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from: Secretary-General of the European Commission,  
signed by Mr Jordi AYET PUIGARNAU, Director

date of receipt: 3 July 2013

to: Mr Uwe CORSEPIUS, Secretary-General of the Council of the European  
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Subject: COMMISSION STAFF WORKING DOCUMENT  
Report in accordance with Article 11 (4) of Directive 1999/62/EC

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**COMMISSION STAFF WORKING DOCUMENT**

**Report in accordance with Article 11 (4) of Directive 1999/62/EC**

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**Report in accordance with Article 11 (4) of Directive 1999/62/EC**

*Summary of measures that internalise or reduce transport externalities*

## 1. INTRODUCTION

1. Article 11 (4) of Directive 1999/62/EC of the European Parliament and of the Council of 17 June 1999 on the charging of heavy goods vehicles for the use of certain infrastructures<sup>1</sup>, as modified by Directive 2011/76/EU<sup>2</sup> ("Eurovignette Directive") requires that:

*“By 16 October 2012, the Commission shall present a report that summarises the other measures, such as regulatory policies, taken to internalise or reduce the external costs related to environment, noise and health from all transport modes, including the legal basis and maximum values used.*

*In order to ensure fair intermodal competition while gradually charging the external costs of all transport modes, it shall include a timetable of the measures which remain to be taken to address other modes or vehicles and/or the external-cost elements not taken into account yet, taking into account progress in revising Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity”.*

2. The current report introduces the principal findings of a study<sup>3</sup> (hereinafter “the Study”), that was carried out by external consultants to collect information on existing policies for the pricing of externalities in transport. The focus is on pricing measures rather than on regulation, in line with the economic concept of ‘internalisation’ of externalities. The Study is available at the following website: [http://ec.europa.eu/transport/themes/sustainable/studies/sustainable\\_en.htm](http://ec.europa.eu/transport/themes/sustainable/studies/sustainable_en.htm).
3. This report also summarises, following the request of the Eurovignette Directive, the regulatory measures that aim at reducing transport externalities. It does so by complementing with the latest developments the information contained in the “Greening Transport Inventory”<sup>4</sup> (hereinafter “the Inventory”) accompanying the Communication on Greening Transport<sup>5</sup>, which summarised the different kinds of measures taken to reduce the negative impact of transport until 31 March 2008.
4. Finally, this report refers to some other non-regulatory measures that also contribute to the abatement of negative externalities and provides updated information on the implementation of the Commission’s internalisation strategy.

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<sup>1</sup> OJ L 187, 20.7.1999, p. 42.

<sup>2</sup> 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.

<sup>3</sup> Unless stated otherwise, the source for the tables, figures and data in the present working document is CE Delft et al., 2012, “Supporting study to the Impact Assessments of the European Commission’s internalisation strategy, to establish an inventory of measures for internalising external costs in all modes of transport”.

<sup>4</sup> Commission Staff Working Document (SEC(2008) 2206) available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52008SC2206:EN:NOT>

<sup>5</sup> COM(2008) 433 final

## 2. BACKGROUND

5. As indicated in the Staff Working Document accompanying the 2011 White Paper – Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system<sup>6</sup> : *“Price signals play a crucial role in many decisions that have relevant and long-lasting effects on the transport system. The localisation of a factory, the outsourcing of an activity, the organisation of retail distribution, the purchase of a house: all these choices are typically influenced by the availability and cost of transport.*
6. *It is therefore important that correct and consistent monetary signals are given to users, operators and investors, so that their decisions on the mode of travel, on the technologies to deploy or on the type of infrastructure to invest in, are also the most desirable from the point of view of society. The internalisation of externalities is part of the effort to align market choices with societal concerns for sustainability”.* For these reasons, in 2008 the Commission adopted the Greening Transport package, which included the Communication on the strategy to internalise the external costs of transport<sup>7</sup>.
7. The right pricing of externalities would also be an efficient way to generate funding for the development and maintenance of transport networks. Furthermore, internalisation of external costs is necessary to establish a level playing field between transport modes, which are often in direct competition.
8. One of the consequences of pricing externalities is to incentivise their reduction. However, negative impacts on the environment and health can also be curbed more directly through regulation. There is indeed a large amount of regulatory policies in the transport sector that play precisely this role.

## 3. SUMMARY OF EXISTING MEASURES

### 3.1. Cross-modal overview

9. The Study gathered information on the very large number of pricing measures that are taken by various levels of government in relation to the external costs of transport. For the purposes of this work, the definition of external costs<sup>8</sup> was taken from the *“Handbook on estimation of external costs in the transport sector”*, which was used for the preparation of the revised ‘Eurovignette’ Directive. The measures that have been

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<sup>6</sup> SEC(2011)0391 final.

<sup>7</sup> COM(2008) 435 final. Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions, *Strategy for the internalisation of external costs.*

<sup>8</sup> *“External costs are costs to society and - without policy intervention - they are not taken into account by the transport users. Transport users are thus faced with incorrect incentives for transport supply and demand, leading to welfare losses. In order to define external costs properly it is important to distinguish between*

- *Social costs reflecting all costs occurring due to the provision and the use of transport Infrastructure, such as wear and tear costs of Infrastructure, capital costs, congestion costs, accident costs, environmental costs.*
- *Private (or internal costs), directly borne by the transport user, such as wear and tear and energy cost of vehicle use, own time costs, transport fares and transport taxes and charges.”*

Source: *“Handbook on estimation of external costs in the transport sector”*  
[http://ec.europa.eu/transport/sustainable/doc/2008\\_costs\\_handbook.pdf](http://ec.europa.eu/transport/sustainable/doc/2008_costs_handbook.pdf)

assessed are those that can be regarded as (partly) internalising the cost of congestion, air pollution, climate change, noise, accidents, and infrastructure wear & tear.

10. An overview of the covered instruments is provided in Table 1. Time and resource constraints did not allow giving account of all conceivable measures: gaps remain particularly for those that are implemented at local level and/or concern the use of very specific parts of the network (tunnels, bridges, locks, etc.). Value added tax (VAT) on transport services was analysed only to the extent that a non-standard VAT rate were in place for these services.

**Table 1 Internalisation measures per transport mode and administrative level**

	EU	National	Regional	Local
<b>Road Transport</b>		Fuel taxes (including reduced levels and exemptions)  Infrastructure charges: - Time-based user charges (vignettes) - Distance-based user charges or tolls on the entire network or parts of the network  Insurance taxes  Vehicle purchase and/or registration taxes  Vehicle ownership and/or circulation taxes  Company car taxation  VAT reductions/exemptions	Tolls on specific parts of the regional network (e.g. bridges, tunnels).	Urban road pricing schemes
<b>Rail Transport</b>	(ETS) <sup>9</sup>	Fuel taxes  Electricity taxes  Infrastructure charges (incl. fees for delays)  VAT reductions/exemptions	<i>out of scope</i>	<i>out of scope</i>
<b>Inland Navigation</b>		Fuel taxes  Fairway dues  Charges related to prevention of water pollution.  VAT reductions/exemptions	Fairway dues	Port charges for selected ports of the TEN-T Core Network, as defined in COM (2011) 650 final.  Not included in the analysis are dues for locks and bridges for maritime shipping and inland navigation, as far as they are not

<sup>9</sup> The production of electricity used in rail transport is subject to the Emission Trading System (ETS)

<b>Maritime Transport</b>		Fuel taxes Charges related to prevention of water pollution VAT reductions/exemptions		related to one of the TEN-T core network ports.  Modulation of port charges
<b>Aviation</b>	ETS	Fuel taxes Ticket taxes VAT reductions/exemptions		Airport charges for selected airports of the TEN-T Core Network, as defined in COM (2011) 650 final, in particular:  - Landing and Take-Off (LTO) charge (often differentiated w.r.t. noise emissions)  - Noise surcharge  - Emission charge

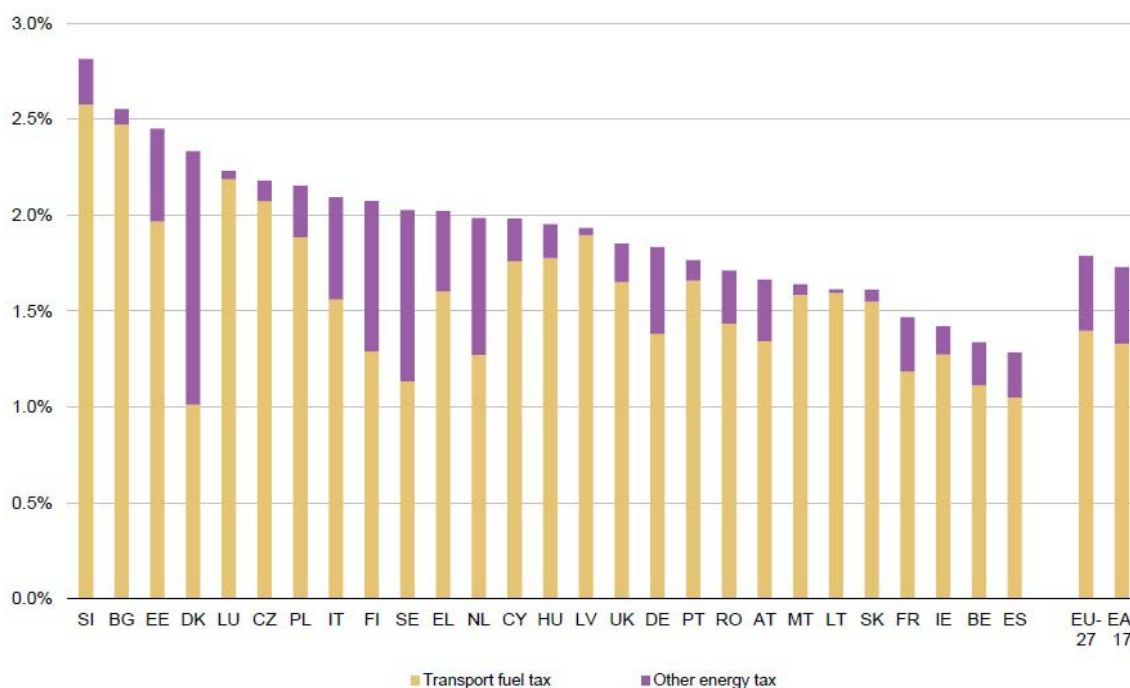
11. In the sections below, a summary of existing pricing measures is provided for the transport sector overall, followed by a short description of the most relevant instruments for each transport mode taken individually (Sections 3.2-3.6).

