible gross weight exceeding 3.5 tons on motorways and main road sections outside built-up areas. The amount of the charge is determined by vehicle category (number of axles), environmental classification and road category (and of course by the distance travelled). Users can purchase route tickets on an occasional basis or in advance, through official website, at the reseller points, or via mobile app. For occasional users registration is not needed, but it's easier, and faster to buy route ticket with valid registration.



Hungarian road network subject to DTS (2015)

An on-board unit also can be purchased, that is a GPS-based tracking device suitable for tracking the route travelled by the vehicle.

Unauthorized road usages can be effectively detected due to the fixed gantries and extensive mobile control system operated all over the tolled network. Beside the official control support done by the National Toll Payment Services PLC., the public administrative fines are imposed by the Police.

Revenues from the toll system is contributed to the State budget and provides financial cover for operation and maintenance of the toll system and the road network (based on priority), and other functions of the State related road traffic infrastructure (e.g. research&development, road network protection system, technical regulation, road network data collection).

The external cost charge shall be used to decrease environmental pollution generated by transport, improve road safety, support the Trans-European Transport Network etc.

2.3.2. Time based charges (vignettes)

The vignette is a form of charge through time instead of distance.

Vignette systems were first implemented in countries with developed road (mostly expressway) networks, but with no possibilities of installing toll gates or plazas afterwards. Road users have access to speed lanes, motorways and other roads by virtue of the payment made.

The vignette system is an effective solution, relatively inexpensive and can be implemented in a short time, although it comes with the issue of disproportionate burden-

sharing, road usage frequency and distance driven within validity period is uncontrollable.

In EU countries Vignette periods are generally 4 days, weekly, monthly and the maximum is one year. Switzerland only sells an annual vignette.
In the case of vehicles with maximum permissible gross weight exceeding 3.5 tons, daily vignettes must be applied.

Vignette prices are to be determined according to Eurovignette Directive, prices of vignette types are in proportion to yearly vignette prices.

Case study: Motorway user charge in Latvia

The charge in Latvia enters into force on 1st July, 2014. Everybody can book vignettes online in https://www.lvvignette.eu/ portal. A previous registration is not required. The vignette is stored electronically and there is no need to carry further paper documents with you.

The charge is paid for the use of the sections of the main state roads by commercial vehicles and their combinations having the gross vehicle weight exceeding 3,500 kilograms, and which are intended or are used for the carriage of goods by road.

According to the The Law on Road User Charges the purpose of the road user charge is the facilitation of the maintenance and development of the main state roads, as well as of the use of more environmentally friendly vehicles in Latvia.

The rate of the charge

1. For goods vehicles and their combinations having total laden mass from 3501 kg up to 12 000 kg

Engine exhaust emission level of a vehicle	*Rates of the charge* (euro)			
	Daily rate	*Weekly rate*	*Monthly rate*	*Annual rate*
*EURO 0**, I, II, III*	*8*	*20*	*40*	*484*
EURO IV and less polluting				*400*

2. For goods vehicles and their combinations having total laden mass from 12 001 kg

Engine exhaust emission level of a vehicle	Number of axles	Rates of the charge (euro)			
		Daily rate [1]	Weekly rate [2]	Monthly rate [3]	Annual rate [4]
EURO 0*	Not more than 3 axles	11	27	55	555
EURO I EURO II	Not less than 4 axles	11	46	92	925
EURO III	Not more than 3 axles	9	24	48	484
	Not less than 4 axles	11	40	80	804
EURO IV and less polluting	Not more than 3 axles	8	21	43	427
	Not less than 4 axles	11	36	71	711

For automatic calculation of the charge, the option of payment of the charge on the website https://lvvignette.eu/ can be used, till the step "Purchase".

** If the engine exhaust emission level of the vehicle is not known, or if there is no statement issued by the vehicle manufacturer or manufacturer's representative on the correspondence of the emissions of a motor vehicle to a particular level, the road user charge corresponding to the rate of "EURO 0" level must be paid.*

1 - The payment of the daily rate of the charge gives the right to use the main state roads for 24 hours starting from the time specified by the payer.

2 - The payment of the weekly rate of the charge gives the right to use the main state roads for seven consecutive days starting from the date specified by the payer.

3 - The payment of the monthly rate of the charge gives the right to use the main state roads for 30 consecutive days starting from the date specified by the payer.

4 - The payment of the annual rate of the charge gives the right to use the main state roads for one continuous year starting from the date specified by the payer. This is maximum period that the charge can be paid for.

Payment options

The following information must be provided when paying the road user charge:

- continuous period (day, week, month, year) when the use of the roads is intended;

- registration number of the vehicle (that of the tractor-vehicle for the combination);

- country of registration of the vehicle (that of the tractor-vehicle for the combination);

- engine exhaust emission level of the vehicle (that of the tractor-vehicle for the combination);

- total laden weight of the vehicle (combination);*

- number of axles of the vehicle (combination).

**(1) for the tractor-vehicle with a trailer, the maximum total laden weight is the sum of maximum laden weights of both vehicles;*

(2) for the tractor-vehicle with a semi-trailer, the maximum total laden weight is the sum of the mass in running order of the tractor-vehicle and maximum laden weight of the semi-trailer.

The road user charge can be paid:

- *on the https://lvvignette.eu/ website it can be done 24 hours a day, 7 days a week without the registration. VISA, MasterCard, VISA Electron, Maestro, American Express payment cards are accepted. No other cards are accepted for the payment of the road user charge.*
- *at the cash-desk of Traffic Safety directorate*
- *at the business locations of the charge collection service supplier. Transaction fee depends on service supplier. The payment can be made in cash or by the payment card*

The fee for the collection of the Road User Charge depends on the service provider. Payments must be made in cash or by credit (bank) card.

Payment of the road user charge can be done one year in advance of the use of roads. Information about the payment of the road user charge enters the Register of Vehicles and Drivers of Latvia once the payment is made, which means that the payment can also be done just before the start of the use of the main roads.

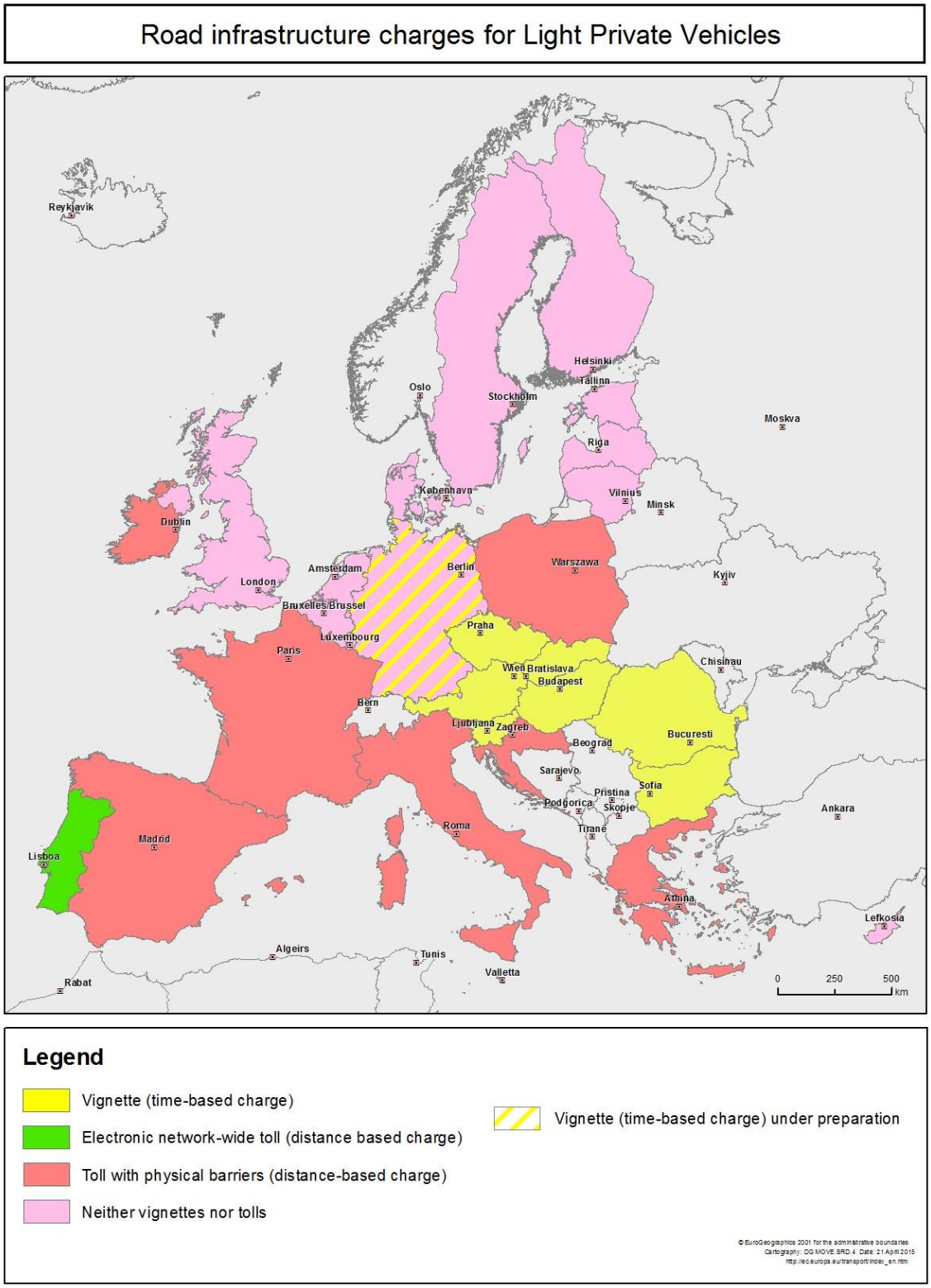
It should be noted that once the road user charge has been paid::

- *no corrections of the data entered for the payment of the road user charge is possible.*
- *payment of the road user charge made via internet is irrevocable.*

