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# The Cost of Non-Europe in the Single Market in Transport and Tourism

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## I - Road transport and railways

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STUDY

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EPRS | European Parliamentary Research Service

**European Added Value Unit**

October 2014 – PE 510.986



# **The Cost of Non Europe in Transport and Tourism**

In May 2013 the European Parliament's Committee on Transport and Tourism (TRAN) requested a Cost of Non-Europe Report in the fields of transport and tourism. Cost of Non-Europe Reports are intended to evaluate the possibilities for economic or other gains and/or the realisation of a 'public good' through common action at EU level in specific policy areas and sectors.

In response to TRAN's request, the European Added Value Unit of the European Parliamentary Research Service (EPRS) has produced this Cost of Non-Europe Report, which seeks to analyse the costs for citizens, businesses and relevant stake-holders of remaining gaps and barriers in the Single Market in transports, as well as to examine the benefits from further action in the tourism sector. In doing so, the report focuses on those areas where liberalization has not been completed or where markets are not functioning effectively. For transports, the four major transport modes - road, railways, sky and maritime transports - as well as some cross-sectoral issues such as passenger rights are looked at. The analysis of the tourism sector concentrates on areas with biggest potential gains.

In addition to a general paper bringing together the research findings as a whole, the exercise comprises three studies commissioned from outside experts, which are published as separate documents:

## **I Cost of Non-Europe in Road Transport and Railways**

*Study by Steer Davies Gleave*

The study - the first in a series- focuses on the potential benefits of completing the Single Market in the rail and road sectors. Firstly, it seeks to review how policy has evolved in the two sectors in recent years and identify what is still missing. Secondly, the study evaluates in qualitative and quantitative terms the impact of filling the remaining gaps in legislation in order to calculate the "cost of non-Europe". In doing so, it looks at both the short- and long term benefits.

## **II Cost of Non-Europe in Air and Maritime Transport**

*Study by MCRIT, OIVA and T33*

The study - the second in a series- reviews European air and water transport policy and regulation, and identifies areas, where further legislative action is necessary to complete the Single Market in these sectors. In addition, the paper looks at the impact of the completion of the Single market in relation to intercontinental transport. Based on that, it quantifies the “Cost of non-Europe” by giving an estimate of the net benefits that rebalancing European intercontinental gateways, which would stem from the completion of the Single Market in these air and maritime transport areas, would produce for the whole European economy.

## **III Cost of Non-Europe in Tourism policy and Passenger Rights**

*Study by Richard Weston et al.*

This study looks at the cost of non-Europe in European tourism policy and passenger rights legislation. For passenger rights, it analyses existing legislation and policy measures, identifying specific gaps where legislation or further initiatives at European level could be beneficial. In the tourism area, it quantifies in economic terms the potential for efficiency gains and identifies the main areas, in which EU action would further support the development of tourism and help realise the potential gains identified.

# **The Cost of Non-Europe in the Single Market in Transport and Tourism**

**- I -**

## **Road Transport and Railways**

**Study  
by Steer Davies Gleave**

### **Abstract**

This study focuses on the potential benefits of completing the Single Market in the rail and road sectors. Firstly, it seeks to review how policy has evolved in the two sectors in recent years and identify what is still missing. Secondly, the study evaluates in qualitative and quantitative terms the impact of filling the remaining gaps in legislation in order to calculate the "Cost of non-Europe". In doing so, it looks at both the short- and long term benefits.