### 3.1.1. *Taxation of fuel*

12. It was found that, in monetary terms, currently the most important measure having the effect of internalising external costs in transport is the taxation of fuel. This is in line with the findings of the Commission's report on taxation trends in Europe<sup>10</sup>, which showed that while non-energy related environmental taxes on transport amounted to around 0.5% of GDP in 2011, taxes on transport fuels represented around 1.4% of GDP (more than € 170 billion in 2011).

<sup>10</sup> European Commission, 2013, Taxation Trends in Europe, available at: [http://ec.europa.eu/taxation\\_customs/taxation/gen\\_info/economic\\_analysis/tax\\_structures/index\\_en.htm](http://ec.europa.eu/taxation_customs/taxation/gen_info/economic_analysis/tax_structures/index_en.htm)

**Figure 1 Energy tax revenues by Member State 2011, in % of GDP<sup>11</sup>**



13. Taxes on energy are particularly well-suited to address externalities that are strictly correlated to fuel use, such as greenhouse gas (GHG) emissions, and are cheap and easy to collect<sup>12</sup>. Energy taxes can also be considered as an instrument to compensate for ‘security of supply risk’ and promote a diversification of energy sources<sup>13</sup>. They are, however, relatively poor instruments to internalise local externalities with variable impacts, namely congestion, air pollution, noise and accidents. This is because these taxes do not take into account the place or time of the actual use, or vehicle characteristics. It would therefore be more efficient to collect the same amount through a mix of instruments that is better capable of applying the ‘polluter pays’ and ‘user pays’ principles also in relation to the non-climate externalities.
14. More than 90% of the fuel taxes are raised in road transport. Rail diesel is subject to often lower excise duty rates, while inland navigation (in most cases), maritime shipping, and commercial aviation are exempted<sup>14</sup>. Electricity used in transport is generally subject to levels of taxation, which are lower compared to those for motor fuels. Furthermore electricity used in rail transport can benefit from a tax reduction or exemption. Compensation for greenhouse gas emissions from electric-powered transport is however paid through the European emission trading system (ETS). Also commercial aviation has been included in the ETS, although, in order to allow for

<sup>11</sup> Weighted averages. Idem footnote 10.

<sup>12</sup> The amount of fuel taxes presently collected (€ 170 billion) implies that emissions from road, rail and domestic navigation (885 Mt in 2011) are charged an average of over € 190 per tonne of CO<sub>2</sub>.

<sup>13</sup> 96% of transport energy needs are satisfied through oil derivatives.

<sup>14</sup> According to Council Directive 2003/96/EC, Member States may limit the scope of the exemptions to international and intra-Community transport



successful negotiations for a global solution, the EU has decided that flights to and from Europe can benefit in 2012 from a temporary exemption from enforcement<sup>15</sup>.

### 3.1.2. *Charges for infrastructure use*

15. Charges for the use of infrastructure are a preferable alternative to fuel taxes to internalise the cost of congestion, infrastructure wear & tear, air pollution and noise. Since infrastructure charges can be modulated to take into account specific conditions of use, they can be designed to apply ‘social marginal cost pricing’, which the Commission has proposed as general principle for internalisation in 2008<sup>16</sup>.
16. For all transport modes considered, a large number of measures have been identified<sup>17</sup>. However, given the nature of these measures and also owing to the lack of information on the charges applied at local level, it is not possible to derive an estimate of the total revenue raised.
17. Charges apply for the use of the railways network in all Member States. Charges are also levied for the use of airports, maritime and river ports in all cases that had been analysed. On the contrary, only a limited part of the road network – and none of it in the case of some Member States – is subject to forms of infrastructure charging.
18. All infrastructure charging schemes for inland waterways, maritime, and air transport use some kind of differentiation, most commonly based on the size of the vessels or aircraft. It was also found that all Member States differentiate charging with regards to wear & tear in the case of rail transport.

### 3.1.3. *Other pricing measures*

19. As shown in Table 1, there is a large variety of other instruments, which raise revenues from the transport sector and are applied currently either at national, regional or local level.
20. While some of these measures effectively contribute to the achievement of social or environmental objectives, they remain far from what can be considered optimal from the point of view of economic efficiency. Vehicle registration taxes can encourage better purchase decisions, but they are not capable of reflecting the actual social costs caused by the use of vehicles. Similarly, circulation, insurance or ticket taxes merely serve as rough proxies to internalise the externalities.
21. This being said, the revenues generated through these additional instruments are not negligible: in road transport alone, it is estimated that more than € 50 billion are raised yearly through taxes on vehicle registration and ownership; while revenues from air passenger taxes amounted to more than € 4.5 billion. At the same time, the rates of value added tax applied to domestic and/or international passenger transport are often lower for some transport modes than the standard VAT rates.

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<sup>15</sup> Decision No 377/2013/EU of the European Parliament and of the Council of 24 April 2013 derogating temporarily from Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, OJ L113 of 25 April 2013, p 1.

<sup>16</sup> Idem footnote 7

<sup>17</sup> Idem footnote 3

### 3.1.4. Regulatory measures

22. There exist many regulatory measures – actually a large part of the entire ‘acquis’ in the transport sector – that have an impact on transport externalities. With regards to the main external costs, the following is worth noticing:
- **Safety** is the subject of many regulatory measures in all transport modes. In sectors where accidents can have catastrophic effects (rail, aviation and maritime) the legislation is particularly strict and the amount of accidents and casualties is comparatively low;
  - **Greenhouse gas emissions** are regulated directly in road transport, by setting limits to the average CO<sub>2</sub> emissions of the new car and van fleets<sup>18</sup>. In the maritime sector, energy efficiency requirements have been established by the International Maritime Organization (IMO) for all new ships built as of 2015. In aviation, there are environmental performance targets to increase flight efficiency with resulting reductions of CO<sub>2</sub> emissions.
  - **Air pollution** is tackled in road through Euro/EURO classes<sup>19</sup>, in maritime through IMO emission limits, some of which have been also transposed into EU legislation, in rail and inland navigation through emission limits set in by the EU Non Road Mobile Machinery Directive, and in aviation through the International Civil Aviation Organization (ICAO) technical design standards. Furthermore, legislation fixes limits to levels of local pollution, which indirectly affect also the transport sector; while low emission zones<sup>20</sup> are specifically designed to exclude the most polluting vehicles from inner cities.
  - **Noise** produced by single vehicles is limited by legislation in road, rail and, as in the case of air pollutants, by international standards for aircraft. In addition, legislation sets limits to local levels of noise, which indirectly affect also the transport sector.
  - **Congestion** takes different forms in the various modes of transport. In transport sectors with scheduled services, regulation determines access to infrastructure (e.g. rail or airport slots) and possible penalties for delays that affect other operators. In the case of road transport, there are various forms of local regulation aimed at limiting congestion, for example, urban access restrictions and parking policy.
23. Contrary to pricing measures, that leave the choice between paying for externalities and avoiding them altogether, regulation imposes certain actions on operators or sets limits to be met. This can be justified, for example, by the presence of other market failures in addition to externalities. As a result, operators might be called to reduce externalities beyond the point that would be reached on the basis of purely pricing measures<sup>21</sup>. Therefore, the presence of regulation complicates the comparison of how externalities are tackled in different modes. In addition, some externalities have different nature and call for a different approach across modes<sup>22</sup>.

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<sup>18</sup> Heavy-duty vehicles' CO<sub>2</sub> emissions have however so far not been regulated.

<sup>19</sup> Euro classes apply to light-duty, while EURO classes apply to heavy-duty vehicles.

<sup>20</sup> An unofficial map and description of these is available at: [www.lowemissionzones.eu](http://www.lowemissionzones.eu)

<sup>21</sup> To give an example, legislation on CO<sub>2</sub> emissions by cars

<sup>22</sup> For example, congestion in rail and aviation cannot be dealt with in the same way as in the road sector.