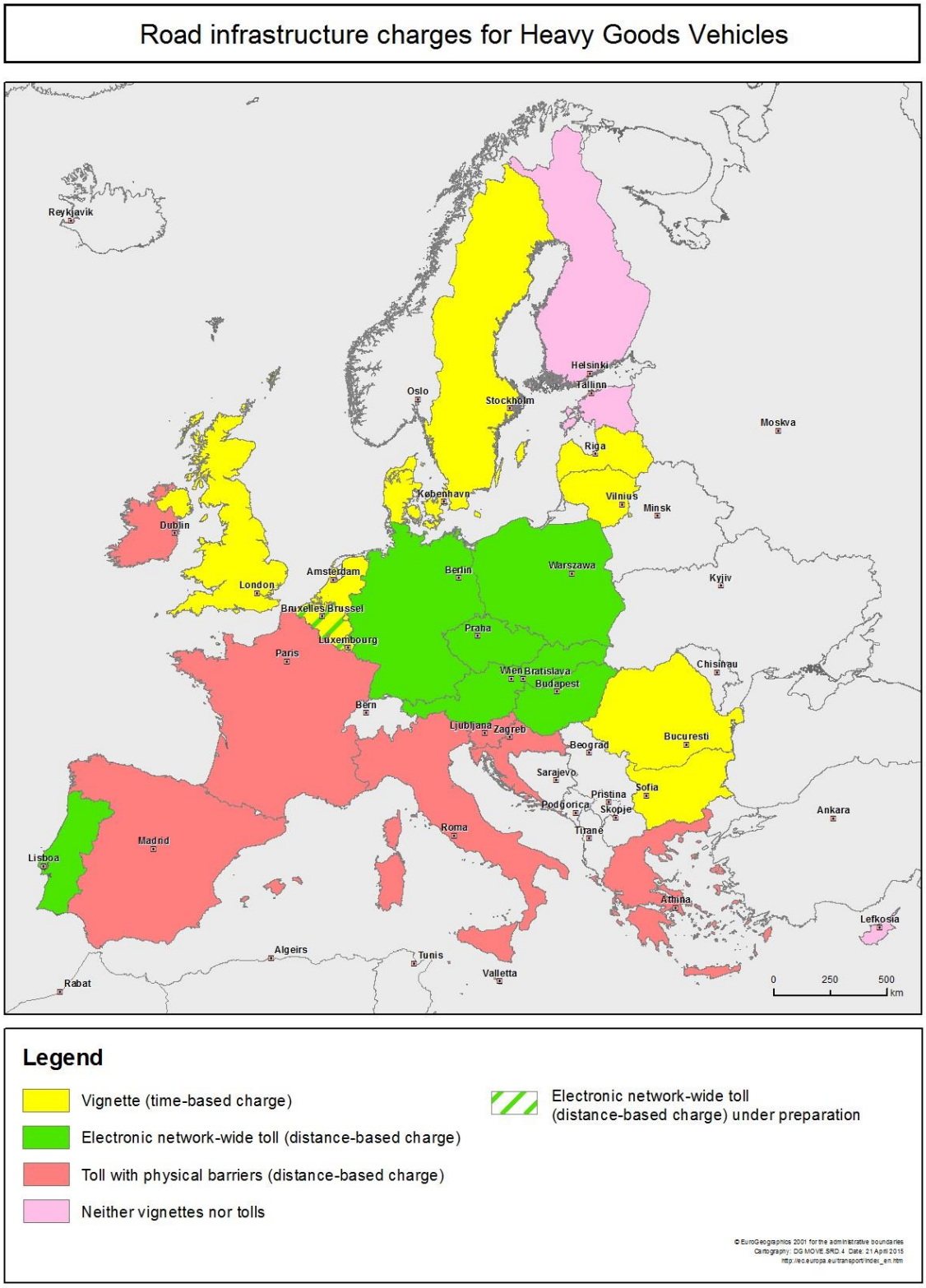
It is possible verify the validity of the paid road user charge on the website https://lvvignette.eu/, in the section „Check"

Eight European States have vignette systems in place for light private vehicles (Czech Republic, Slovakia, Slovenia, Hungary, Bulgaria, Austria, Romania, and Switzerland), in Latvia for vehicles over 3.5 tons and in BENELUX states for vehicles over 12 tons.

Country	Vignette Network Km (2015)
Czech Republic	1,172
Slovakia	2,400
Slovenia	612
Hungary	1,224
Bulgaria	19,400
Austria	2,183
Romania	16,500
Switzerland	72,000



Source: Road user charges for light private vehicles in Europe - EC (2015)



Source: Road user charges for Heavy Goods Vehicles in Europe - EC (2015)

Enforcement of vignette systems is typically undertaken by Police forces which issue instant fines for non-compliance; therefore vehicles must display a label stuck on their

windscreen. However, in some countries it´s not necessary to do this as the vehicle´s plate is registered once the vignette is paid.

Advantages	Disadvantages
Short implementation term.	Unfair for users who drive less.
High flexibility possibilities.	Revenues don´t represent the usage of the roads in terms of distance travelled.
	Barriers can arise. Vignettes can be a barrier to the free flow goal.
	If not well controlled, frauds can arise.
	It can cause negative impact on freight transport and increase goods transport costs.

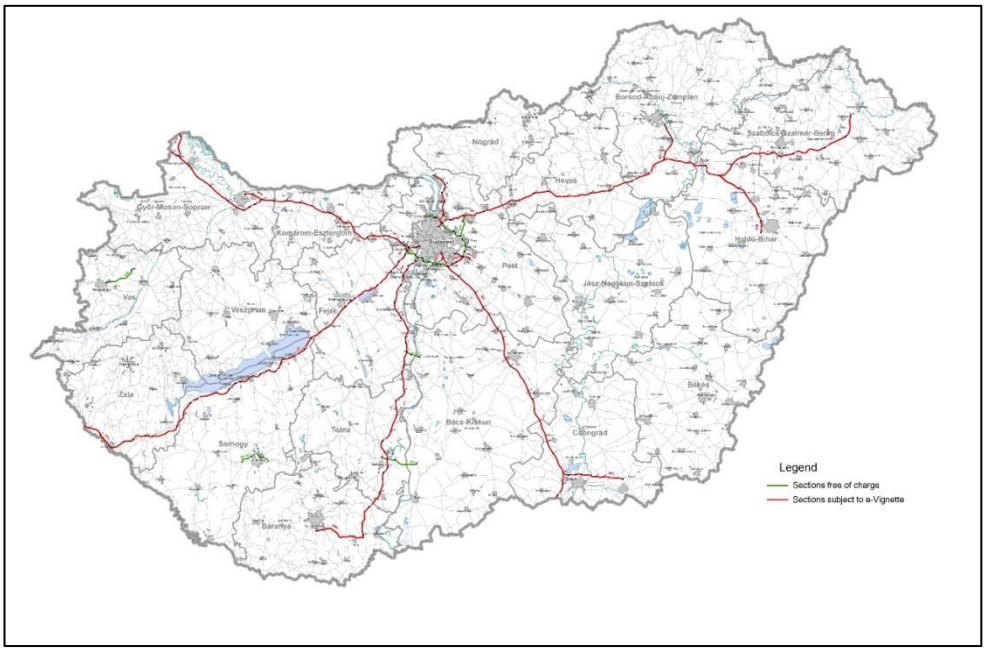
Directive 2011/76/EU of the European Parliament and of the Council of 27 September 2011 amending Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures, recommends the use of the incomes procured through this charge to improve overall transportation systems, not only for road network development; hence countries are free to earmark the funds collected to the projects they consider more appropriate.

Case study: The e-vignette system in Hungary

Vignettes were labels to stuck physically on the windshield until 2008 when the e-vignette system was implemented, since then purchases are handled electronically, the license plate is registered in a computer system with the validity period.

The e-vignette user charge system applies to motorcycles, passenger cars, as well as cargo vehicles and campers with a maximum permissible gross weight of maximum 3.5 tons, buses, and their trailers.

There are three types of time-based e-vignettes (weekly, monthly and yearly) and there is a special type that is valid for one year on a specified region (area licensing).



Hungarian road network subject to E-vignette (2015)

E-vignettes can be purchased at sales points (e.g. petrol stations, customer service offices) or via mobile payment. Upon purchase, users are entitled to use charged speedway network including concession motorways in Hungary.

Similar to the distance-based user charge system, unauthorized road usages can be effectively detected due to the extensive static and mobile control system operated all over the charged network.

Revenues from the e-vignette system are as well contributed to the State budget.

These funds are allocated for operation and maintenance, as well as development of the road network (based on priority), for control activities and

for other functions of the road traffic infrastructure.

2.3.3. Tolls

Toll mechanisms rely on the direct payment by the motorist for the use of the infrastructure. The Road User pays a fixed amount for the use of the infrastructure, either by a cash payment or by using electronic fund transfer.

Advantages	Disadvantages
The Government makes no payment (This is not always so, in some cases a government subsidy may be required), and spends the budget in other sectors.	Traffic risk involved, under estimation of traffic volumes in the design of the project can cause financial default.
Through a band incomes design, minimum revenues can be guaranteed to the concessionaire and in the event of overpassing a certain incomes level, a percentage can be shared with the grantor.	Opposite consumer reaction to “pay per use” concept.
It applies to every vehicle using the country´s roads.	Political controversy makes it difficult to implement.

Under the real toll scheme, there are particular cases:

1) The link lane or Managed lane. This corresponds to a premium lane in a given road, which has a toll or charge for its use, for a better or faster lane, next to regular lanes.

2) Standard toll roads or motorways where the road user pays a flat rate charge or a charge per km for using the road.

Case study Real Tolls: Electronic toll collection.

In 2004, in the Czech Republic the Government decided to put in to effect the electronic toll system in certain roads, with the aim of obtaining the resources to build a core network of roads that had not been finished. The amount of traffic had increased significantly due to the admission of the Czech Republic into the European Union (that reduced the barriers to trade and customs).

According to the border crossing points the amount of traffic increased by 53% during the period 2000-2006, and focusing on heavy trucks, the increase in traffic was 150%.

Following these two premises, the Government believed that the installation of the electronic toll system for heavy trucks was suitable and appropriate for this use This new approach makes the users pay for their effective use and makes them contribute to their related costs. The toll rates were differentiated by emission class and number of axles:

Electronic Toll Rates						
	Emission Class up to Euro II[1]			Emission Class Euro III and higher		
	Number of axles					
	2	3	4+	2	3	4+
Motorways & Expressways	2.30	3.70	5.40	1.70	2.90	4.20
Class I roads	1.10	1.80	2.60	0.80	1.40	2.00

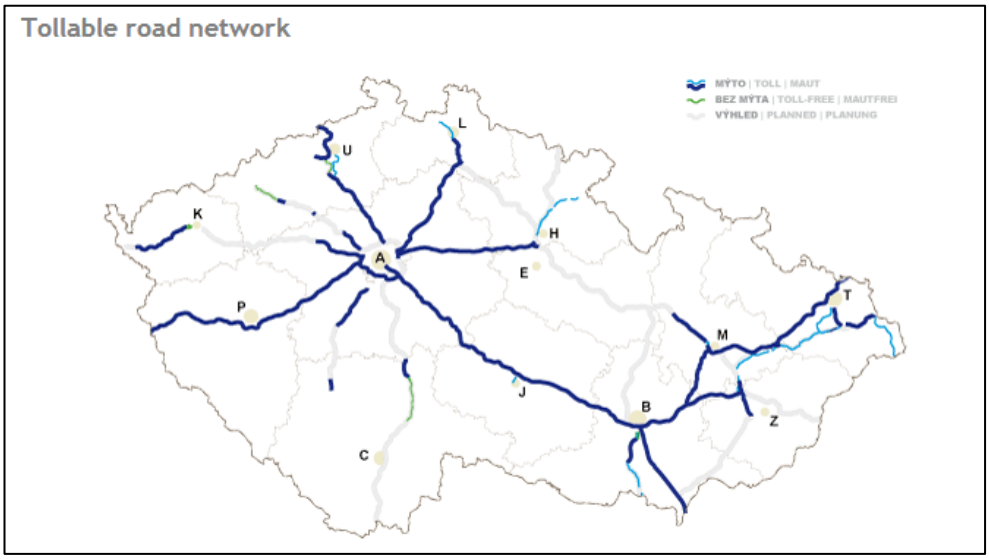
Source: Pricing as a tool for funding and regulation in an equity´s perspective. PIARC Technical Committee

Before the implementation of the real toll system in the Czech Republic, the construction, maintenance and operation of roads were financed through taxes (including the vignette). The collected funds were brought together in the State Fund of Transport Infrastructure.

Years after the implementation of this toll for vehicles of more than 12 tons, the revenues have been insufficient for the funding of the core road network.

[1] Emission standards according to European Union Directives

The extension to other vehicle weight categories is a possible solution for the complete funding needs.



Source: Motorway.cz

As highlighted in the map above, the total amount of core road network has not been built (by 2009, last updated map in the motorways web page of the Czech Republic) due to the under estimation of the total revenue to be raised by the heavy truck tolls.