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## List of abbreviations

<b>AC</b>	Alternating current
<b>ACEA</b>	European Automobile Manufacturers' Association (French: Association des Constructeurs Européens d'Automobiles)
<b>AT</b>	Austria
<b>BE</b>	Belgium
<b>BG</b>	Bulgaria
<b>CEF</b>	Connecting Europe Facility (financial instrument to promote growth, jobs and competitiveness through targeted infrastructure investment at European level)
<b>CER</b>	Community of European Railway and Infrastructure Companies
<b>CIVITAS</b>	City-VITAlity-Sustainability (initiative of the European Union to implement sustainable, clean and efficient urban transport measures)
<b>CO<sub>2</sub></b>	Carbon dioxide
<b>CORTE</b>	Confederation of Organisations in Road Transport Enforcement
<b>CY</b>	Cyprus
<b>CZ</b>	Czech Republic
<b>DB</b>	Deutsche Bahn (German national railway company)
<b>DC</b>	Direct current
<b>DE</b>	Germany
<b>DeBo</b>	Designated Body
<b>DG</b>	Directorate-General
<b>DG MOVE</b>	Directorate-General for Mobility and Transport of the European Commission
<b>DG TREN</b>	Directorate-General for Transport and Energy of the European Commission (operating between 2000 and 2010)
<b>DK</b>	Denmark
<b>DSRC</b>	Dedicated short-range communications
<b>EC</b>	European Commission
<b>ECMT</b>	European Conference of Ministers of Transport
<b>EE</b>	Estonia
<b>EEA</b>	European Environment Agency
<b>EEC</b>	European Economic Community

<b>EETS</b>	European Electronic Toll Service (service which describes the principles for an international agreement for the creation of a European electronic toll service)
<b>EL</b>	Greece
<b>ELTIS</b>	European Local Transport Information Service (European portal for local transport news and events, transport measures, policies and practices)
<b>EP</b>	European Parliament
<b>ERA</b>	European Railway Agency
<b>ERTICO</b>	Europe's Intelligent Transportation System organization (network of Intelligent Transport Systems and Services stakeholders in Europe)
<b>ERTMS</b>	European Rail Traffic Management System
<b>ES</b>	Spain
<b>ETCS</b>	European Train Control System
<b>ETSC</b>	European Transport Safety Council
<b>EU</b>	European Union
<b>FI</b>	Finland
<b>FR</b>	France
<b>GB</b>	Great Britain
<b>GDP</b>	Gross Domestic Product
<b>GHG</b>	Greenhouse gas
<b>GNSS</b>	Global Navigation Satellite System
<b>GSM</b>	Global System for Mobile Communications
<b>GSM-R</b>	Global System for Mobile Communications – Railway
<b>HGV</b>	Heavy goods vehicle
<b>HSL</b>	High speed line
<b>HU</b>	Hungary
<b>Hz</b>	Hertz (unit of measure of frequency in the International System of Units)
<b>ICT</b>	Information and Communications Technology
<b>IE</b>	Ireland
<b>IM</b>	Infrastructure Manager (any body or undertaking that is responsible in particular for establishing and maintaining railway infrastructure, or a part thereof, which may also include the management of infrastructure control and safety systems, capacity allocation, setting charges for the use of infrastructure and providing access to other rail-related services)

<b>INEA</b>	Innovation and Networks Executive Agency (successor of the Trans-European Transport Network Executive Agency)
<b>IRG-Rail</b>	Independent Regulators' Group – Rail (network of independent rail Regulatory Bodies from twenty-five European countries)
<b>IT</b>	Italy
<b>ITAS</b>	Institute for Technology Assessment and Systems Analysis
<b>ITF</b>	International Transport Forum
<b>ITS</b>	Intelligent Transportation System
<b>KIT</b>	Karlsruhe Institute of Technology
<b>Km</b>	Kilometre
<b>KV</b>	Kilovolt
<b>LEZs</b>	Low Emission Zones
<b>LNG</b>	Liquefied natural gas
<b>LT</b>	Lithuania
<b>LU</b>	Luxembourg
<b>LV</b>	Latvia
<b>Mm</b>	Millimetres
<b>MS</b>	Member State
<b>MT</b>	Malta
<b>NL</b>	Netherlands
<b>NoBo</b>	Notified Body
<b>NOx</b>	Generic term for mono-nitrogen oxides NO and NO <sub>2</sub> (nitric oxide and nitrogen dioxide)
<b>NPV</b>	Net Present Value (difference between the present value of cash inflows – or other benefits – and the present value of cash outflows – or other costs – where “present value” of a cash flow means a future amount of money that has been discounted at an appropriate rate to reflect its current value)
<b>NS</b>	Nederlandse Spoorwegen (Dutch incumbent railway undertaking)
<b>NSA</b>	National Safety Authority
<b>NSRs</b>	National Safety Rules
<b>NTRs</b>	National Technical Rules
<b>NTV</b>	Nuovo Trasporto Viaggiatori (Italian private open-access railway undertaking)
<b>OBU</b>	On-board unit
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>PL</b>	Poland