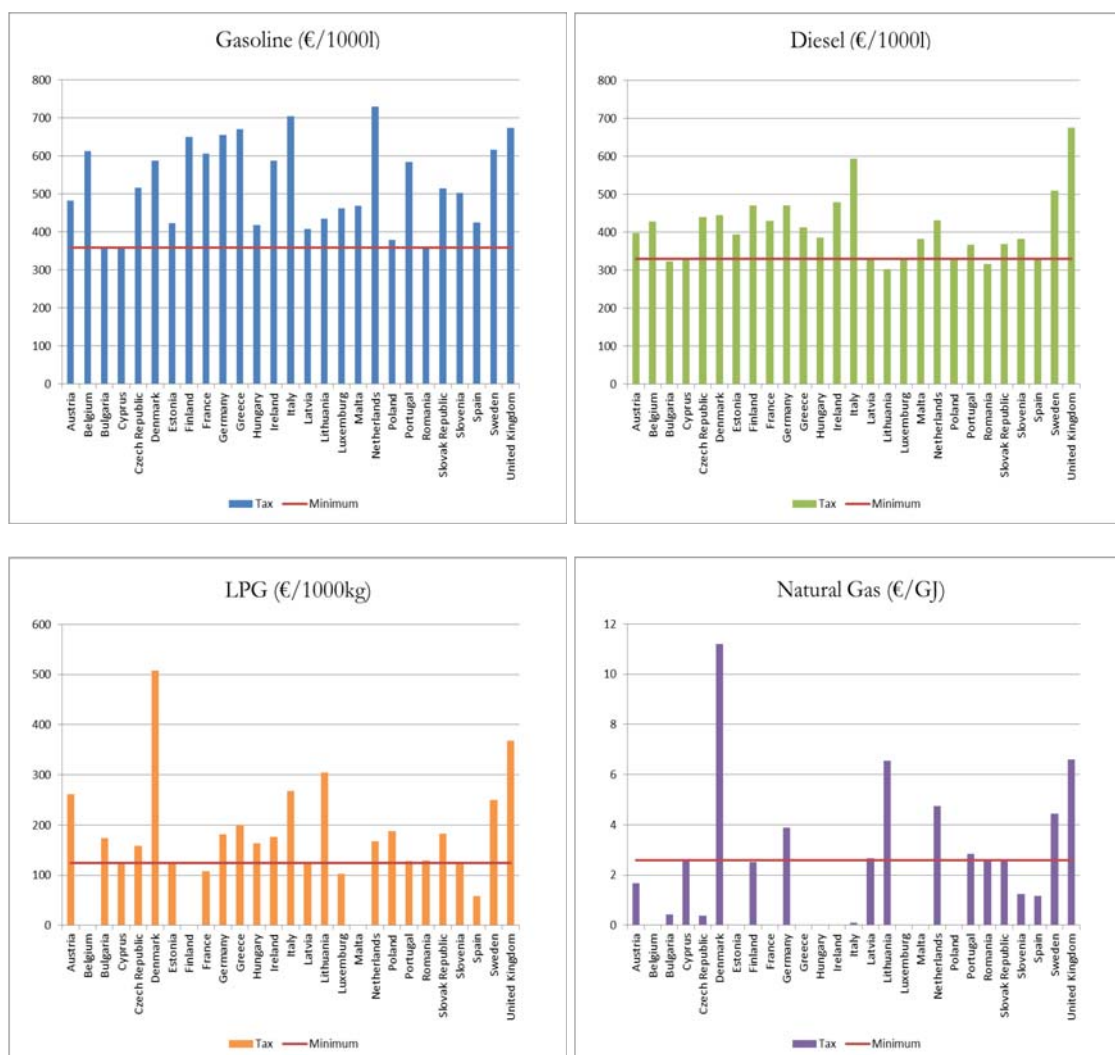
24. Not falling necessarily within the category of ‘regulatory measures’, but also relevant, are those initiatives that are taken to promote less polluting technologies and modes of transport. These initiatives – typically in the field of research and infrastructure – have strong synergies with internalisation measures, which can only translate into actual change of behaviour if users have satisfactory alternatives. Conversely, the existence of correct pricing contributes to the economic viability of modes and technologies that have a particular value to society for their ability to reduce negative externalities.

### 3.2. Road transport

#### 3.2.1. Fuel taxes

25. The Study has assessed the current level of fuel taxation across the various Member States for the main motor fuels currently in use. As shown in Figure 2, the level of fuel taxes remains highly diverse both in absolute and relative terms across the EU: for instance the Netherlands tax gasoline over 80% higher than Poland, and diesel only 30% higher; the United Kingdom taxes a litre of gasoline and diesel at the same rate, which is double the level of excise duty that Luxembourg applies on diesel.

Figure 2 Fuel tax levels in the EU (2012)



26. Fuel taxes have multiple objectives and in most cases are not formally linked to CO<sub>2</sub> emissions; only some Member States have an explicit CO<sub>2</sub> tax in place. Nevertheless, fuel taxation is directly correlated to fuel consumption and CO<sub>2</sub> emissions and therefore represents an appropriate instrument for internalising the climate change externality. If one were to consider the current fuel tax levels as internalising climate costs only (from exhaust CO<sub>2</sub> emissions), then translating the minimum tax levels of the Energy Taxation Directive into a carbon price would result in € 124.5 and € 157 per tonne of CO<sub>2</sub> for diesel and gasoline, respectively. Moreover, many Member States apply rates that are higher than the minimum levels stipulated in EU law<sup>23</sup>.

### 3.2.2. *Infrastructure charges*

27. Distance and time-based user charges, as well as tolls for specific infrastructure segments (e.g. bridges, tunnels) are used in road transport to a varying degree across Member States. With the exception of Cyprus, Estonia, Finland, Latvia, Malta, and the United Kingdom, all Member States apply them for Heavy Goods Vehicles (HGVs). At the same time, passenger cars are often not covered by these schemes: in addition to these six countries, the Benelux states, Denmark, Germany, and Sweden have neither vignettes nor tolls in place, apart from tolls on specific infrastructure segments.
28. The existing schemes most commonly differentiate charges with regard to vehicle size (normally approximated through the number of axles and/or vehicle weight) and to the air pollutant emission class of the vehicles (Euro/EURO class). In case where distance-based charging applies, this differentiation enables a close-to-optimal internalisation of the external costs of infrastructure wear & tear, and of air pollution.
29. Only few infrastructure charges (e.g. Czech Republic, some tolls in Spain) modulate charges based on the time of the day, in order to reflect the additional costs due to congestion. The internalisation of the noise externality is the least developed as there is hardly any scheme which differentiates charges based on the noise emission class of the vehicles.
30. As a result, and as demonstrated through the calculations shown in Table 2, the actual infrastructure charges per km show a very large variation across Member States: ranging from € 0.06/km to € 0.30/km for HGVs.

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<sup>23</sup> In several cases, mainly for natural gas, the tax level is below the minimum level set in Directive 2003/96/EC. This is because, for LPG and natural gas exemptions are made possible in Art. 15 (1) (i) of Directive 2003/96/EC. Some Member States apply lower levels of taxation for biofuels, in some cases also for the proportion in mixtures with fossil fuels.

**Table 2 Road user charge levels for representative vehicles (2012)**<sup>24</sup>

Country	Charge description	Vehicle B	Vehicle C	Vehicle D	HGV (vignette per year)	HGV (distance based charge for selected road sections)
<b><i>Time based</i></b>						
Austria	Vignette	€ 77.80	€ 77.80	€ 77.80		
Belgium	Eurovignette				€ 1,250.00	
Bulgaria	vignette	€ 34.26	€ 34.26	€ 34.26	€ 664.69	
Czech Republic	Vignette	€ 60.29	€ 60.29	€ 60.29		
Denmark	Eurovignette				€ 1,252.03	
Hungary	Vignette	€ 145.94	€ 145.94	€ 145.94	€ 797.79	
Luxemburg	Eurovignette				€ 1,250.00	
Netherlands	Eurovignette				€ 1,250.00	
Romania	Vignette	€ 28.00	€ 28.00	€ 28.00	€ 1,210.00	
Slovak Republic	Vignette	€ 50.00	€ 50.00	€ 50.00		
Slovenia	Vignette	€ 95.00	€ 95.00	€ 95.00		
Sweden	Eurovignette				€ 1,257.97	
<b><i>Distance based</i></b>						
Austria	distance-based HGV charge (100 km Maut)					€ 30.45
Czech Republic	distance-based HGV charge (100 km daytime)					€ 16.56
France	road toll (Paris-Lille, 221 km)	€ 15.40	€ 15.40	€ 15.40		€ 45.30
Germany	distance-based HGV charge (100 km Maut)					€ 15.50
Greece	road toll (120 km Korinthos-Patras)	€ 3.10	€ 3.10	€ 3.10		€ 11.00
Ireland	road toll (M1, 87 km)	€ 1.80	€ 1.80	€ 1.80		€ 5.90
Italy	road toll (plain roads, 100 km)	€ 6.42	€ 6.42	€ 6.42		€ 15.60
Poland	road toll (100 km)	€ 2.28	€ 2.28	€ 2.28		€ 6.16
Portugal	road toll (A25 Portico 9, max 21 km)	€ 1.85	€ 1.85	€ 1.85		€ 4.60

<sup>24</sup>

To enable comparisons among the Member States, a number of representative vehicles were chosen for the purposes of the study. 'B' refers to a small car (petrol), 'C' to a medium car (diesel), 'D' to a large car (petrol), and 'HGV' to a 40-tonne truck.

Slovak Republic	distance-based HGV charge (100 km)					€ 18.90
<b>Country</b>	<b>Charge description</b>	<b>Vehicle B</b>	<b>Vehicle C</b>	<b>Vehicle D</b>	<b>HGV (vignette per year)</b>	<b>HGV (distance based charge for selected road sections)</b>
Slovenia	road toll (Kompolja-Tepanje, 121.9 km)					€ 30.60
Spain	road toll (Barcelona-Tarragona, 100.36 km)	€ 12.97	€ 12.97	€ 12.97		€ 28.66
United Kingdom	road toll (M6, 43 km)	€ 6.40	€ 6.40	€ 6.40		€ 12.80

### 3.2.3. *Vehicle taxes*

31. All Member States apply some form of vehicle taxation, either on the registration or on the ownership of some or all type of motor vehicles, although in some countries private vehicles are fully exempted. For registration taxes several parameters are used to set the tax level: CO<sub>2</sub> emissions, engine size/power, Euro/EURO standards, age, value, fuel type, weight. For taxes on ownership, with the exception of vehicle value, the same parameters are used.
32. In order to better enable comparison among countries, the applicable vehicle tax rates were calculated for four representative vehicles<sup>25</sup>. As shown on Figure 3 and Figure 4, the divergent methodologies and large variety parameters results in significantly different absolute and relative taxation levels of vehicles across Member States.
33. It is to be noted that in a number of Member States there is no registration tax at all. The big differences in taxation levels have been a source of tax-induced cross-border registration of cars in certain cases.

<sup>25</sup> 'B' refers to a small car (petrol), 'C' to a medium car (diesel), 'D' to a large car (petrol), and 'HGV' to a 40-tonne truck.