2.3.4. Road pricing

Road pricing mechanisms are direct charges levied for the use of roads, and they are usually designed to discourage the use of certain classes of vehicle, fuel sources or more polluting vehicles. These charges may be used primarily for revenue generation, usually for road infrastructure funding, or as a transportation demand management tool to reduce peak hour travel and the associated traffic congestion or other social and environmental negative externalities associated with road travel (such as air pollution, greenhouse gas emissions, visual intrusion, noise and road accidents).

Although the term road pricing may broadly include road tolls, distance or time based fees, congestion charges and charges to manage demand, we will refer exclusively to those charges that are aimed at managing demand. Typically road pricing is used in urban or sub-urban areas of cities and towns in order to reduce the traffic flows to an acceptable and sustainable level. While revenue generation may be possible, the primary objective is travel demand management, and often, the charges applied are set to cover the costs of operating the systems, and to discourage motorists from using their cars. Some of the revenues generated are usually spent on improving the public transport systems in order to cater for the increased demand.

A particular case may be the following:

- Cordon pricing or area pricing, which charges drivers for entering a city´s congested central area. This requires a daily payment for the use of the roads and the payment can vary depending on the usage or access. One example of this real charge is the London Congestion Charge Zone (CCZ) in the UK. This charge was first introduced in February 2003, and the system is run by Transport for London. The cordon operates between 07:00 and 18:00 hours each day from Monday to Friday, and the charge for entering the cordon zone is £11.50. The Congestion Charge has been very successful in managing traffic volumes in the city of London. Traffic entering the control zone has remained stable at a level about 27% lower than that in 2002. There are nearly 80,000 fewer cars entering the charging zone each day.

A variation of road pricing is to ration peak period vehicle-trips or vehicle-miles using a revenue-neutral credit-based system. For example, each resident in a region could receive credits for 100 peak-period vehicle-miles each or €20 worth of congestion fees each month. Residents can use the credits themselves, or trade or sell them to somebody else. The result is a form of congestion pricing in which the benefits are captured by residents rather than road owners or governments.

2.3.5. International transit fees

Transit charges can be imposed to trucks taking into account the transit distance, quantity of goods carried, and other aspects which are randomly practiced internationally.

In Bulgaria such road charge is levied on foreign HGVs entering or transiting through Bulgaria and registered in countries outside the European Union.

This charge is collected at border crossing points. It is collected on each entry into Bulgaria, with the exception of border traffic on which it is collected once a day, irrespective of the number of entries. If a carrier, who has paid road taxes and motorway tolls for a fixed route through Bulgaria, changes this route, he must pay the difference when leaving the country.

Advantages	Disadvantages
Affects heavy goods traffic, which causes more costs in the maintenance of roads.	It can cause negative impact on freight transport and increase goods transport costs.

2.4. Development cost charges (value capture)

An innovative funding method in transport is value capture; this concept can be defined as the means by which transport infrastructure investment is funded or financed through the capture of either some or all of the added value of real estate property that results directly from that investment, or that takes exclusive benefit from it.

2.4.1. Commercial areas access contribution

The development cost charges to commercial areas are fees imposed to new commercial developments, shifting the payment of the infrastructure construction and/or maintenance from the general budget to those who open businesses in the area. As all these businesses get profit from having adequate accesses and infrastructures, they have to contribute to these roads so the funding of them partially capture the value that roads create for these businesses.

The burden that can be transferred to businesses is usually not able to fully pay for the construction, and usually cannot even afford the complete maintenance of roads; this leads to a partial funding formula.

An alternative formula for funding the infrastructure may be, instead of making commercial areas pay for it, to oblige them to construct and/or maintain it. In this case, of course under public supervision, users make themselves responsible for the whole process of providing and keeping the road in good use.

This type of funding mechanism is very popular in the United States of America and in Canada.

Advantages	Disadvantages
Places the burden of costs on buyer of new businesses tenants.	It is not enough to cover construction costs.
Allows the municipalities to optimize their roads investment.	Usually it is not enough to cover O&M cost of roads.
The infrastructure is built upon the demand.	It is a burden in the development of isolated rural areas.

2.4.2. Urban development contribution

The development cost charges to urban development contribution are fees imposed to municipalities or to new residents by infrastructure development public bodies, so certain local authorities or private residents will pay for the construction and/or maintenance of a road access or network that benefits them. This mechanism allows linking transportation investments and revenues directly to the area with the development project benefitting from the road project.

Most development cost charges are imposed using a formula that benefits those who live near the urban core. The high density of people in urban areas means that this formula is of most benefit to high-density areas.

As mentioned before, an alternative formula would be to make beneficiaries not to pay, but to construct and/or maintain the road; in this case, it would be suitable for municipalities or big neighbourhood associations, as for particular people it would be unaffordable.

This type of funding mechanism is very popular in North America, and recently it is getting more impact in Europe.

Advantages	Disadvantages
Places the burden of costs on local authorities and new home tenants.	It is not enough to cover construction costs.
Major infrastructure development public bodies are able to optimize road investment planning.	Usually it is not enough to cover O&M cost of roads.
	It is a burden in the development of isolated rural areas.

2.5. Grant Funding

Grants are non-repayable funds disbursed by one party, often a government agency, to another authority or body. In Europe there are several grants aimed at building and maintaining European roads.

Advantages	Disadvantages
Free payment for users.	Is a non-repayable fund, there is no economic return for Governments.
Promotes the construction of new roads and highways.	Management costs.
	Funds are directly or indirectly raised from taxes.

A special mention will be made to the most important European tools for funding infrastructures, being the Connecting Europe Facility -with the TEN-T programme- and the Cohesion Funds.

2.5.1. The Connecting Europe Facility (CEF)

Since 1995, the European Union has the possibility of granting financial assistance to projects of common interest included in the Guidelines for the development of the Trans-European Transport Network (TEN-T). The latest update of the TEN-T Guidelines was laid down in 2013, at the same time when the Connecting Europe Facility (CEF) was established, succeeding the former TEN-T Programme.

The main objective of the Connecting Europe Facility instrument for the transport sector, as set out by the TEN-T Guidelines, is to help complete the TEN-T Core Network and its Corridors by 2030. To achieve this objective, a total budget of €24 billion has been made available for projects on the Trans-European Transport Network for the 2014-2020 period. In relation to its predecessor (the 2007–2013 TEN-T Programme) CEF allocation for transport projects made available increased almost threefold. Out of this budget, €11.3 billion is reserved for projects in the EU Member States, which are eligible for support under the Cohesion Fund.

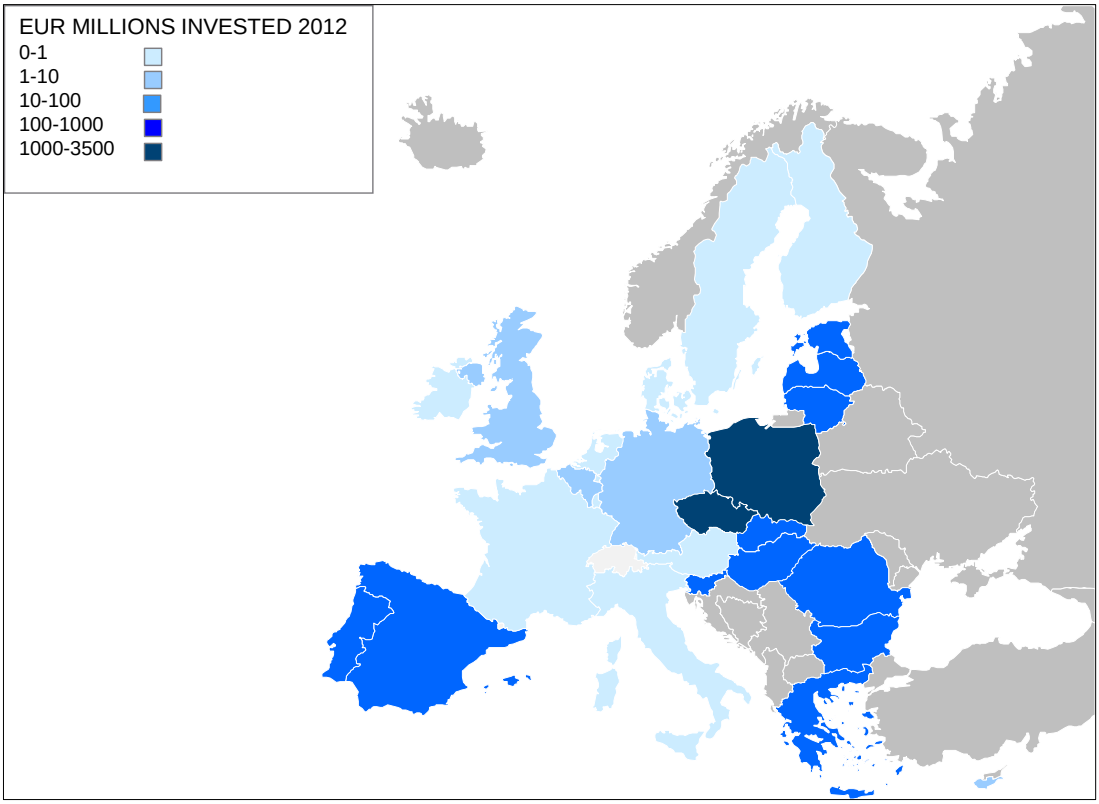
Priorities to earmark the funds depend on the country or countries union, but in general, these funds are used mainly for designing and building new roads rather than for maintaining them. They are also generally used to connect special regions through a key corridor or to connect developing or isolated regions.

The 26 billion euro earmarked for transport from the Connecting Europe Facility, under the multiannual financial framework serve as “start-up” capital, which will stimulate other Member States investments to complete difficult cross-border connections and lines that otherwise would not be built. According to estimates, the cost of implementing the first phase of funding the core network will amount to 250 billion in 2014-2020. The core network is to be completed by 2030.

From 80 to 85% of this amount will be allocated to priority projects along the nine corridors to be implemented in the core network; will also available funding for a limited number of projects on other traits representing high European added value for the core network.

Residual funding will be directed to “ad hoc” projects, including the global network projects.

TEN-T programme resources invested 2012



Source: European Commission. 2012

CEF priorities

In light of the main aims of the CEF, the funding allocated to projects is organised around three funding objectives:

- Funding Objective 1 (FO1): Removing bottlenecks and bridging missing links, enhancing rail interoperability, and, in particular, improving cross-border sections.
- Funding Objective 2 (FO2): Ensuring sustainable and efficient transport systems in the long run, with a view to preparing for expected future transport flows, as well as enabling all modes of transport to be decarbonized through transition to innovative low-carbon and energy-efficient transport technologies, while optimising safety.
- Funding Objective 3 (FO3): Optimising the integration and interconnection of transport modes and enhancing the interoperability of transport services, while ensuring the accessibility of transport infrastructures In order to ensure best use of the limited EU resources available, the vast majority of CEF funding during the programming period will be directed to major cross-border projects and projects addressing main bottlenecks and missing links on the nine TEN-T multimodal Corridors, as well as on horizontal priorities such as the implementation of traffic

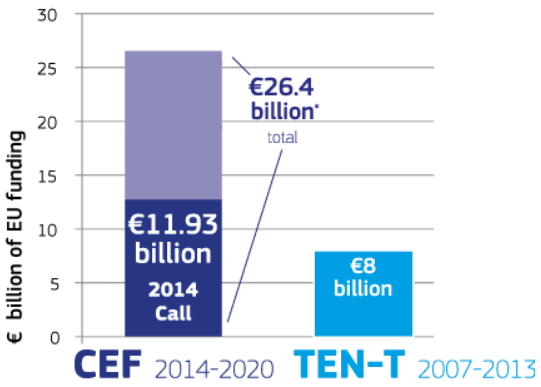
management systems, which allow the best use of existing infrastructure (e.g. ERTMS for railways, SESAR for aviation, ITS for road).