<b>PM</b>	Particulate Matter (PM10 with diameter of 10 micrometres or less, PM2.5 with diameter of 2.5 micrometres or less)
<b>PSC</b>	Public Service Contract
<b>PSO</b>	Public Service Obligation
<b>PT</b>	Portugal
<b>R&amp;D</b>	Research and Development
<b>RAILCALC</b>	Calculation of charges for the Use of Railway Infrastructure (project commissioned by the DG TREN aimed at developing a best practice guide on compliance of rail infrastructure charges with the rules of directive 2001/14/EC)
<b>REETS</b>	European Electronic Toll Service at Regional level
<b>RISC</b>	Railway Interoperability and Safety Committee
<b>RO</b>	Romania
<b>RSAP</b>	EU Road Safety Action Programme
<b>RU</b>	Railway undertaking (any public or private undertaking, the principal business of which is to provide services for the transport of goods and/or passengers by rail with a requirement that the undertaking must ensure traction)
<b>SE</b>	Sweden
<b>SI</b>	Slovenia
<b>SK</b>	Slovakia
<b>SNCF</b>	Société Nationale des Chemins de fer Français (French national railway company)
<b>TEN-T</b>	Trans-European Network – Transport
<b>TERFN</b>	Trans-European Rail Freight Network
<b>TISPOL</b>	European Traffic Police Network
<b>Toe</b>	Tonne of oil equivalent
<b>TRAN</b>	Committee on Transport and Tourism of the European Parliament
<b>TSI</b>	Technical Standards for Interoperability
<b>UIC</b>	International Union of Railways (French: Union Internationale des Chemins de fer)
<b>UK</b>	United Kingdom
<b>V</b>	Volt (derived unit for electric potential, electric potential difference, and electromotive force)
<b>WHO</b>	World Health Organization

## Executive summary

This research paper on the Cost of Non-Europe in the rail and road sectors has been prepared with the aim of providing an update to the original Cecchini Report, published in 1988 to identify the potential benefits from completing the single market in the EU. The transport sector has lagged behind other economic areas in relation to the creation of the single market. Although some of the technical and legal barriers have been either wholly or partially removed in last years, many still remain.

This study focuses on the potential benefits of completing the single market in the rail and road sectors, firstly highlighting what the progress has been to date in terms of legislative actions, and secondly seeking to evaluate in a qualitative and (where possible) quantitative manner the impact of filling the remaining gaps in legislation. The study focuses, in particular, on those areas where liberalisation has started but not been completed, and those where markets are not functioning effectively – that is, where legislation is not currently being envisaged, but where it is likely that intervention will be needed in future.

In the rail sector, the creation of a Single European Railway Area has developed through a number of key policy initiatives. A series of Directives and Railway Packages have progressively restructured and liberalized the market, strengthening the level of competition by requiring the independence of the capacity allocation and gradually opening up the market to new freight and passenger operators. Administrative barriers to entry have been reduced with the creation of harmonised standards for the railway (TSIs) and creating the European Railway Agency tied with the creation of a common approach to safety and interoperability.

The road transport market is significantly more advanced in the creation of a Single Market. This is largely due to actions already taken at EU and national level in recent decades on aspects such as liberalisation of international transport operation, access to the profession, the harmonisation of social conditions of workers, harmonisation of vehicle and infrastructure standards, and harmonization of the charging system. The intrinsic nature of a market that does not face critical technical and interoperability issues such as those in rail has also supported the creation of a Single Road Area in the EU. However, concerns remain in the areas of road safety and environmental sustainability. Although the number of fatalities across the EU has fallen significantly in the last decades, it still remains at very high levels. Moreover, road transport is the largest single emitter of greenhouse gas and polluting emissions in the EU.