Figure 3 Comparison of registration taxes for selected vehicles (2012) – logarithmic scale

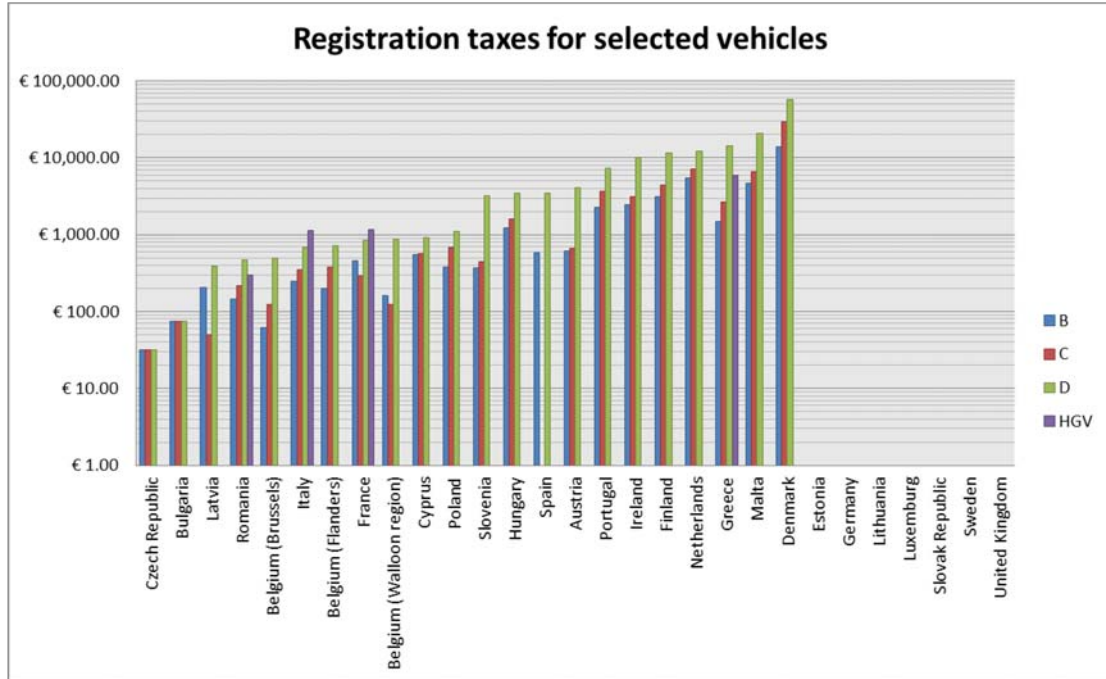
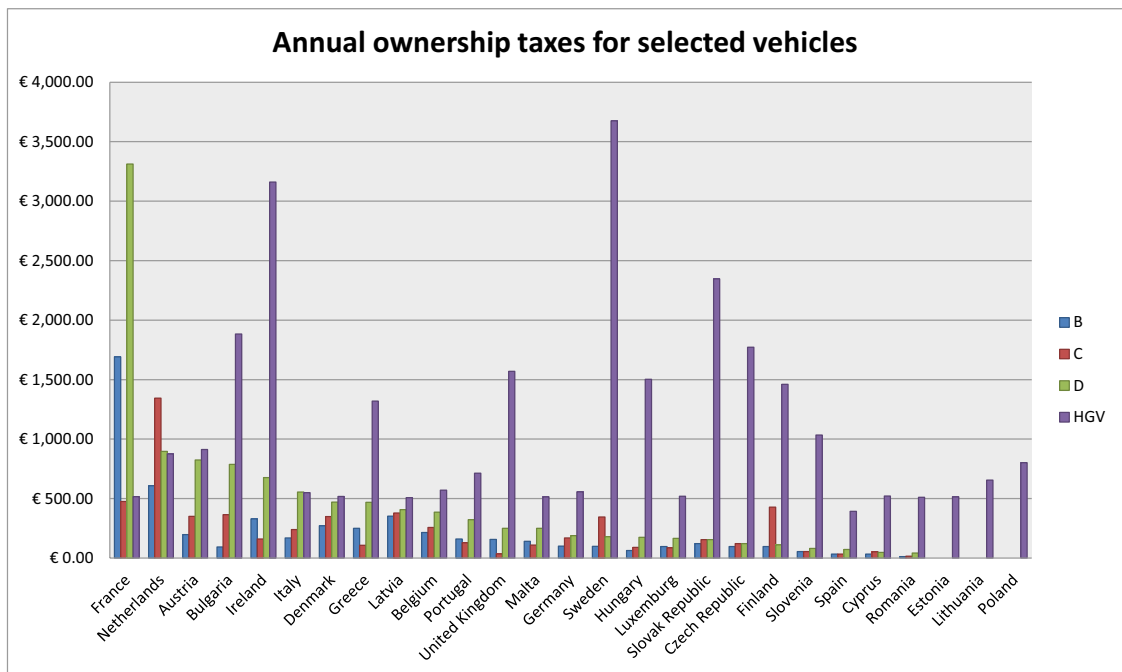


Figure 4 Comparison of ownership taxes for selected vehicles (2012)



3.2.4. Insurance taxes

34. Taxes on insurance premiums can be regarded as means to internalise the external costs of accidents not covered by insurances. A tax proportional to a premium that takes into account the profile of the insured driver and the distance driven would be an appropriate way to internalise the additional societal costs not covered by the insurance.
35. 23 Member States levy taxes on insurance premiums, and around half of them earmark some or all of the revenues for health- or emergency-related funds (Table 3). This

makes this type of measure the most commonly earmarked type of internalisation instrument.

**Table 3 Insurance tax levels in the EU (2012)**

Country	Tax	Remark
<b>Austria</b>	11.00%	Engine related insurance tax exists as well.
<b>Belgium</b>	27.10%	Basic rate: 10%. Of the rest, 17.5% earmarked for a health risk related fund (INAMI), 0.35% for the Red Cross. The basic rate is reduced for commercial vehicles.
<b>Bulgaria</b>	2.00%	
<b>Cyprus</b>	5.00%	Fully earmarked for the Motor Guarantee Fund. Stamp duty of € 1.71 is also levied.
<b>Denmark</b>	42.90%	Standard rate. Lorries are exempt, buses pay 34.4%, mopeds pay DKK 230/year.
<b>Finland</b>	23.00%	
<b>France</b>	34.20%	16.2% is earmarked for road transport risk related funds.
<b>Germany</b>	19.00%	
<b>Greece</b>	18.00%	18% on the part of the insurance related to liability, 5% of which is earmarked for the Motor Guarantee fund.
<b>Hungary</b>	1.50%	Fully earmarked for the Fire Brigade Tax.
<b>Ireland</b>	5.00%	2% is earmarked for special funds for the insurance sector.
Country	Tax	Remark
<b>Italy</b>	25.35%	10.5+2.5% is earmarked for road transport risk and health related funds.
<b>Lithuania</b>	15.00%	
<b>Luxemburg</b>	4.00%	
<b>Malta</b>	10.00%	
<b>Netherlands</b>	9.70%	
<b>Portugal</b>	26.74%	17.5% is earmarked for various health and road transport related funds, 0.242% for the insurance sector.
<b>Romania</b>	1.50%	Fully earmarked for the Motor Guarantee Fund.
<b>Slovak Republic</b>	8.00%	Fully earmarked as a Fire Brigade levy.
<b>Slovenia</b>	6.50%	
<b>Spain</b>	8.15%	2.15% is earmarked for special funds of the Insurance sector (financial risks).
<b>Sweden</b>	32.00%	
<b>United Kingdom</b>	6.00%	

### 3.2.5. Regulatory measures

36. In the area of road safety, the Inventory of 2008 reports regulatory instruments in place regarding speed limiters in lorries and buses, weights and dimensions, abnormal loads and dangerous goods, blind spot mirrors, roadworthiness testing, daytime running



lights, tyres, intelligent vehicle safety systems, driving licence and training, as well as enforcement. A number of regulatory measures have been adopted since then:

- a single European driving licence with minimum requirements for obtaining it<sup>26</sup>;
- the revision of the tachograph legislation to make full use of new technological development to ensure better compliance with rules on driving times and rest periods, thereby increasing road safety<sup>27</sup>;
- new rules on enforcement of sanctions facilitating the cross-border exchange of information on road safety related traffic offences<sup>28</sup>;
- an adaptation to technical progress of the legislation on roadworthiness testing<sup>29</sup>;
- and, according to the legislation on road infrastructure safety management, since the end of 2010 Member States must calculate the average social cost of a fatal accident and the average social cost of a severe accident occurring on their territory. The cost rates should be updated at least every five years<sup>30</sup>.

37. EU legislation sets binding CO<sub>2</sub> emission targets for new car and van fleets. As the automotive industry works towards meeting these targets, average emissions are falling each year<sup>31</sup>.

- Under the Cars Regulation<sup>32</sup>, the fleet average to be achieved by all new cars is 130 grams of CO<sub>2</sub> per kilometre (g/km) by 2015 – with the target phased in from 2012 – and 95 g/km by 2020. The regulation is currently undergoing amendment in order to implement the 2020 target<sup>33</sup>. The 2015 and 2020 targets represent reductions of 18% and 40% respectively compared with the 2007 fleet average of 158.7g/km.
- The Vans Regulation<sup>34</sup> limits CO<sub>2</sub> emissions from new vans to a fleet average of 175 grams of CO<sub>2</sub> per kilometre by 2017 – with the target phased in from 2014 – and tentatively 147 g/km by 2020. The regulation is currently undergoing amendment in order to confirm and implement the 2020 target<sup>35</sup>. These cuts represent reductions of 14% and 28% respectively compared with the 2007 average of 203 g CO<sub>2</sub>/km.

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<sup>26</sup> Commission Directive 2009/113/EC, 2011/94/EU and 2012/36/EU amending Directive 2006/126/EC  
<sup>27</sup> COM(2011) 451 final, Proposal for a regulation of the European Parliament and of the Council amending Council Regulation (EEC) No 3821/85 on recording equipment in road transport and amending Regulation (EC) No 561/2006 of the European Parliament and the Council

<sup>28</sup> Directive 2011/82/EU of the European Parliament and of the Council, OJ L 288, 5.11.2011.