CEF funding is awarded mainly in the form of grants (through calls for proposals), but also in the form of financial instruments (managed in cooperation with entrusted entities, notably the European Investment Bank).

A number of programme support actions are also being carried out, and others are being planned, in particular to improve the capacity of Member States and project promoters to prepare the project pipelines.

CEF financial support takes primarily two forms:

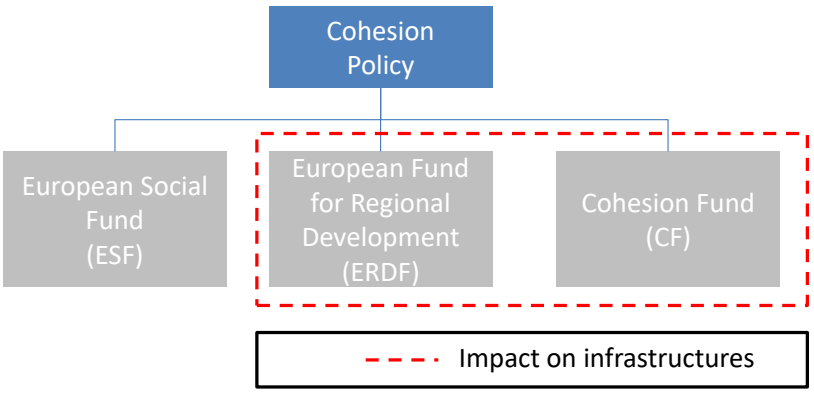
- grants, which are non-reimbursable investments from the EU budget; and
- contributions to innovative financial instruments, developed together with entrusted financial institutions such as the European Investment Bank, such as: the Marguerite Fund , the Loan Guarantee for TEN Transport (LGTT) and the Project Bond Initiative.



* subject to final approval of the European Fund for Strategic Investments (in 2015)

2.5.2. The Cohesion Policy and the Cohesion Funds

Another example that aimed at supporting the funding of EU infrastructure is the Cohesion Policy, whose main objective is the reduction of disparities between the various regions and the improvement of competitiveness and infrastructure of the least-favoured ones.



2.5.2.1. The European Regional Development Fund (ERDF)

The ERDF aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions.

ROADS INVESTMENT CRITERIA	
Road features	**Region**
All kind of road projects except those for routine maintenance	All EU regions

2.5.2.2. Cohesion Fund (CF)

The Cohesion Fund is aimed at reducing economic and social disparities and promoting sustainable development in Member States whose Gross National Income (GNI) per inhabitant is less than 90 % of the average of EU 28 to invest in Trans-European Networks transport. The eligible Member States will be decided upon once the Common Provisions Regulations enters into force.

In the transport sector, in addition to the TEN-T network, the Cohesion Fund will contribute to investments in low-carbon transport systems and urban transport. Member States eligible for the Cohesion Fund in 2014-2020 are: Bulgaria, Cyprus, Croatia, Estonia, Greece, Latvia, Lithuania, Malta, Poland, Portugal, Czech Republic, Romania, Slovakia, Slovenia and Hungary.

ROADS INVESTMENT CRITERIA	
Road features	**Region**
All kind of road projects as long as it belongs to the TERN[2]	Member States whose Gross National Income (GNI) per inhabitant is less than 90 % of the EU average.

Case study Grants: TENT-T programme

The TEN-T programme aims to establish a complete and integrated trans-European transport network, covering all Member States and regions. It is a mechanism which can be used to provide funds for the development of transport infrastructure through different channels: co-financing of studies, direct grants for works, interest rate rebates on loans (including EIB loans), contribution to EIB for LGTT and risk capital participation (equity investment fund).

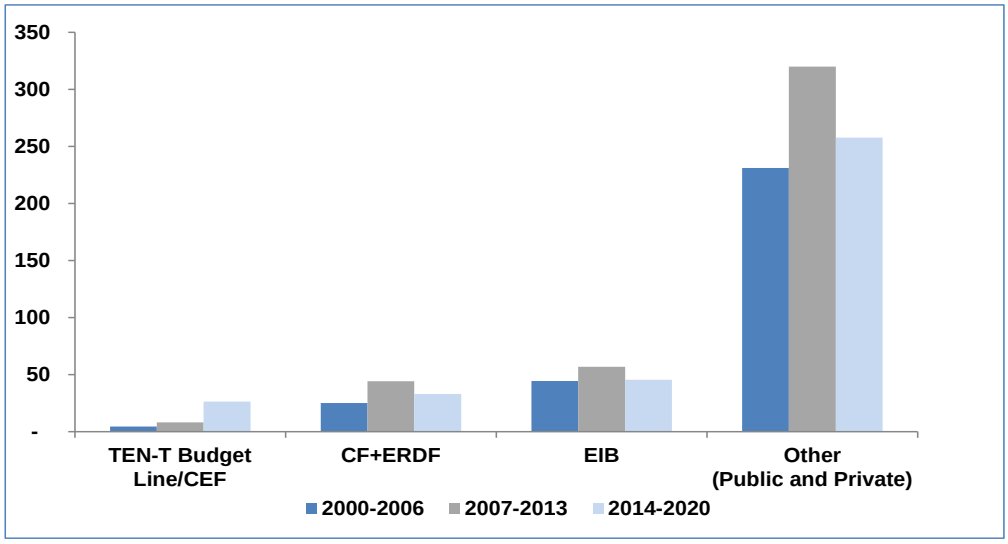
Projects receiving financing from the TEN-T programme are managed by the TEN-T EA. The contribution of the TEN-T programme to the total financing of TEN-T projects managed by the TEN-T EA is 17%. Apart from financial support, the Commission also provides non-financial support, for example through the European PPP Expertise Centre (EPEC) and direct advice at the project level.

Background of TEN-T policy

The Trans-European Networks (TEN) is a premier development issue of European economic and social policy that dates back to the Treaty of Rome (1957). TEN include communications, energy and transport infrastructure networks. The adoption of a Common Transport Policy (CTP) was already foreseen at this founding stage of the EU. However, the implementation of such European infrastructure networks was so slow that the Treaty of Maastricht (1992) included an obligation for the European Commission and the European Parliament to prepare guidelines for the development of TEN and to update them periodically. For the TEN-T the first guidelines were published in 1996, followed by revisions in 2004 and 2011/13. The latest revision of the TEN-T guidelines was proposed by the European Commission in 2011 and put into regulation at the end of 2013. TEN-T projects should fit into the strategic European transport network, as the core network developed by an analytical top-down approach, but also into the Strategic Transport Plans to be set up by each Member State. Together the core network and

[2] Trans European Road Network

the comprehensive network form the TEN-T. The TEN-T core network is planned to be fully implemented by 2030. In parallel to the TEN-T guidelines the Connecting Europe Facility (CEF) was established to structure and organize funding of the TEN. The CEF was initially assigned a budget of EUR 26.25 billion for transport for the period 2014 to 2020, which meant a tripling of TENT funds compared to the previous 7-years programming period. The costs of planned investments for the period up to 2020 were estimated at EUR 500 billion, of which half would be required to implement the core network. TEN-T co-funding rates were increased to reach up to 40% for cross-border projects and 30% for critical bottlenecks.

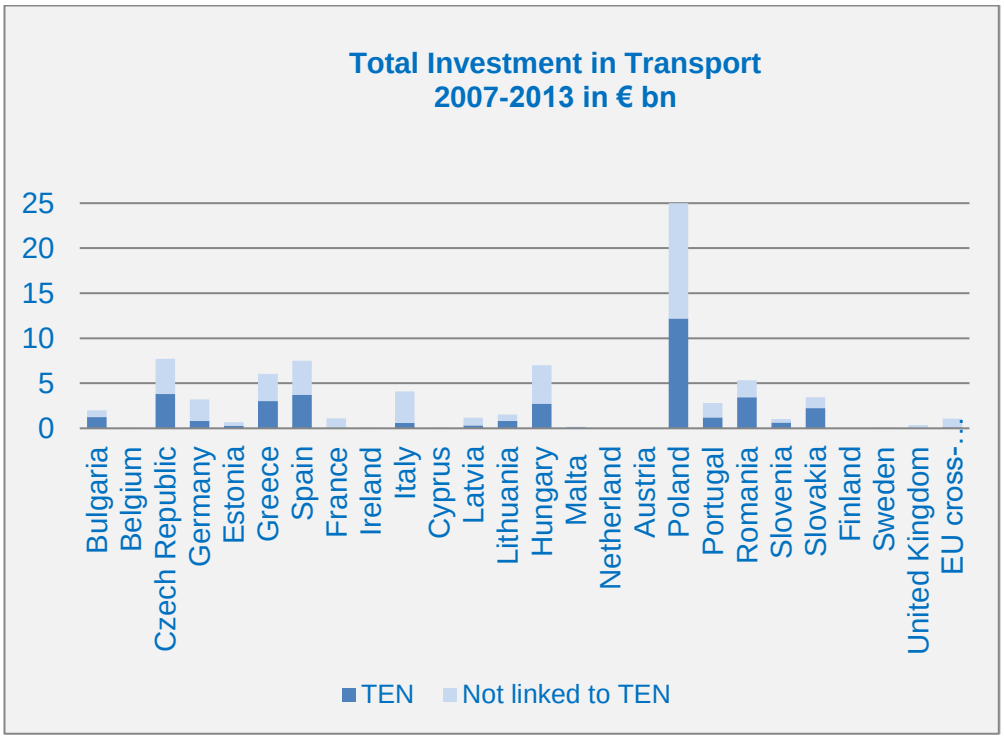


	2000-2006		2007-2013		2014-2020	
	€ bn	%	€ bn	%	€ bn	%
TEN-T Budget Line/CEF	4,4	1%	8	2%	26,3	7%
CF+ERDF	25,1	8%	44,2	10%	33	9%
EIB	44,3	15%	56,8	13%	45,5	13%
Other (Public and Private)	231,1	76%	320	75%	257,7	71%
Total TEN-T Financing	**304,9**	**100%**	**429,0**	**100%**	**362,5**	**100%**

TEN-T Financing over time and preliminary planning (EIB 2014)

ROADS INVESTMENT CRITERIA	
Road features	**Region**
All kind of road projects as long as it belongs to the TERN	*All Member States*

Source: European Commission, Cohesion Policy 2007-2013.



Source: European Commission, Cohesion Policy 2007-2013.

2.6. Private donations

Individuals, organizations or businesses can help to maintain roads or even can partially help to build them, having the option to participate as volunteers or to hire a maintenance service provider to perform the work on their behalf.

It can be a matter of altruism in order to complete a good action towards the community, or it can also be a matter of private interest, in which they prefer to privately afford the construction -or part of it- and/or maintenance of a certain public road because it is worth it for their own interests, although they are contributing to a public road and public bodies get profit of it.

In exchange for its services, a company may receive the opportunity to have its name and logo posted on a sign in the section of the roads they maintain.

Alternatively, private companies can need roads for their own use, that have to be built on public land and can be useful for not only the resource company that builds the road but also for citizens. In this case, these roads are declared public roads although its funding may come totally or partially from private players.