For each of the sectors we have identified the following gaps:

#### **Rail sector**

- Gap 1: Completing market opening.
- Gap 2: Competition for Public Service Contracts.
- Gap 3: National specific vehicle authorisation and safety certification.
- Gap 4: Ensuring non-discriminatory access to infrastructure.
- Gap 5: The single signalling system.
- Gap 6: Passenger rights.
- Gap 7: Varied access charges.
- Gap 8: Different technical standards across Europe.
- Gap 9: The legacy rail system.
- Gap 10: Standard technical parts.
- Gap 11: Standardisation of rolling stock.
- Gap 12: Single infrastructure manager.
- Gap 13: Single operating language.
- Gap 14: Missing links at borders.
- Gap 15: Different working conditions.

#### **Road sector**

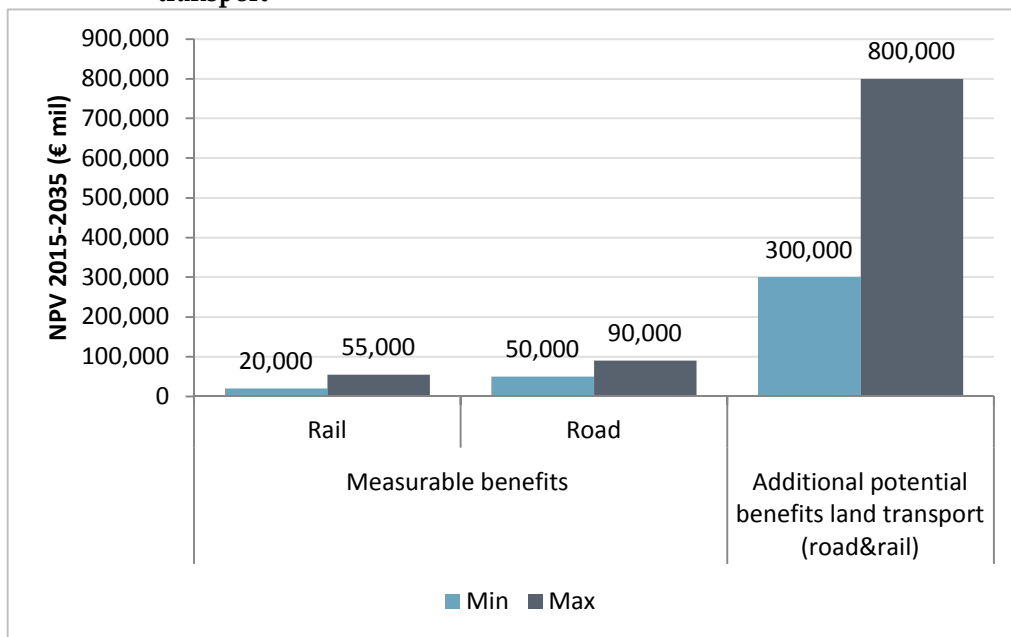
- Gap 1: Completing market opening.
- Gap 2: Harmonisation of social legislation in road transport.
- Gap 3: Enforcement of rules.
- Gap 4: Vehicle standards/1: Maximum weights and dimensions of road vehicles.
- Gap 5: Vehicle standards/2: Cleaner, safer and more intelligent vehicles.
- Gap 6: Road charging/1-Setting the price.
- Gap 7: Road charging/2-EETS technologies.
- Gap 8: Road safety/1-Technology.
- Gap 9: Road safety/2-Vulnerable users.
- Gap 10: Road transport environmental sustainability/1-Subsidiarity and local action.
- Gap 11: Road transport environmental sustainability/2-Policy coordination.
- Gap 12: Road transport environmental sustainability/3-Promoting shift towards more sustainable modes of transport.
- Gap 13: Road passenger rights.

Each of these gaps is discussed in more detail in Chapter 3.

Filling the measurable gaps identified in the rail sector should lead to total savings in NPV terms of between €20 billion and €55 billion until 2035. Filling the gaps identified in the road sector should lead to total savings in NPV between €50 and 90 billion until 2035. These are set out in more detail in the figure below and in Chapter 4.