<sup>29</sup> Commission Directives 2010/47/EU, 2010/48/EU and EU Recommendations 2010/378, 2010/379

<sup>30</sup> Directive 2008/96/EC of the European Parliament and of the Council, OJ L 319, 29.11.2008, p. 59–67

<sup>31</sup> [http://ec.europa.eu/clima/policies/transport/vehicles/index\\_en.htm](http://ec.europa.eu/clima/policies/transport/vehicles/index_en.htm)

<sup>32</sup> Regulation (EC) No 443/2009 of the European Parliament and of the Council of 23 April 2009 setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO<sub>2</sub> emissions from light-duty vehicles, OJ L 140, 5.6.2009, p. 1.

<sup>33</sup> COM(2012) 393 final

<sup>34</sup> Regulation (EU) No 510/2011 of the European Parliament and of the Council of 11 May 2011 setting emission performance standards for new light commercial vehicles as part of the Union's integrated approach to reduce CO<sub>2</sub> emissions from light-duty vehicles, OJ L 145, 31.5.2011, p. 1.

<sup>35</sup> COM(2012) 394 final

38. As a first step towards addressing CO<sub>2</sub> emissions from HDV, a number of studies have been commissioned, including a methodology for CO<sub>2</sub> emission measurement for HDV, taking into account not only the engine but the whole system – engine, truck, driving resistance, aerodynamic – and measuring all relevant contributions of CO<sub>2</sub>. The Commission announced in its April 2010 Communication on "*A European strategy on clean and energy efficient vehicles*"<sup>36</sup> – and subsequently confirmed in the Transport White Paper – that it would propose a strategy targeting fuel consumption and CO<sub>2</sub> emissions from HDVs.
39. In addition, EU legislation requires a reduction of the greenhouse gas intensity of the fuels used in vehicles by up to 10% by 2020. The Fuel Quality Directive applies to all petrol, diesel and biofuels used in road transport<sup>37</sup>.
40. Regarding air pollutants, the Regulation on heavy duty vehicles<sup>38</sup> defines the legal framework for type-approval of motor vehicles, engines and replacement parts with respect to their emissions. Manufacturers must equip their vehicles or engines with components that ensure compliance with the emission limits laid down in Annex I to this Regulation.
41. Air pollution caused by light passenger and commercial vehicles is limited by Euro 5 and Euro 6 standards set in 2007.
42. At the end of 2011, the Commission proposed to reduce noise produced by cars, vans, buses, coaches, light and heavy trucks<sup>39</sup>. Noise limit values would be lowered in two steps of each 2 dB(A) for passenger cars, vans, buses and coaches. For trucks the reduction would be 1 dB(A) in the first step and 2 dB(A) in the second step. Annex III to the proposed Regulation includes the limit values.
43. Urban congestion can be managed through integrated land use and transport planning and coordinated transport development involving all transport modes – including appropriate levels of public transport. Next to the provision of new capacity or freeing up existing capacity, there are different approaches that cap, limit or otherwise manage traffic levels<sup>40</sup>:
- Directly managing the physical access to the roadway through access policies.
  - Indirectly managing access to the roadway network and directly influencing road travel to particular areas through parking policies.

<sup>36</sup> COM(2010)186 final, p 6, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0186:FIN:EN:PDF>

<sup>37</sup> More specifically on biofuels, in October 2012, the Commission published a proposal for a Directive to limit global land conversion for biofuel production, and raise the climate benefits of biofuels used in the EU [COM(2012)0595 final]. The use of food-based biofuels to meet the 10% renewable energy target of the Renewable Energy Directive would be limited to 5%. This is to stimulate the development of alternative, so-called second generation biofuels from non-food feedstock.

<sup>38</sup> Regulation (EC) No 595/2009 of the European Parliament and of the Council of 18 June 2009 on type-approval of motor vehicles and engines with respect to emissions from heavy duty vehicles (Euro VI), OJ L 188, 18.7.2009, p.1.

<sup>39</sup> Proposal for a Regulation of the European Parliament and of the Council on the sound level of motor vehicles, COM(2011) 856 final

<sup>40</sup> Managing Urban Traffic Congestion – ECMT, 2007, <http://www.internationaltransportforum.org/jtrc/CongestionSummary.pdf>

- Managing the level of traffic through road pricing policies that target the use of, or access to, roads or urban areas.
44. Previous and on-going EU-funded research initiatives have contributed to making transport more environmentally sustainable and less dependent on fossil fuels. EU contribution to research related to greening the European transport amounted to € 1,325 billion for the period 2007-2013, which represents around 40% of the total amount devoted to transport. All modes have been addressed, but having in mind that the road sector is the biggest polluter, a lot of efforts have been concentrated on road vehicles.
  45. Extensive R&D investment has contributed to substantial improvements in vehicle energy efficiency, both via incremental improvements of incumbent technologies such as internal combustion engines, as well as measures supporting the deployment of alternatively fuelled vehicles, such as the electric ones. In this context, the European Green Car Initiative, with the overarching goal to foster research, development and innovation in the field of sustainable mobility, has been financed by an EU contribution of € 500 million from the Seventh framework programme of the European Community for research and technological development including demonstration activities (FP7), with electrification of road vehicles as one of the main priorities. Further CO<sub>2</sub> reductions have been achieved by optimizing tyres' rolling resistance, vehicle weight reduction and improved aerodynamics.
  46. It is important to note that the latter CO<sub>2</sub> mitigation measures cover not only passenger cars, but also address public transport and commercial vehicles, including heavy duty ones. Extensive efforts aiming to replace fossil fuel driven vehicles with alternative fuels have also been performed in the framework of the Fuel Cells and Hydrogen Joint Undertaking, with an EU contribution of € 470 million under FP7, which supports research, technological development and demonstration activities in fuel cell and hydrogen energy technologies in Europe.

### 3.3. Rail transport

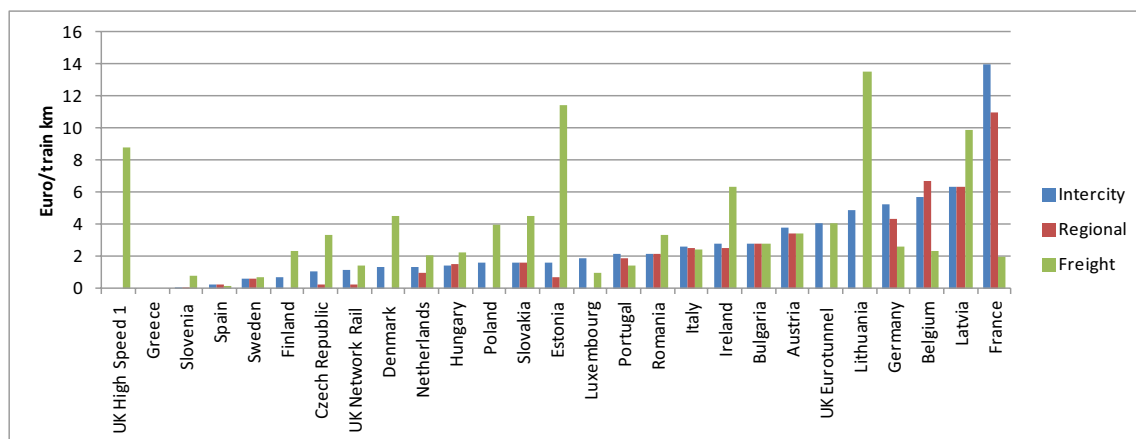
#### 3.3.1. Infrastructure charges

47. Directive 2012/34/EU establishing a single European railway area<sup>41</sup> sets out the rules governing infrastructure charging in railways, and all Member States having railway networks apply these rules. Such track access charges are not in general set having regard to externalities. Also, charges for a large part of the network are in a narrow band, in other cases charges differ for various reasons, e.g. different intensity of usage (gross tonnage or the density of trains on the network), the railway companies' ability to pay, the technology used or the pricing principles adopted. The structure of charges varies significantly from one Member State to the other<sup>42</sup>. Figure 5 illustrates the divergence of the average charges for some representative train types.

<sup>41</sup> OJ L 343, 14.12.2012, p. 32.

<sup>42</sup> For example, the charge structure of Finland only applies gross tonne-km and train type as a basis, while the ones adopted by Austria or Germany take all relevant variables into account

Figure 5 Average level rail usage charge per train typology (€/train km)



48. Another reason for this divergence is the fact that the coverage of external costs of railways varies greatly across the Member States. While all of them charge the costs of wear & tear, only few charging systems apply some form of internalisation of the costs of congestion or scarcity (13 Member States), air pollution (4 Member States), noise pollution (3 Member States<sup>43</sup>), and accidents (3 Member States).

### 3.3.2. Taxes on diesel and electricity

49. The majority of Member States apply a partial or full exemption from excise duties on diesel consumed by rail transport, while exemptions apply in 11 Member States on the use of electricity. Accordingly, taxes on fuel and electricity play a more limited role in the internalisation of external costs of rail transport (rail is also inherently more fuel efficient and thus produces fewer negative externalities, and it should be noted that train operators additionally have to pay track access charges for use of infrastructure). Nevertheless, the externalities related to climate change are internalised for electric trains, which are indirectly covered by the EU ETS.

### 3.3.3. Regulatory measures

50. In the rail sector, the regulatory measures adopted after the publication of the Inventory that have a significant impact on externalities are the Technical Specifications for Interoperability (TSI) in the form of Commission Decisions.<sup>44</sup>

51. TSIs relating to the control-command and signalling subsystems of the trans-European rail system<sup>45</sup> (ERTMS) are a means to reduce congestion and increase safety both for high-speed and conventional rail.

52. Safety is also addressed by technical specifications relating to freight wagons<sup>46</sup>, to the rolling stock subsystem — ‘Locomotives and passenger rolling stock’ of the trans-

<sup>43</sup> At the time of the study, only three Member States were planning to internalise the external costs of noise: from December 2012 Germany applies a noise related component in the freight train path price together with a bonus system; from 2013, the Czech Republic will introduce a noise factor in the access charge formula; while the Netherlands aims at reducing noise by providing bonuses to trains with silent wagons.