Advantages	Disadvantages
Is a non-repayable fund, there are no costs for Governments, or for users.	Only useful to support road maintenance and maybe partially construction, as the

Advantages	Disadvantages
Enables the road authority to save money spent on the maintenance of its roads, and to receive money from advertisements.	capital construction investment is too high to be funded by this way.
Governments do not have to pay for any system to collect the funds.	It can be negative for road safety (driving distraction from the advertising signs).
Positive image for funders: companies and users.	Incentives for private donations are not always evident or substantial.

Case Study Private Donations: Adopt-A-Highway Program USA

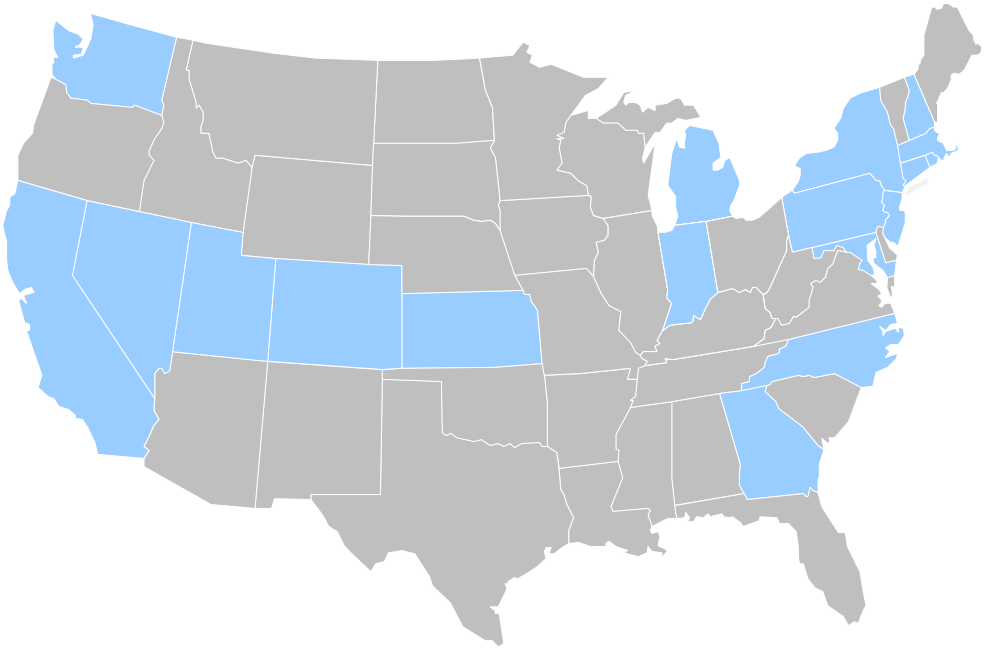
The Adopt-A-Highway Program (AAH), also known as Sponsor-a-Highway was established in the 1980s in Texas, since then, this program runs throughout the U.S. states. The program gives the opportunity to Individuals, organizations or businesses to contribute to the maintenance of roads. Usually the Adoptions are focused on two mile road sections and permits are issued for five year periods. Participation can include activities such as the followings:

ACTIVITIES
Removing litter
Planting and establishing trees or wildflowers
Removing graffiti
Controlling vegetation

In exchange for its services, an organisation is allowed to have its name posted on a sign in the section of the highways they maintain.

Throughout the USA there are several states which run an Adopt-A-Highway Program such as California, New York, North Carolina or Texas, and as indicated in the figure below.

Adopt-A-Highway Program – U.S. States



An example where this initiative is performed successfully is in North Carolina. It was established in 1988 by the North Carolina Department of Transportation (NCDOT) in response to growing public concern regarding litter along the state's highways. The program is administered by the NCDOT Office of Beautification, and is a joint effort between community volunteers and the NCDOT. Since its start, more than 120,000 inhabitants have cleaned and enhanced over 15,000 shoulder-miles of roadside.

In New York City, the Adopt-A-Highway program has many commercial companies renting out signs for advertisement purposes on both Highways and Parkways. Signs are rented for a term of 1 year and usually consist of about 1 mile of roadway per sign.

2.7. Hybrid funding mechanisms

These funding mechanisms are formed by a mix of several funding sources. They are usually designed to minimize the unique contribution of a single funding source, in order to lighten the burden of each element.

One of the most usual examples are subsidized tolls, which is a particular case of toll roads which are supported with subsidies from some authorities that allow the concessionaire to lower tariffs, hence the use of the road becomes cheaper for drivers. With this solution, governments low their investment requirements, they put part of the burden into users, and get the infrastructure available for use with a small public payment.

Advantages	Disadvantages
The Government makes a lower payment than financing the whole infrastructure; therefore, it has the chance to spend the budget in other sectors.	Traffic risk involved, under estimation of traffic volumes in the design of the project can cause financial default.
Through a band incomes design, minimum revenues can be guaranteed to the concessionaire and in the event of overpassing a certain incomes level, a percentage can be shared with the grantor.	Opposite consumer reaction to “pay per use” concept.
Despite the general opposition to “pay per use” concept, as tariffs are low, it´s easier to take up by users.	

Case study Hybrid Funding: AP-8 highway, Spain

The AP-8 highway is a toll road located in Vizcaya, in the North of Spain.

Last December 2013, the provincial Government established some subsidies to local users in order to support them with the tariff burden.

These discounts are aimed at commuters who often use the asset; hence, the toll road payment causes an important impact on their economies. These are the requirements to be the target of these subsidies:

- *Not to be a company, just a citizen allocated in the province of Vizcaya*
- *To own a TAG device*
- *Certificate of up-to-date tax and social security payments possession*

AP-8 Highway. Spain	
Grantor	*Diputación Foral de Vizcaya (Provincial Authority)*
Length	*120 km*
Category	*Real Toll*

With the implementation of this measure, the Administration is able to promote the use of toll roads by giving discounts to road users who use the facility on a regular basis. This is the distribution of discounts according to the frequency of monthly trips:

Days 0-11:	Days 11-25	Days 26 to the end of the month
•0% discount rate	*•35% discount rate*	*•45% discount rate*

3. Roads Funding issues and means of implementation

3.1. General budget vs Road fund allocation

Once funds are collected, the next step is to find the best way to implement the infrastructure investment or expenditure; the first decision to be made is whether the general budget or specific infrastructure allocation budgets are used.

In the first case, which is the most commonly employed method, the Treasury periodically determines a national budget - usually annually, but in some cases multiannual - and where funds are allocated to each government department, and within these, for each programme and projects.

However, some countries promote the development of road funds, specifically aimed at building and maintaining roads. These funds can be provided with incomes from different sources, like specific taxes, road user charges or grants, and the revenues generated at allocated directly towards road construction and maintenance, rather than the general national exchequer.

In Argentina and New Zealand earmarked funding was implemented after the crisis, around 2010. Some other countries did the same before the crisis, such as India or Nicaragua, and some countries like Japan and Australia implemented these earmark long ago, although Japan terminated it by 2009.

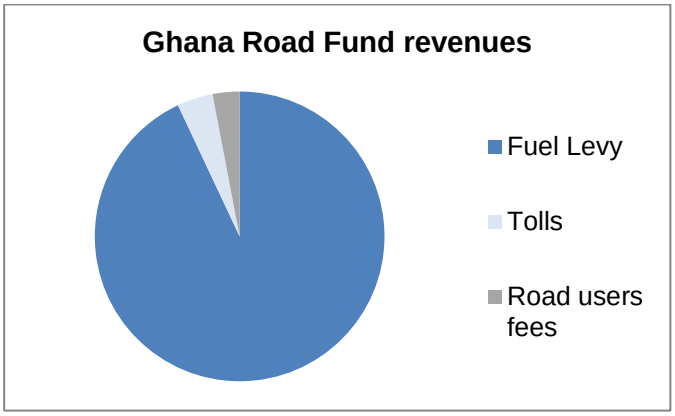
Some examples of earmarked taxes are petrol taxes in Argentina or vehicle registration revenue in Australia.

On the contrary, some countries have revoked the earmark in the past decades, such as Austria, with fuel taxes earmarked for federal roads until 1986; or Hungary, where part of the fuel price was earmarked to a Road Fund up to 1998; or finally Slovenia, with earmarked taxes until 2002.

While some developed countries have been doing away with their dedicated road funds, many developing countries, particularly in Africa and countries in transition, have been setting up road funds over the last 25 years. Some examples may be Ghana, Zambia and Yemen:

- **Ghana:** at the time of independence in 1957, the Ghana road network was in very good condition. In the 1960's the road budget declined and maintenance suffered. By the 70's, the roads were breaking up and failing faster than they could be maintained.

As result, a specific road fund was created in 1985 to maintain roads. This fund found its sources in Fuel Levy, Bridge, road and ferry tolls (users) and Vehicle examination fees. Funds were collected in the regions and transferred to the road fund account.



Source: Road Financing and Road Funds. 1999

The Legislation associated with the road fund clearly defines the spending priorities of the fund:

1st. Routine and periodic maintenance
2nd. Roads upgrading and rehabilitation
3rd. Road safety activities

- **Zambia:** Zambia has a road network of 37,000 km. of various classes of roads. As the country is surrounded by eight neighboring countries, transit traffic is high. In 1987 about 40% of the primary road network in Zambia was in good condition. By 1990 the percentage of the good roads had declined to 20%.

  Poor management and neglect of policies and institutional support caused a paramount decline in roads conditions. The road fund was established in 1994, with the sole source of Fuel Levy and disbursed for road maintenance only, but not for rehabilitation, reconstruction or new road construction.

- **Yemen:** The fund is currently focused on the 7,500 km of roads under the Ministry of Construction, but in the medium to long term extending the coverage to all roads in the country.

  This fund was established in 1995 and sourced by multiple ways: Fuel Levy, Fines for overloading, Allocations from the State Budget, Loans, grants and donations, Budget funds allocated to Ministry of Construction and other road agencies, and Other funds.

Not only taxes can be earmarked, but also fines can. In Iran, a relevant percentage of traffic fines and penalties directly goes to municipal systems and the rest is allocated to a road agency, where it should be used for safety affair of roads.

However, in CEDR countries there have been some examples that may be interesting, such as Latvian road fund established in 1994.

Case study: Latvian experience in establishing and using the state road fund 1994 - 2004

Regain of state independence of Latvia in August 1991 became a reason for essential economical and social changes in the country. It was raised necessity to prove to the world our ability of self - dependent management, ability to transform our economy from typical soviet time to the market oriented economy. However every beginning is hard. Such economical difficulties Latvia met in the first years of independence. Economical situation in the country we can see, if we analyze financing of the state road network, which testify, that in 1992 and 1993 national economy was not able to generate sufficient funds to finance all branches of national economy on adequate level, also for maintenance of road network. Picture of the complexity of the situation are as follows:

Funding available for roads from the state budget:

1990 117 mil .USD
1991 102 mil .USD
1992 10 mil .USD
1993 8 mil .USD

It was raised impression that financial resources for this important branch of national economy was planned according to principle "take what remain". State roads received only 8% from urgently needed funds. Numberless asks and trials to persuade composers of the state budget in necessity to increase financing for state roads remain without answers.

As a result of such poor financing were rising of backlog. In this situation it was absolutely clear, that it is possible to improve road financing through establishment of State Road fund:

- *separated from state consolidated budget;*
- *envisaged in Latvia legal documents, predictable source of financing.*

Establishment and Development of the State Road Fund

The establishment of the State Road Fund has taken several years and its development may be divided in several periods.

***The first stage**. In the result of this preliminary work on January 13, 1994 Saeima, the Latvian Parliament, adopted the law "On Annual Vehicle Tax" which:*

- *opened the possibility for establishing the State Road Fund;*
- *determined the first stable source of income for the State Road Fund;*
- *made the first steps for the financing of municipal roads and streets.*

We have to mention that The Ministry of Transport and the Latvian Road Administration are responsible for 20.329 kilometres of state roads. Besides the state roads there is also a municipal road network comprising:

- *32,190 kilometres of municipal roads,*
- *10,869 kilometres of streets.*

These municipal roads, as well, have been constructed and maintained for the state finances and currently they are in the same poor and even worse condition as the state road network.

In order to solve the financing problems both for state and municipal roads already during the preparation of the draft law a condition was envisaged determining that the annual vehicle tax has to be spent for the maintenance and repairs of both state and municipal roads. After the adoption of the law "On Annual Vehicle Tax" the Cabinet of Ministers already on February 1, 1994, adopted the decision "On State Road and Municipal Road (Street) Funds" by which:

- *the State Road Fund was established;*
- *recommendations to municipalities were given to establish road (street) funds;*
- *the Statutes of the State Road (Street) Fund were adopted;*
- *the draft Statutes for Municipal Road (Street) Funds were adopted.*

The first monetary resources from the Annual Vehicle tax the State Road Fund received on April 7, 1994. A very important condition contributing to the establishment of the State Road Fund was the fact that the Fund was established not by diverging the sources of income from the state basic budget into some special budget but by creating a legal permanent

predictable source of income which increased the income of the total budget in general.

***The second stage** was connected with the increase of the money flow into the State Road Fund. When analysing the income from the annual vehicle tax in 1994 it became clear that established rates and the number of vehicles for which the tax was paid could not ensure sufficient financial resources to finance fully both state and municipal road network. Due to that a new draft law "On Annual Vehicle Tax" was drafted in the end of 1994 and it was adopted on January 1, 1995. The law determined:*

- *higher tax rates;*
- *tax rates according to differentiated total weight of vehicles.*

The continuation followed in March 1995 when the Parliament adopted amendments to the law "On Excise Duty" which determined that starting with June 1, 1995, 50% of the excise duty on petrol, diesel fuel, their substitutes and components have to be diverged into the State Road Fund. This law determined, as well, that a part of these finances has to be used for the financing of municipal roads (streets). Thus the second legal source of income for the State Road Fund was determined. Now it forms 80% of all revenues of the Fund.

We have to admit that at this stage the amount of the revenues from both the resources has increased significantly and it has concluded the second stage of the development of the State Road Fund. Unfortunately, financing from the General State budget was stopped.

***The third stage** lasted up to the beginning of year 1999 and we are of the opinion that this was the State Road Fund growing time and the establishment of the Fund legal base. An important contribution to the development of revenues of the State Road Fund was given by the amendments to the law "On Excise Duty" adopted by the Parliament on May 16, 1996. They clearly determined the state policy towards the increase of excise duty in order to draw nearer the tax rates to those minimum rates determined by the European Union.*

At the same time we acquainted with EU directives in transport legislation, as well as, with the experience of European countries in road network financing. The most important acquired conclusion is that "the use of the road has to be become a service which is paid for by the road user".

Of course, there are lots of problems and difficulties in achieving this goal. They are connected with the economic development in the country, both internal and external policy, as well as, solvency of inhabitants and

willingness to pay for this service. Exactly in the implementation of this principle we see the place of the State Road Fund as a financial mechanism in the economic development of Latvia

***The fourth stage** – "Hard days" started in 1999. This has been a period of cutting revenues from the Excise duty on oil products due to the Russian crisis which has seriously affected the national economy of Latvia. After this crisis we received only 2/3 from the previous year's revenues from the Excise duty on oil products. To raise the activity of our economy the Parliament adopted amendments to the law "On Excise Duty on oil products" which determined that starting with July 1, 2000 we would reduce the Excise duty rate on diesel fuel from 0.13 LVL/per litre to 0.10 LVL/per litre. This law determined that till January 1, 2003 the Excise duty rates would be as follows:*

- *for unleaded fuel 0.16 LVL/per litre,*
- *for leaded fuel 0.21 LVL/per litre,*
- *for diesel fuel 0.10 LVL/per litre,*

Hopefully these changes provide the expected revenues in a long time period and the total amount of resources to be used for the state road network financing annually increase.

Management of the State Road Fund

According to Latvian legislation the state road network is under the responsibility of the Ministry of Transport. When implementing the State Road Fund it was clear that the Fund, as well, has to be under the responsibility of the same owner, which is responsible for the state road network. Thus the State Road Fund as an amount of financial resources (but not as a legal entity) is under the tenure (possession) of the Ministry of Transport which has delegated the right to manage the Fund to the Non-profit Organisation State Joint Stock Company "Latvian Road Administration".

The Latvian Road Administration carries out both the functions of the orderer in the state road sector and the management of the State Road Fund. The State Road Fund Division in the Latvian Road Administration has been established for this purpose. It has the following responsibilities:

- *the organisation of collection of annual vehicle tax;*
- *the accounting of the revenues from annual vehicle tax and excise duty in separate bank accounts;*
- *the allocations to road transportation and municipalities, as stipulated in the legislation;*

- *the working out and review of draft legal acts concerning the revenues and expenditures of the State Road Fund;*
- *the planning of expenditures for the state road network.*

In order to regulate the order of expenditures from the State Road Fund the Cabinet of Ministers approved regulations "The procedure of Administration and Utilisation of the State Road Fund".

These regulations determined that the Minister of Transport establishes the Advisory Board of the Fund, which gives advice to the Minister on planning and expenditure of the Fund. The Advisory Board acts as an advisory body and its decisions have the character of recommendations. The Consultative Board of the State Road Fund acts on the basis of the statutes approved by the Minister and carries out the following main tasks:

- *the review of proposals regarding the use of finances from the State Road Fund;*
- *the supervision of collecting and transferring duties and taxes into the State Road Fund;*
- *the review of strategic issues regarding the revenues and expenditures of the State Road Fund, etc.*

Structure of the expenditures from the State Road Fund is formed according to these regulations. The two main sources of the State Road Fund have been formed independently from each other and they have different subjects of payment (vehicle and fuel), therefore the structure of expenditures differs, as well.

Expenditures from the Annual vehicle tax. The structure of expenditures from the collected Annual vehicle tax is determined by the law "On Annual vehicle tax" which stipulates that:

- *70% of the total amount of the duty have to be transferred to the State Road Fund, and*
- *30% of the duty has to be transferred to the municipal road (street) funds.*

Expenditures from the Excise duty.

- *Target subsidy for transportation of passengers by bus - not more than twelve percent of the planned annual income of the Fund*
- *according to the declaration of the State Joint Stock Company "Latvian Railroad", 50% of the excise duty paid to the diesel fuel used for rail transport in the previous month are compensated to The Railroad Infrastructure Fund.*

- *30% of the remaining amount allocated to the municipalities as the Targeted subsidy for municipal roads (streets) network.*
- *and finally remaining amount of excise duty revenues are used for the state road financing*

Revenues of the State Road Fund

According to Latvian legislation the revenues of the State Road Fund were formed by two main independent sources of income:

- *annual vehicle tax;*
- *50% of the excise duty on oil products.*

After joining the EU in year 2004, in State budget optimization purposes the Latvian Cabinet of Ministers adopted a decision on the including of special budgets to the State consolidated budget composition. After this Latvian road network financing was not longer linked to the contributions paid by road users, but rather depends on the political decisions taken by the budgetary context.

3.2. Main issues to increase funding for roads

In order to implement the infrastructure investment planning of the different Public Administration, especially for new investments, sometimes, it is needed to increase the funding.

In this sense, there are some limitations to achieve the funding required, here are detail some of the most common ones:

- Political controversy: commonly there is always a political negative impact when the proposed actions touches the pocket of the citizens, for example, when tolling existent roads for maintenance purposes there is a clear rejection by the common users of the road. Another regular case happens when increasing taxes, general or specific, which implies a greater burden for the taxpayer with their consequent discontent.
- Create inflation through an increase in the final cost of goods: when creating a specific tax on road goods transport service cost that might go to road, which implies an increase of the inflation that should be take into account before applying the new tax to increase the funding.
- Create additional pressure for all vehicle drivers and for the economy: when increasing of the fuel excise or increasing of the vehicle tax there is an additional pressure for vehicle drivers and for the economy. For instance, it should be previously analysed the possible impacts of the measures to be adopted versus the benefits that the new infrastructure will generate.
- The expansion the heavy vehicle toll on all heavy vehicle classes; for example greater than 3,5t in countries that have implemented it, or enlarging the road network where it applies, or implementing a time depending road pricing for cars are two clear examples of measures that creates additional pressure for vehicle drivers.
- Increase of administrative cost or difficulties to manage the collection: increasing the variety of tariffs and types can increase the amount collected but also implies difficulties in the management of the collection that could derive in increase the administrative cost reducing the capacity of funding.
- In the same way, earmarking traffic fines (or a part of it) to road safety (some countries already done it), are measures adopt to obtain funds for road which could obtain difficulties to manage the collection.
- Distract from driving: when using advertising revenue in road to obtain the funding, it could imply a distraction to the drivers, with the corresponding negative impact on road safety. It is therefore very important to analyze the optimal places where to place advertisements and to avoid their use in case of possible reduction of road safety.
- Difficulty to establish up to what kind and percentage of benefit should support each part: when collecting funds for any directly related business to a road (those

benefitting from the road), it is very important to analyse the capability of the business to afford it and to be fair in the distribution of the funding applied.

3.3. Types of contracts

The type of contract used by governments for infrastructure provision or maintenance is very important for public planning and budgeting. Historically, the most common form of contract used in construction or Operations and Maintenance (O&M) contracts is the competitive tender, depending on the phase of the infrastructure. In these, contractors bid for work by means of open or restricted tenders, provide their work (construction or O&M of the road), and they are paid for it once they have delivered the service. The tenders are normally awarded on the basis of EU Procurement Directives, either as Lump Sums or billed rates. Payments are made in full by the state authorities for the work done. Various types of contracts are employed by state agencies or totally including:

a. Construction only (usually designed by the Employer)
b. Design-Construct (designed by the Contractor)
c. Design-Construct-Maintain
d. Design-Construct-Finance-Maintain (usually through some form of Public private Partnership)
e. Maintain only

In opposition to this, some alternative contracting practices have arisen through the past decades. Shadow tolling, availability payments or partial subsidies are a means of paying partially or totally for the infrastructure, but not necessarily at the time of the investment, but up to the usage life of the infrastructure.

Under the system of Availability Payments, the private sector pays for the entire cost of designing, constructing, maintaining and financing the road project. There is no associated traffic risk transferred to the concessionaire, no tolls are collected from the road users, and no payments are made until the road is open to traffic. Once the road is open to traffic, the concessionaire is paid a number of annual payments over the entire contract period, which is usually twenty five or thirty years, based on the road lanes being open. If there are any lane closures during the concession period, deductions are made from the Availability Payments. This contract form is currently used in Ireland as part of its PPP Programme, and in the United Kingdom in its Private Finance Initiative (PFI).