<sup>44</sup> <http://www.era.europa.eu/Core-Activities/Interoperability/Pages/TechnicalSpecifications.aspx>

<sup>45</sup> Commission Decision 2012/88/EU amended by Commission Decision 2012/696/EU, applicable since 1 January 2013, OJ L 51, 23.2.2012.

<sup>46</sup> Commission Decision 2009/107/EC, OJ L 45, 14.2.2009, p. 1.

European conventional rail system<sup>47</sup>, and to safety in railway tunnels in the trans-European conventional and high-speed rail system<sup>48</sup>.

53. Technical specifications relating to the rolling stock subsystem of the trans-European high-speed rail system<sup>49</sup>, and to the subsystem rolling stock — noise of the trans-European conventional rail system<sup>50</sup> help reduce noise emissions.

### 3.4. Inland waterways transport

#### 3.4.1. Port dues

54. Infrastructure charges are principally levied through port dues, which are composed of port access, transshipment and/or some other form of charges such as anchorage charge. Based on the sample of 26 ports, the most commonly used basis for charges are the weight of goods and the capacity of the vessels for freight transport (Table 4), while for passenger ships either a general charge, or the length/gross tonnage of ships are applied.

**Table 4 Charge base for port dues in each selected port for freight vessels**

Port	MS	Tonnes shipped	Tonnes capacity	Gross Tonnage	m <sup>2</sup> of ship	Other
Krems	AT	x	x			
Antwerp	BE			x		Distance sailed in port, number of locks used, length of ship, environmental discount
Gent	BE					m <sup>3</sup> , per container
Liège	BE	x				m <sup>2</sup> space used
Vidin	BG	x				Self-propelled / non-propelled
Decin	CZ		x			Self-propelled / non-propelled
Port	MS	Tonnes shipped	Tonnes capacity	Gross Tonnage	m <sup>2</sup> of ship	Other
Duisburg	DE	x	x		x	Type of goods
Frankfurt am Main	DE	x	x		x	Type of goods
Hannover	DE	x	x			Type of goods, cargo handling capacity
Mannheim	DE		x			Type of goods

<sup>47</sup> Commission Decision 2011/291/EU as amended by Commission Decision 2012/464/EU, OJ L 139, 26.5.2011, p. 1.

<sup>48</sup> Commission Decision 2008/163/EC as amended by Commission Decision 2012/464/EU, OJ L 64, 7.3.2008, p. 1.

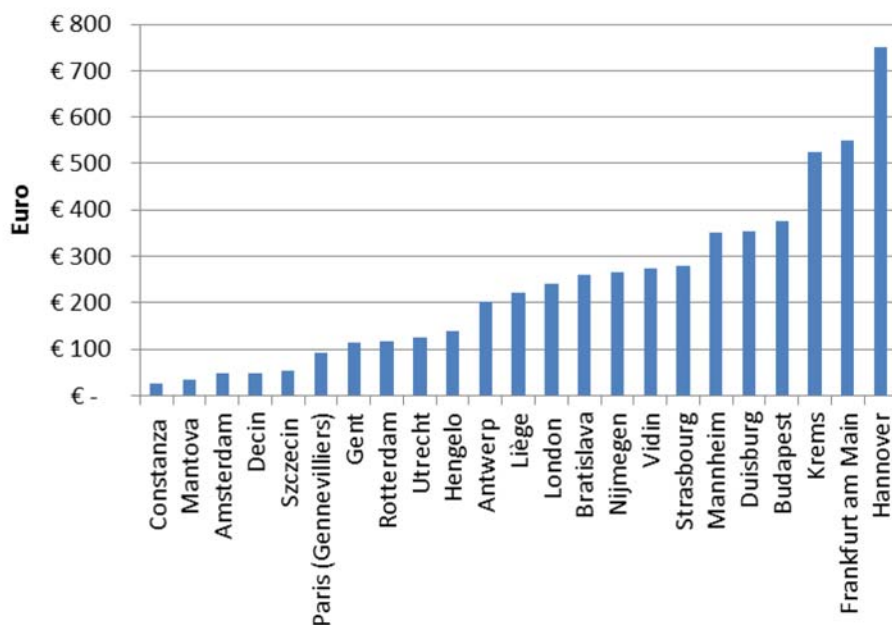
<sup>49</sup> Commission Decision 2008/232/EC, OJ L 84, 26.3.2008, p. 132.

<sup>50</sup> Commission Decision 2011/229/EU, OJ L 99, 13.4.2011, p. 1.

<b>Lyon</b>	FR					Per trailer/container, m3, pallet, boxes
<b>Paris Gennevillier</b>	FR	x				Type of good
<b>Strasbourg</b>	FR	x				Type of good
<b>Budapest</b>	HU	x	x		x	
<b>Mantova</b>	IT					Length of ship
<b>Mertert</b>	LU	x				
<b>Amsterdam</b>	NL		x		x	Environmental discount
<b>Hengelo</b>	NL					m <sup>3</sup> water shifting
<b>Nijmegen</b>	NL	x	x			
<b>Rotterdam</b>	NL		x			Environmental discounts
<b>Utrecht</b>	NL		x			Per container
<b>Szczecin</b>	PL			x		m <sup>3</sup>
<b>Constanza</b>	RO		x			Self-propelled / non-propelled
<b>Bratislava</b>	SK	x			x	
<b>London</b>	UK	x		x		Per trailer/container.

55. While in all ports the tariff increases with the size of the vessels, average charge levels differ greatly even within a Member State (Figure 6). It was found that ports in Germany charge generally more, while the lowest tariffs are applied in Italy and Romania.

**Figure 6 Comparison of port due levels for 1250-tonne M5 motor vessels**



56. Externalities, in particular air pollution, are considered explicitly only in three of the sampled ports – Amsterdam, Antwerp and Rotterdam – where a discount can be

obtained when cleaner engines are used. Moreover, as commercial inland waterways transport is exempted from excise duties in all Member States (with the exception of passenger transport in France and Italy), the external cost of climate change is merely taken into account indirectly through the increase of port dues for larger vessels.

#### 3.4.2. *Fairway dues*

57. Fairway dues for inland navigation are applied in Belgium, France, Germany, Luxembourg and Romania. The charges are mostly distance-based (tonne-kilometre), and differentiated to the type of goods for freight vessels, while for passenger ships they are set on the basis of the number of passengers and/or the number of beds.
58. The charge levels vary significantly depending on the size of the vessels (which serves as a proxy for the fuel consumed), but also the actual waterway where they are applied. They range from € 0.31/km in Belgium to € 17.76/km in Germany (Weser-Datteln-Canal).
59. Due to the Mannheim and Danube Conventions, charges on the Rhine and the Danube and their tributaries are not allowed.

### 3.5. **Maritime transport**

#### 3.5.1. *Sea port dues*

60. Charges applied by maritime ports for ships are the fundamental way not only to obtain payment for services provided but also to internalise costs related to local externalities. Accordingly, all 29 ports considered use port dues.
61. Gross tonnage is overwhelmingly common as basis for setting the charges. While some ports use volume as proxy for capacity, there are only two ports in the sample whose charges are not tonnage or volume based.
62. Environmental considerations are taken into account by 13 ports, which grant discounts based on participation in the Environmental Ship Index scheme<sup>51</sup> (7 ports in Belgium, France, Germany and the Netherlands), and/or based on the Green Award certificate<sup>52</sup> (5 ports in Latvia, Lithuania, the Netherlands and Portugal), or directly through rebates linked to NO<sub>x</sub>/SO<sub>x</sub> emissions (Port of Stockholm and Trelleborg in Sweden) or via levying a sulphur fee (Port of Gothenburg, Sweden)<sup>53</sup>.
63. The resulting variation in port dues is shown in Table 5 for four types of vessel. It was found that sea port dues diverge the greatest for Roll-On-Roll-Off-Passenger (RoPax) vessels, because of the dissimilar charging for passengers and passenger cars across the ports as well as charging partially based on gross tons or on length of vessels.

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<sup>51</sup> The Environmental Ship Index is based on ship emissions of local pollutants, such as NO<sub>x</sub>, SO<sub>x</sub>, particulate matter, and GHG. Source: [http://www.wpci.nl/projects/environmental\\_ship\\_index.php](http://www.wpci.nl/projects/environmental_ship_index.php)

<sup>52</sup> The Green Award certification scheme focuses on crew, operational, environmental and managerial elements. Source: <http://www.greenaward.org/greenaward/>

<sup>53</sup> In addition, Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues (OJ L 32, 28.12.2000, p. 81), requires ports to provide waste reception facilities and vessels are, against a waste charge, obligated to make use of these facilities. The charges are always differentiated based on certain characteristics of the ship, such as gross or net tonnage, engine power, or volume.