4. Optimum scope for each funding formula

After having addressed the road funding catalogue, it is especially interesting to assess in which specific cases each formula is more suitable. Moreover, CEDR's Strategic Plan 2013-2017 set the goal to be achieved by Task S-4 as "Identification of the most adequate scope for each of the available formula".

In this chapter it will be developed selection of criteria to be applied, analysis of the suitability of each formula according to them, and assessment of the optimum scope for each formula.

An adequate selection of the way to fund an investment, particularly an infrastructure, is crucial for any public authority. This decision directly affects not only the immediate impact for public budget, but also the capacity of investment maybe for future years; the relevance of selecting carefully which funding formula to use is out of any doubt, although many times this decision obeys to improvisation or political issues, rather than technical suitability.

4.1. Selected criteria for assessing the funding formula

Obviously, suitability will not be an absolute feature for each formula, but it will depend on which criteria is applied to assess it. To transfer to users the funding may be adequate in certain cases, but in others it may not, and public authorities will have to pay for the road with budgetary resources.

There are as many criteria as can be imagined; for this report two criteria have been selected, as shown to be the most relevant in general terms for most of the countries. The first one will be the maturity of the road network, as it is a very differential factor for each country. The second one will be the economic cycle situation, as there are different needs and financial availability depending on whether an expansive momentum is on top, or a financial crisis is going on.

4.1.1. Maturity of the road network

When we refer to maturity of a network, we have to distinguish between those countries with big needs of investment in new roads, and those that have already invested through the past decades and, although they will need to continue investing in the future, have their needs more focused in maintenance expenditure and light investments.

It is obvious that this is not a black or white option; it is very difficult to evaluate whether a state has a mature road network or not, and which grade of maturity is enough to distinguish between both. It is rather a self-assessment task for each state to do and, of course, in most of the cases both formula more suitable for new investments and those

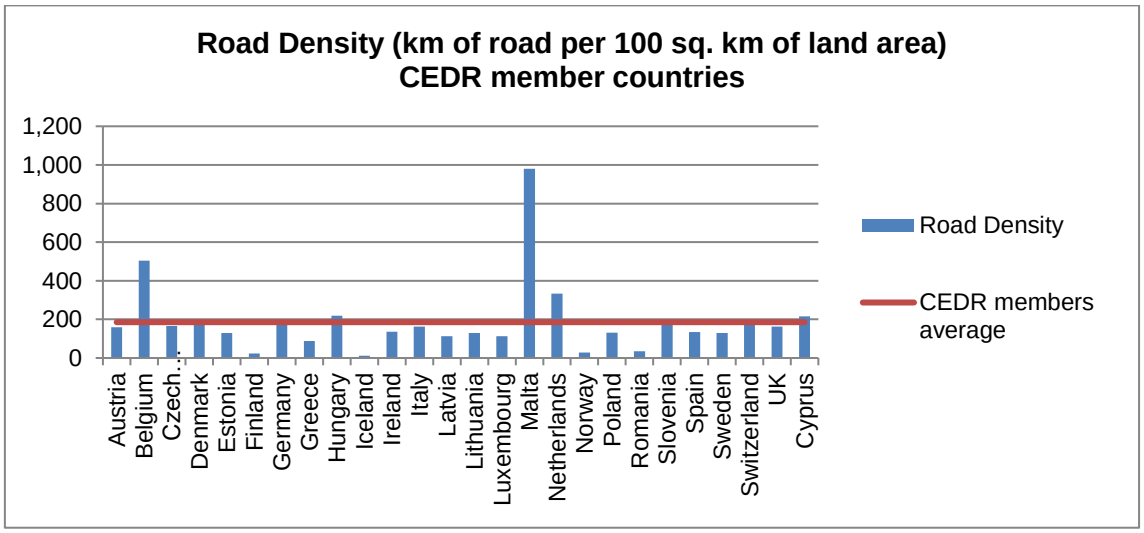
more appropriate for maintenance duties will have to be applied depending on the project, region, etc.

Not every state has the same grade of development in its national road network; moreover, within a state even not every region has. Nevertheless, it is a fact that every state, with no exceptions, will have needs for both investing in new roads and maintaining -in this case, including light or minor investment- existing ones in order to deliver a proper service to its citizens.

Total length of the road network gives little information on the maturity; it is not the same to have a certain length for a huge country than a small one; as well as it is very different to have that length for an overpopulated country or a very low populated one.

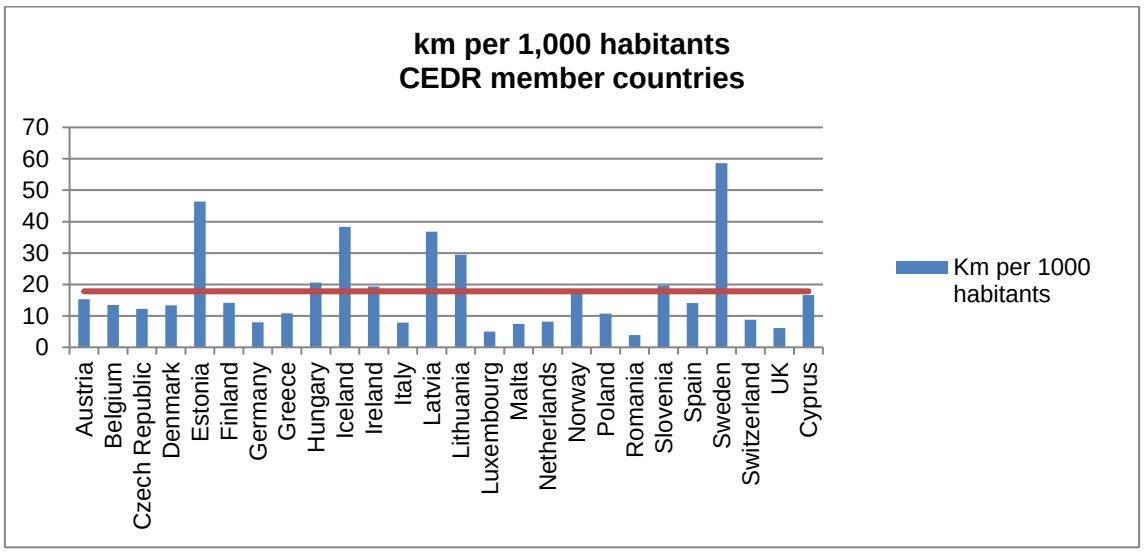
As we saw before, a good indicator for grading the maturity of a network may be road density, defined as the ratio of the length of the country's total road network to the country's land area. If we look into CEDR countries' road density graphic, we may see great differences among them, from countries like Iceland, Finland, Norway or Romania which have very low ratios -below 40 km per 100 sq. km- to countries such as Belgium, Malta or the Netherlands, with densities over 300 km per 100 sq. km.

This does not tell us an unquestionable conclusion, but it may be a factor to look at, absolutely.



Another interesting indicator may be the number of road km per habitant that each country counts. Previously we already saw the graphic regarding CEDR countries, and in this case, differences are even greater than road density ones.

Identically as we considered before, this ratio on its own is not as valuable as if it is analysed within a rationale comprising several ratios and business intelligence.



For this report, we will distinguish two categories for us to assess the funding formula:

A. New investments
B. Maintenance expenditure and minor investments

It is important to analyse the advantages that each formula has for each situation, as well as the limitations that may arise from the utilization of it. This should allow policy makers to choose in a proper way which formulas to consider when they are fronting an investment or expenditure.

A. New investments

This category will be characterised by the level of investment required. It will focus on capital expenditure regarding greenfield projects -new roads or networks- or major investment in brownfield projects -whole rehabilitation of a long section or road network, big capacity improvement programs, etc.-.

As is easy to deduct, these investments detract huge amounts of funds, either from public budget if it is publicly funded, or from private wealth. It is quite common to include within the discussion the timing for paying for the infrastructure, this is, if such a relevant investment should be paid exclusively through the construction period or if it is worth to distribute this payment through its useful life -or a point between them-.

Another big issue to discuss is, once involved the private sector -users or private companies or communities- to pay for the road, if they can afford the whole investment or if a mix of public and private funding must be used. Often it is not a matter of fairness of who should pay for it, but if it can be solely funded by users.

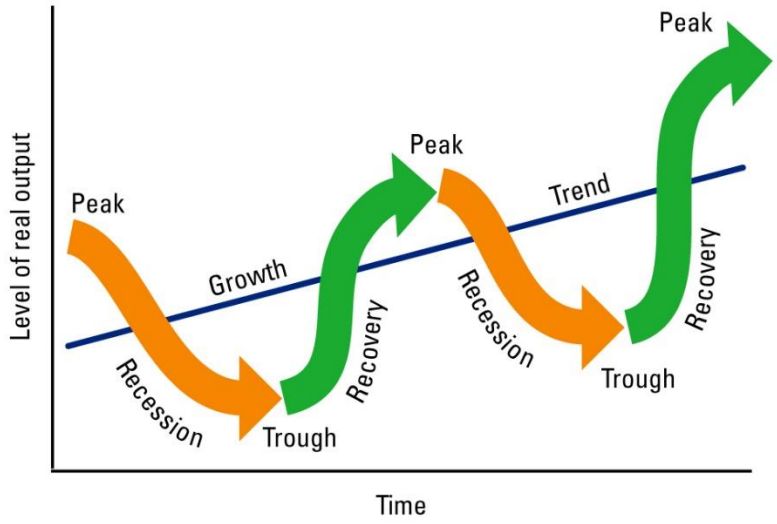
B. Maintenance expenditure and minor investments

The level of investment will also be the drier for this category. This kind of expenditure allows certain formulas to be very adequate, because needs of funding are much smaller in each project. This category will be focused mainly in brownfield projects, in which operation and maintenance is needed, as well as certain minor investments.

4.1.2. Economic cycle situation

The economic cycle can be defined as the natural fluctuation of the economy between periods of expansion (growth) and contraction (recession). Factors such as gross domestic product (GDP), interest rates, levels of employment and consumer spending determine the current stage of the economic cycle.

In the following graphic



Source: mrshearingeconomics.weebly.com

An increase in public infrastructure investment affects the economy in two ways. First, similar to other government spending, it boosts aggregate demand through the short-term fiscal multiplier, whose magnitude may vary with the state of the economy (Auerbach and Gorodnichenko, 2013). It may also crowd in private investment, given the highly complementary nature of infrastructure services.

The macroeconomic effects of public investment also vary depending on how it is financed. Government projects financed through debt issuance have stronger expansionary effects than budget-neutral projects that are financed by raising taxes or cutting other spending. It is possible that increasing debt-financed public investment in countries where debt is already high may increase sovereign risk and financing costs if the productivity of the investment is in doubt (e.g., because of poor project selection or implementation), exacerbating debt sustainability concerns.

For this report, we will distinguish two categories for us to assess the funding formula:

a. Recession stage
b. Recovery stage

Each of these two categories has its own characteristics that make lead to certain formula for its more suitable implementation.

a. Recession stage

This stage can be mainly characterised by both public and private financial constraint.

Users and companies see how their income is reduced, sometimes drastically, and have much less funds to use in general terms, and specifically for using infrastructures; public authorities tend to have decreases on GDP figures, usually accompanied by tax collection falls and much higher social expenditure needs through this periods.

Therefore, availability of big amounts of funding to be destined to road investments is quite low throughout this stage. This is a great limitation for developing infrastructure, although there is a common criterion on the expansive effect that good infrastructure projects have on the economy. On one side and immediately because of the construction motion that they generate -especially because construction is a high-demanding work force activity-, and on the other side because of the long term benefits that will arise from improving productivity by building better connection corridors.

In the short-term, building or upgrading transport or energy networks, for example, can boost aggregate demand through increased construction activity and employment. In the long-term, infrastructure investment can boost economic growth by increasing the potential supply capacity of an economy. For example, improving transport facilities could make workers more mobile, so making labour markets more efficient and increasing productivity.

b. Recovery stage

In contrast with recession stages, recovery is characterised by both public and private financial availability.

The big issue here is that cycles are not easy to predict and infrastructure projects have long development from the idea to its implementation, of course longer than most of recession periods. This gap makes decisions crucial to be able to anticipate needs and also financial constraints.

4.2. Advantages and limitations of each formula

In order to evaluate each formula in a simple and visual way, we have defined a firelight-assessment system for the formulas defined. This system will consist of a green, amber or red light depending on the adequate, neutral or inadequate suitability of each formula in each case.

4.2.1. All Purpose Taxes

Maturity of the road network

These taxes do not have a special feature regarding mature or recent road networks. This formula would be equally suitable for both categories defined, as budget is usually big enough to cover certain major investments, it depends on policy makers priorities.

New investments	Maintenance expenditure and minor investments
	

Economic cycle situation

General taxes trend to fall during recession stages and rise again through recovery, as unemployment increases and economic activity -and so companies' incomes- decreases. This makes particularly hard for policy makers to take decisions on the allocation of resources -meaning budgetary resources in fact- for new investments, especially non-social ones. On the other hand, once recovery is on top, taxes grow and these previously commented constraints turn to available resources.

Recession stage	Recovery stage
	

4.2.2. Special Purpose Road User Taxes and Fines

Maturity of the road network

Identically as said before, being also taxes and usually joint to public budget, there are no significant constraints in this case.

New investments	Maintenance expenditure and minor investments
	

Economic cycle situation

Although certain taxes are quite fixed and independent of the economic situation, such as annual vehicle taxes, many others covered within this chapter are variable with economic performance, like fuel taxes -which depend on fuel consumption-. Therefore, in general terms, we can say that correlation between the economic cycle and the availability of these sources is relatively high.

Recession stage	Recovery stage
	

4.2.3. Road User Charges

Maturity of the road network

User charges may be limited to the value that the infrastructure can give to users; depending on the amount of investment, it is quite usual that tariffs that users are willing to pay for cannot afford the whole package of the initial investment, operation and maintenance costs and reinvestments needed throughout useful life of the road. As an example a road that earns 30 minutes for a user may be a tunnel-bridge road that makes its initial investment absolutely unaffordable for users on their own.

New investments	Maintenance expenditure and minor investments
	

Economic cycle situation

Road users are mainly common people and companies -mostly transportation ones-. Doubtless the impact that economic recession has on both groups, and the depletion that their income, and therefore their expenditure capacity, suffers.

It is very common to see how road traffics drastically fall during recession periods, moreover they tend to anticipate financial crisis, and how they strongly rise when economy is recovering.

Recession stage	Recovery stage
	

4.2.4. Development cost charges (value capture)

Maturity of the road network

Developing players such as new commercial areas, municipalities or new residents frequently do not have enough resources to fully cover initial investment on new roads, as usually consider huge figures to connect new areas with the current network. However, it may be quite suitable for these players to partially pay for the investment and its ulterior maintenance. Having said this, in some cases these developments are already constrained by their inner costs to be able to pay for road accesses.

Additionally, in mature networks, maybe the point is that development cost charges are less necessary, or more limited, as current networks usually cover many needs.

New investments	Maintenance expenditure and minor investments
	

Economic cycle situation

On one hand, both commercial and urban developments are more likely to be undertaken in high-cycle situation; although some of these projects, which are also long-term ones, get into operation once crisis has come. On the other hand, municipalities or residents are quite inelastic -or unable to not pay- to costs that are submitted on a yearly basis, in this case for maintaining infrastructures, for instance; of course, taking into consideration that these charges may be somehow insignificant for them.

Recession stage	Recovery stage
	

4.2.5. Grant Funding

Maturity of the road network

Grant funding are developed for reinforcing economic and social cohesion, and this can only be met by new investments. New corridors that connect more depressed areas are good example of this. On the contrary, granting maintenance or minor investment costs does not seem to be meeting what grants seek.

New investments	Maintenance expenditure and minor investments
	

Economic cycle situation

As grants are political instruments to strengthen economic and social cohesion, although they are quite limited by budgetary constraints, they may be less affected in recession stages than other sources. Precisely in recession, grants may play a special role in strengthening the economy and empowering all the benefits that investing in infrastructure have.

Recession stage	Recovery stage
	

4.2.6. Private donations

Maturity of the road network

It is quite obvious that private donations cannot be of such size to fully fund a road investment. What usually happens is that individuals, companies or businesses help maintaining roads by means of donations, either doing those works by their own means, or hiring a provider for that.

In this sense, the amounts to be funded by this mean are very limited.

New investments	Maintenance expenditure and minor investments
	

Economic cycle situation

As these donations are small amounts and usually give private players certain helping image within their communities, it is not too likely that under recession they will be removing their aid; however, in some cases they just cannot afford any additional cost far from their business, so in a number of cases, recession may bring haircuts regarding these donations.

Recession stage	Recovery stage
	

4.2.7. Hybrid funding mechanisms

Maturity of the road network

As these mechanisms are a mix from many other aforementioned, it will depend on which tools they are combining to be able to evaluate their suitability according to each criteria. As a generic approach, we would say that they are suitable for both mature -where maintenance and minor investment is majorly needed- and developing networks.

New investments	Maintenance expenditure and minor investments
	

Economic cycle situation

In the same sense than explained before, this criteria depends on which formula are being combined in each case. As well as said before, and in a broad approach, we would say that these hybrid systems are more suitable for ramp up stages rather than stressed situations.

Recession stage	Recovery stage
	

4.3. Assessment of the optimum scope for each formula

Taking into account the criteria previously defined in this report, and the analysis done on the advantages and limitations of each funding formula regarding these criteria, we will follow the same firelight system used above.

This output should be taken as mere recommendations based on the analysis, criteria and experience of the Task Group and all the people who have contributed to this report.

This output can be summarised in the following table:

Category	Funding mechanism	Maturity of the road network		Economic cycle situation	
		New investments	Maintenance expenditure and minor investments	Recession stage	Recovery stage
All Purpose Taxes	General taxes	🟢	🟢	🔴	🟢
Special Purpose Road User Taxes and Fines	Vehicle taxes	🟢	🟢	🔴	🟢
	Fuel taxes				
	Green taxes				
	Fines				
Road User Charges	Distance based charges	🟡	🟢	🔴	🟢
	Time based charges (vignettes)				
	Tolls				
	Road pricing				
	International transit fees				
Development cost charges (value capture)	Commercial areas access contribution	🔴	🟢	🟡	🟢
	Urban development contribution				
Grant Funding		🟢	🔴	🟢	🟢
Private Donations		🔴	🟢	🟡	🟢
Hybrid funding mechanisms		🟢	🟢	🟡	🟢

5. Conclusions

It is a fact that more infrastructure assets are required to be constructed, improved or maintained. The growing population, economic growth, and the transportation needs thus generated, put pressure on Governments to develop new and more efficient road networks, linking different countries and connecting people and services through safe and efficient roads. However, we should also be conscious of the European Commission's White Paper on Transport (2011), and **ensure that road networks are developed in a sustainable manner**, and where there is a specific requirement.

The OECD average investment levels in land-based transport were estimated to be about 1% of Gross Domestic Product (GDP) for 2011. Similar studies carried out by PIARC (Evaluation and Funding of Road Maintenance in PIARC Member Countries, 2005) would indicate a expenditure of about 0.4% of GDP on road maintenance alone. These are indicative of the levels of investment, which are required of governments in order to have adequate transport systems.

According to classic economy, the annual (public) expenditures for the road sector increase in parallel with GNP and with traffic volume; and road users pay in accordance with the magnitude of the road damage they themselves cause.

Road networks provide a vital connectivity between all European countries and cities, and facilitate economic growth and development. They are an extremely valuable asset, which need to be maintained on a routine and periodic basis. That is the reason why **new ways of funding are required in the development of new road construction, and in the refurbishment and maintenance of the existing ones**.

The efficiency of the current practices to fund projects is key for its sustainability, and for the realisation of projects in order to contribute to national and international goals (safety, transport efficiency, competitiveness, and economic growth).

Traditional funding sources have been mainly relying on taxes and real tolls. This second option is being developed in a higher proportion in most countries now, as perhaps the "pay per use" (User Pays Principle) concept is fairer than taxes charged to all citizens, including road users but also non-users.

The introduction of additional dedicated road taxes is implausible, if the roads are already suffering a lack of maintenance due to misappropriation of established road taxes by the relevant authorities.

Despite the fairness of toll roads, it can be negatively perceived by users, as they have the idea of double-paying, as they would consider that their taxes alone are enough to fund road infrastructure. Therefore, toll systems can have an important impact on traffic and driver choice. That could be positive when environmental solutions are required, or

traffic jams need to be controlled, but it can also cause a decrease on traffic and hence toll incomes, when drivers choose to avoid toll roads. This can undermine the financial models upon which the toll scheme relied, and put in danger future scheme procurement. In some cases, commercial vehicle companies or drivers will choose not to use a tolled road facility if they consider the charges to be too high.

A good example of the general toll opposition, especially in Europe, is the recent Portuguese case. Seven highways were transformed from shadow toll to real toll. Hence, users now have to pay to use these roads. Traffic decreased in 2012 from 18% to 48% from its previous level, according to *Instituto de Infraestructuras Rodoviárias* (Inir).

Value capture is another vital concept for road funding; widening the concept from user to beneficiary is a must for modern infrastructure funding. Those players which are particularly benefited by a certain road investment should contribute to it, at least to its maintenance, and if possible, partially to its development.

As shown in the case studies, the measurement of the users' satisfaction through data collection feedback is important for proper implementation of different systems and in order to correct any deviation. **A balance needs to exist between the cost of a road toll, and the user's willingness to pay for its use**. The benefits of the road scheme may need to be highlighted more strongly by road authorities in terms of greater safety, greater journey time savings and more efficiency. Opinion would also suggest that these levels of expenditure are inadequate. In the case of limited or inadequate expenditure on maintenance, it is likely that the cost of any reactive remedial measures would be significantly higher than that if routine or periodic maintenance had been carried out.

While it may be possible to shift some goods and services transport onto rail, it is likely that road based transport will remain as the primary mode of movement for most goods and services. Road based transport is more flexible, and lends itself more readily to the "just-in-time" business philosophy.

Recent reports and studies have suggested a broader examination of charges on freight (Heavy Goods Vehicles) transport, with an objective of more specific tolls or charges on commercial vehicles. Whilst heavy goods vehicles cause the most loading and damage to road pavements, they are vital to the economic well-being of any state. If specific charges or pay per km tolls are to be levied against commercial operators, it should be done in a fair manner, and should not lead to a situation where transport costs in Europe become uncompetitive. In any event, these higher charges may inevitably be transferred back to the purchaser or the business community by the transport operator. The most recent report by PIARC also stresses the wider economic impact and benefit of road transport to society. Many people still rely on road transport (either by private car or bus or coach) to commute to work, or to travel for leisure and social purposes. In this context, there may be a need for a wider discussion and consultation on funding.

In the short to medium term it is likely that the primary sources of funding for road infrastructure will remain as general taxation and the range of specific measures outlined in this report.

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