Table 5 Sea port dues calculated for exemplary vessels (2012, in €)

Port	Aframax liquid bulk carrier	Panamax bulk carrier	Handy container vessel	RoPax vessel
Port of Antwerp, Belgium	41,500	24,700	8,800	18,700
Port of Zeebrugge, Belgium	19,800	14,000	4,900	5,800
Port of Bourgas, Bulgaria	30,400	24,500	9,200	14,400
Port of Lemesos, Cyprus	43,500	17,100	9,200	16,300
Port of Copenhagen-Malmö, Denmark	68,100	25,200	9,700	19,400
Port of Tallinn, Estonia	99,000	32,000	11,900	11,000
Helsinki Port, Finland	37,800	23,000	6,000	9,800
Grand Port Le Havre, France	44,100	25,800	3,100	5,900
Grand Port Maritime de Marseille, France	35,300	28,500	3,400	9,500
Ports of Bremen/Bremerhaven, Germany	24,600	11,000	6,000	9,500
Port of Hamburg, Germany	24,200	16,600	3,200	2,300
Port of Riga, Latvia	54,200	35,800	7,000	8,800
Port of Klaipeda, Lithuania	31,900	23,500	8,700	24,400
Grand Harbour of Valletta, Malta	50,800	24,600	9,300	3,900
Port of Amsterdam, The Netherlands	29,500	17,500	3,600	16,300
Port of Rotterdam, The Netherlands	31,700	17,600	5,500	5,200
Port of Gdansk, Poland	30,300	22,300	4,100	4,800
Port of Sines, Portugal	17,000	11,300	2,700	8,100
Port	Aframax liquid bulk carrier	Panamax bulk carrier	Handy container vessel	RoPax vessel
Port of Constanza, Romania	17,000	7,700	3,800	8,100
Port of Koper, Slovenia	10,700	6,800	2,800	2,900
Port of Barcelona, Spain	21,000	21,400	6,500	18,200
Port of Valencia, Spain	21,500	21,800	6,300	18,400
Port of Gothenburg, Sweden	22,800	16,800	6,200	5,800
Port of Stockholm, Sweden	86,900	27,300	10,300	20,300
Port of Trelleborg, Sweden	36,500	12,700	5,700	3,100
Ports of Grimsby & Immingham, UK	237,600	140,000	14,300	159,300
Port of London, UK	33,000	21,900	7,700	15,200
Ports of Tees & Hartlepool, UK	92,200	67,900	25,100	67,000



### 3.5.2. *Regulatory measures*

64. In the maritime sector, the following regulatory measures adopted after the publication of the Inventory have a significant impact on externalities.
65. The third maritime safety package<sup>54</sup> adopted in 2009 contains two Regulations and six Directives providing for safety standards to reduce the risk of accidents. Tools to monitor maritime traffic along EU coasts have been developed and improved. Inspection of vessels in EU ports is better targeted at vessels that pose a risk and the worst of those are banned from European ports. An obligation of ship-owners operating in EU waters to take out sufficient insurance for maritime claims, such as claims in respect of personal injury or death of passengers, delay in carriage of cargo, or the cost of wreck removal, is also introduced. Besides, additional regulatory measures were proposed and/or adopted in 2012 in relation to seafarers whose role is essential as far as safety is concerned.
66. Directive 2010/65/EU<sup>55</sup> simplifying port reporting formalities will help to improve planning and execution of ship arrivals at ports and thus reduce congestion and related emissions. Furthermore it will reduce truck congestion/emissions as road hauliers will be able to optimise their truck use with more accurate information on ship arrivals.
67. In relation to emissions, the IMO adopted, in July 2011, new regulations on the Energy Efficiency Design Index, which will require efficiency improvements for all ships built as of 1 January 2015, leading to a significant decrease of CO<sub>2</sub> emissions for such ships. As regards air pollution, existing IMO regulations foresee strict emission limits for both SO<sub>x</sub> and NO<sub>x</sub> emissions from ships.
68. Specific emission standards for SO<sub>x</sub> emissions have been incorporated in EU legislations by means of Directive 2012/33/EU amending Council Directive 1999/32/EC<sup>56</sup>, which introduced new limits for the sulphur content of marine fuels (0.1% for sulphur emission control areas from 2015; down from currently 1.0% and 0.5% for other EU waters from 2020; down from currently 3.5%). These new limits will strongly reduce air pollutants.
69. The proposed Clean Power for Transport Directive<sup>57</sup> is expected to increase the use of LNG (less air pollutants) and shore-side electricity (less air pollutants and noise in port areas compared to electricity generated on-board).

## 3.6. **Air transport**

### 3.6.1. *Airport charges*

70. The assessment of charging schemes at 25 European airports found that maximum take-off weight, number of passengers, and the noise characteristics of aircraft are the most

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<sup>54</sup> [http://ec.europa.eu/transport/modes/maritime/safety/third\\_maritime\\_safety\\_package\\_en.htm](http://ec.europa.eu/transport/modes/maritime/safety/third_maritime_safety_package_en.htm)

<sup>55</sup> Directive 2010/65/EU of the European Parliament and of the Council of 20 October 2010 on reporting formalities for ships arriving in and / or departing from ports of the Member States and repealing Directive 2002/6/EC, OJ L 283, 29.10.2010, p. 1.

<sup>56</sup> OJ L 327, 27.11.2012, p. 1.

<sup>57</sup> Proposal for a Directive of the European Parliament and of the Council on the deployment of alternative fuels infrastructure, COM(2013)018 final.

common basis for charging. The first two are used to calculate charges for landing and take-off (LTO), parking, passengers, security and persons with reduced mobility.

71. As shown in Table 6, a noise charge is levied at 19 out of the 25 assessed airports either directly (in Prague, Munich and Frankfurt based on the noise category of the aircraft; while in Stockholm Helsinki and Vienna based on noise levels), or through modulation of the LTO charge. The latter are in line with the provision of Directive 2009/12/EC on airport charges<sup>58</sup>, which allows "*the modulation of airport charges for issues of public and general interest, including environmental issues*" (article 3).
72. Less common is the application of emission related charges: only 6 out of the 25 airports have in place charges for NO<sub>x</sub> emissions (Table 6). By comparing the charge levels to the external costs of NO<sub>x</sub> at national level, it was found that the degree of internalisation varies from 150% (London Heathrow) to around 25% (Frankfurt).
73. There is also evidence that modulation of charges in order to promote use of capacity outside peak periods is starting to be introduced at some airports as a kind of congestion charging<sup>59</sup>.

**Table 6 Noise- and emissions related charges per airport (2012)**

Airport	Noise related charge	Emission related charge
Vienna International, Austria	x	
Brussels National, Belgium	x	
Prague Ruzyně International, Czech Republic	x	
Copenhagen, Kastrup, Denmark		x
Helsinki Vantaa, Finland	x	
Paris – Charles de Gaulle, France	x (noise tax)	
Pairs – Orly, France	x (noise tax)	
Frankfurt, Germany	x	x
Munich, Germany	x	x
Athens International, Greece		
Airport	Noise related charge	Emission related charge
Budapest Ferenc Liszt International, Hungary	x	
Dublin, Ireland		
Milan Malpensa, Italy		
Rome Fiumicino, Italy		
Amsterdam Schiphol, Netherlands	x	
Warsaw Chopin, Poland	x	

<sup>58</sup> OJ L 70, 14.3.2009, p. 11.

<sup>59</sup> For example, lower airport charges in operation at Dublin and Gatwick for IATA winter season operations.

<b>Lisbon, Portugal</b>		
<b>Barcelona – El Prat, Spain</b>	x	
<b>Madrid – Barajas, Spain</b>	x	
<b>Palma de Mallorca, Spain</b>	x	
<b>Stockholm Arlanda, Sweden</b>	x	x
<b>Manchester, UK</b>	x	
<b>London Gatwick, UK</b>	x	x
<b>London Heathrow, UK</b>	x	x
<b>London Stansted, UK</b>	x	

### 3.6.2. *Aviation taxes*

74. An aviation-specific charge has been recently introduced in several EU Member States. The tax, which is not harmonised at EU level, is charged per passenger in Austria, Germany, Ireland and the United Kingdom, while the French civil aviation tax is also applicable for cargo.
75. With the exception of Ireland, the tax level is differentiated based on the final destination of the passenger, with the objective of using this as a rough proxy for the distances covered. However, this tax cannot be considered an internalisation tool, being poorly correlated with the amount of externalities that are produced and not providing any particular incentive effect for their reduction.

### 3.6.3. *Regulatory measures*

76. In the aviation sector, the regulatory measures adopted after the publication of the Inventory that have a significant impact on externalities concern the whole range of mitigating tools: setting standards, promoting operational measures, and specific regulatory initiatives, including market-based measures.
77. The Single European Sky (SES) legislation<sup>60</sup> adopted in 2009 reforms the way air traffic management is organised in Europe, improving safety and the environmental performance of aviation and reducing congestion. Furthermore, the common charging scheme for air navigation services allows Member States to modulate charges taking into account congestion of airspace.
78. The SES legislation introduced a performance scheme for the provision of air navigation services with target setting. There are environmental performance targets to increase flight efficiency with resulting reductions of CO<sub>2</sub> emissions defined in Commission decisions covering reference periods. For the 2012-2014 reference period, the target is 0.75% reduction of the average horizontal flight extension compared to the year 2009 baseline by 2014 leading to carbon-neutral growth of aviation as far as air navigation is concerned.

<sup>60</sup> Regulation (EC) No 1070/2009 of the European Parliament and of the Council of 21 October 2009 amending Regulations (EC) No 549/2004, (EC) No 550/2004, (EC) No 551/2004 and (EC) No 552/2004 in order to improve the performance and sustainability of the European aviation system; OJ L 300 of 14.11.2009

79. The SESAR initiative is the technological component of SES and one of its objectives is to reduce emissions by 10% per flight. The EU contribution to the SESAR Joint Undertaking has been € 350 million under FP7; another € 800 million were allocated to the Clean Sky Joint Technology Initiative directed at optimising aircraft technology with, for instance, smart wings, more energy-efficient engines and aircraft eco-design.

#### 4. RECENT DEVELOPMENTS

80. Since the adoption of the White Paper on Transport in March 2011, the Commission adopted a number of proposals that specifically address externalities or that contribute to their reduction:

- Commission proposal for a Council Directive amending Directive 2003/96/EC restructuring the Community framework for the taxation of energy products and electricity<sup>61</sup>. This proposal splits the current minimum tax levels into a tax on energy products on the basis of their energy content and a CO<sub>2</sub>-tax, thereby creating a better link between taxation and the production of externalities, namely the emissions of CO<sub>2</sub>.
- Commission proposal for a Regulation on Union guidelines for the development of the trans-European transport network<sup>62</sup>. This proposal sets out the priorities for investment in European transport infrastructure. The guidelines favour in particular infrastructure for rail and waterborne transport, for multimodal transport, and for the deployment of new technologies for traffic management and for the use of clean fuels. The availability of infrastructure influences greatly the distribution of transport among the different modes and its performance in terms of externalities. The Commission proposal is intended to boost the use of the modes that generate less externality as well as to curb accidents, congestion and emissions on the roads through modern technologies.
- Commission proposal amending the current set of rules for the allocation of slots at EU airports<sup>63</sup>. Largely inspired by IATA Worldwide Scheduling Guidelines, this so-called "Slot Regulation" has the objective of ensuring that access to congested airports is organized through a system of fair, non-discriminatory and transparent rules so as to improve the utilisation of airport capacity and to enhance competition. The Slot Regulation does not apply to airports that are not congested and where airlines can operate without a slot being allocated. The above-mentioned Commission proposal aims at introducing the possibility of slot trades between airlines, as well as strengthening the independence and transparency of the slot coordinator and the correct use of slots.
- Directive 2011/76/EU, which amended Directive 1999/62/EC, introduced the optional internalisation of some environmental external costs in the framework of road tolls. Under the new rules, Member States can decide to levy from heavy goods vehicles a charge reflecting the external costs of noise and air pollution, on top of the infrastructure charge. The internalisation charge cannot exceed the caps fixed by the legislation. While the Directive does not allow applying to heavy

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<sup>61</sup> COM(2011) 169 final

<sup>62</sup> COM(2011) 650 final

<sup>63</sup> COM(2011) 0827 final.

goods vehicles proper congestion charges, Member States are nevertheless allowed to vary the infrastructure charges according to the type and time of the day explicitly to address the problem of congestion.

- Commission Communication on the application of national road infrastructure charges levied on light private vehicles<sup>64</sup>.
- Commission proposal for a Regulation on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach<sup>65</sup> allows national administrations to mitigate noise emissions in the most cost-effective way. The proposal would also facilitate noise charging by airports by centralising the necessary noise information of individual aircraft.
- Commission Regulations (EU) No 6/2013 and 7/2013 setting the application date for the newest NO<sub>x</sub> standards for aircraft engines<sup>66</sup>.
- Commission Communication on “Clean Power for Transport: A European alternative fuels strategy”<sup>67</sup> and Commission Proposal for a Directive of the European Parliament and of the Council on the deployment of alternative fuels infrastructure<sup>68</sup>. These initiatives aim at facilitating the deployment of alternative fuels, with mitigating effects on the level of emissions of local pollutants and greenhouse gases.
- Commission proposal amending Directive 96/53/EC laying down for certain road vehicles the maximum authorised dimensions in national and international traffic and the maximum authorised weights in international traffic<sup>69</sup>. The new rules will allow manufacturers to develop more aerodynamic lorries, which will reduce fuel consumption by 7-10%, cut emissions of greenhouse gases, and also enhance the safety of vulnerable road users.
- As part of the review of the Port policy, the Commission proposed common rules<sup>70</sup> enabling the setting of more efficient port infrastructure charges and facilitating their differentiation according to the environmental performance, energy efficiency or carbon efficiency of transport operations.
- Commission Delegated Regulation supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users.<sup>71</sup>

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64 COM(2012) 0199 final

65 COM(2011) 0828 final

66 OJ L 4, 9.1.2013, p. 34-37.

67 COM(2013)17 final

68 COM(2013)18 final

69 COM(2013) 195 final

70 COM(2013) 296 final

71 C(2013) 2550 final, [http://ec.europa.eu/transport/themes/its/news/doc/c\(2013\)2550\\_en.pdf](http://ec.europa.eu/transport/themes/its/news/doc/c(2013)2550_en.pdf)

- To help mitigate the consequences of serious road accidents across the EU, the Commission adopted two proposals<sup>7273</sup> setting harmonised provisions for an interoperable EU-wide eCall system in road transport. Beyond the main aim of reducing road fatalities and the severity of injuries, thanks *inter alia* to the reduction of response time by emergency services, the proposals will also help reduce secondary accidents, road congestion and subsequent pollution.
- For GHG emissions in maritime transport, the Commission proposes a monitoring, reporting and verification (MRV) system at European level<sup>74</sup>. This should stimulate progress in IMO on market-based measures, but also at short term on MRV and efficiency standards covering existing ships under the current MARPOL Convention.

## 5. POSSIBLE FUTURE MEASURES

81. The next steps that are currently envisaged to address transport externalities are a new proposal on road charging which would consider the replacement of time-based vignettes with distance-based tolls, which are a much more adequate and efficient tool for internalising the external costs of road transport. In the case of rail, the Commission is considering an initiative for the reduction of rail freight noise, including a possible modulation of access charges according to the noise characteristics of wagons. In the aviation field, the EU is working at the global level within ICAO to sharpen the aircraft noise standards and develop standards for CO<sub>2</sub> and PM emissions. Finally, the Commission's services will start a consultation process on the use of infrastructure charging to help achieve internalisation of external costs in inland waterway transport once the other modes of transport have also achieved this objective.
82. A timetable of the forthcoming measures that will affect transport externalities is provided in the Commission work programme, available at the following address: [http://ec.europa.eu/atwork/key-documents/index\\_en.htm](http://ec.europa.eu/atwork/key-documents/index_en.htm)
- Commission initiatives planned until the end of 2013 are included in the following document: [http://ec.europa.eu/atwork/pdf/forward\\_programming\\_2013.pdf](http://ec.europa.eu/atwork/pdf/forward_programming_2013.pdf)
83. Out of those measures included in the work programme the following are relevant for internalising or reducing the external costs of transport:
- As announced in its Communication of April 2010 on "*A European strategy on clean and energy efficient vehicles*"<sup>75</sup> – and subsequently confirmed in the White Paper on transport – the Commission intends to propose a strategy targeting fuel consumption and CO<sub>2</sub> emissions from HDVs. It is now foreseen that this strategy will be issued in 2013.

<sup>72</sup> Proposal for a Regulation of the European Parliament and of the Council concerning type-approval requirements for the deployment of the eCall in-vehicle system and amending Directive 2007/46/EC, COM(2013) 316 final

<sup>73</sup> Proposal for a Decision of the European Parliament and of the Council on the deployment of the interoperable EU-wide eCall – Public Safety Answering Points, COM(2013) 315 final

<sup>74</sup> Proposal for a Regulation of the European Parliament and of the Council on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport and amending Regulation COM(2011) 789 final, COM(2013) 480

<sup>75</sup> COM(2010)186 final, p 6, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0186:FIN:EN:PDF>

- A new proposal on road charging. The initiative would consider the replacement of time-based vignettes with distance-based tolls, which are a much more adequate and efficient tool for internalising the external costs of road transport. Transparent and non-discriminatory congestion charging for cars could be encouraged on the congested parts of the interurban network. Some adaptation, in the light of recent scientific progress and price indexation, of the caps for noise and air pollution charges could also be considered.
  - An action plan on technical safety devices in road transport, including event data recorder, alcohol lock and speed limiters.
  - The adoption of an EU framework for Sustainable Urban Mobility Plans promoting the most cost-effective urban mobility-related solutions.
  - The revision of the current legislative framework on passenger ship safety, improving safety (and avoid distortion of competition) for several passenger ship types engaged in international/domestic voyages.
  - The Revision of the Directive on stability requirements of roll-on/roll-off passenger ships.
  - Among other objectives, the revision of Directive 2002/59/EC establishing a Community vessels traffic monitoring and information system<sup>76</sup> should further enhance the possibilities to prevent accidents and pollution at sea.
  - The Commission is also revising the Non Road Mobile Machinery Directive, which regulates emissions from, amongst others, inland navigation vessels and railcars. In particular the emission limits for inland navigation need to be thoroughly revised as these have not been updated since 2004.
  - The Revision of EU air safety aircrew fatigue rules (Regulation 3922/91) to ensure an appropriate level of aviation safety.
  - The Commission is reviewing the EU air quality policies in order to meet the threat to human health and the environment from poor air quality.
84. In addition, based on the priorities identified in the White Paper on transport, there is on-going policy work in the following areas:
- The Commission's services will start the consultation process on the use of infrastructure charging to help achieving internalisation of external costs in inland waterway transport once that the other modes of transport have also achieved this objective.
  - An initiative is being prepared for the reduction of rail freight noise. Several elements will be considered including a possible modulation of access charges according to the noise characteristics of wagons.

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<sup>76</sup> OJ L 208, 5.8.2002, p. 10–27

- The proposed TEN-T policy instruments on Union guidelines for the development of the trans-European transport network<sup>77</sup> and on the Connecting Europe Facility<sup>78</sup> adopt the "corridor" approach. Within this framework, the Commission intends to create a testing ground for a broad range of infrastructure and transport policy measures with the aim of promoting resource-efficiency and making concrete and measurable contributions to reducing carbon emissions. This may cover, for example, schemes on charging or noise reduction.
- The Commission together with the Member States is working at the global level within ICAO to sharpen the aircraft noise standards and develop standards for CO<sub>2</sub> and PM emissions.
- The revision of the Technical Specification for Interoperability on Energy for traction of train, which would facilitate energy efficient train driving and provide incentives to reduce electricity use by trains.

## 6. CONCLUDING REMARKS

85. It was found that the existing instruments for internalising transport externalities cover to a varying degree the external costs in the different transport modes. It was also established that very large differences exist among Member States in the actual level of charges. Furthermore, there is a significant amount of revenues that are collected on transport, which are weakly related to the production of externalities and are not capable of providing the correct incentives to users.
86. These findings confirm the need for continuing efforts to further internalise transport externalities as indicated in the White Paper "Roadmap to a Single European Transport Area – Towards a Competitive and Resource Efficient Transport System". The Commission proposals for restructuring the taxation of energy products and for introducing the optional internalisation of some environmental external costs in the framework of road tolls, are important steps in this direction,
87. As regards regulatory measures and support schemes that are taken to reduce the external costs, several significant initiatives have been adopted by the Commission since the publication of the above-mentioned White Paper. Some of these provide more stringent standards for various types of emissions, while others promote technologies and means of transport that are safer, cleaner and more energy efficient.

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<sup>77</sup> Idem footnote 62  
<sup>78</sup> COM(2011) 665 final