In addition, there are a number of further net benefits that will also accrue over the long term. Some are specific of the rail or road sector and include those relating to further integration in the rail sector and reduced deaths in the road one. Others cut across both themes and include such things as the improvement of the environmental sustainability of land transport (through the introduction of cleaner road vehicles and modal shift towards more sustainable modes of transport) and of information provided to passengers. These benefits cannot be measured in detail, however in course of the study we have commented on the potential outcomes that could be expected in addressing them in future years, in particular that long term rail benefits could be up to 10 times those set out above (€200 billion to €550 billion). Overall, we estimate that addressing the cost of non-Europe across the EU land transport – i.e. considering the rail and road sectors jointly - could lead to **measurable benefits** of between €70 billion and €145 billion. Considering the **additional benefits**, calculated in NPV terms, could raise the total benefit to between €300 billion and €800 billion by 2035.

**Figure 1 : Summary of expected savings by addressing existing gaps in the EU land transport**





# **I. Context**

## **1. Background**

Steer Davies Gleave is pleased to present this study on the Cost of Non-Europe in the rail and road sectors. This study has been commissioned by the European Parliament Economic Evaluation and European Added Value Unit with the aim of providing an update to the original Cost of Non Europe Report – the Cecchini Report – published in 1988 identifying the potential benefits from completing the single market in the European Union.

Since the publication of the Cecchini Report the transport sector, and in particular the rail and road sectors have lagged behind other areas of the economy in relation to the creation of the single market. For example, while other markets had already started to liberalise and take significant steps towards market integration by 1988, the rail sector had not seen any progress at European level with the first pieces of legislation being introduced only in 1991. By 1988 the majority of the technical barriers in the road sector had started to be removed, but the main legal barriers still remained.

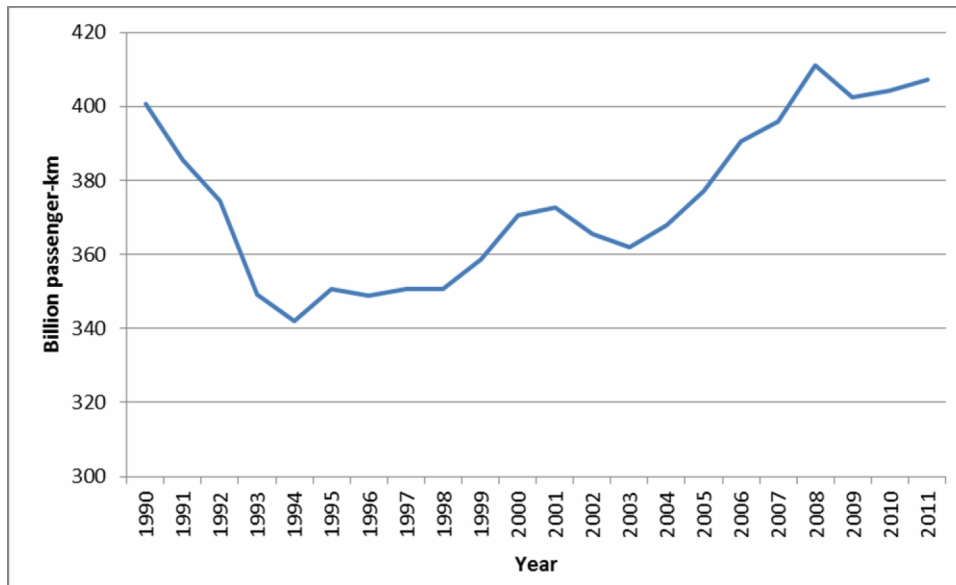
This study focuses on the potential benefits of completing the single market in these two transport sectors highlighting what the progress has been to date in terms of legislative actions and seeks to evaluate what gaps in legislation still need to be filled.

The study is structured to show both those areas where there is currently legislation in the pipeline which may not however go far enough to meet the requirements of a single market as well as those areas where legislation is not currently being envisaged, but where it is likely that intervention will be needed. We will refer predominantly to gaps in legislation, but in some areas it may be more appropriate to address these gaps with the publication of binding or non-binding guidelines or through encouraging industry cooperation. Where this is the case we will refer to it directly.

## **2. Evolution of the rail market**

The first steps towards the opening and integration of the rail sector started at the end of the 1980s with vertical separation of train operations from infrastructure management in Sweden. This was followed by similar steps in the UK accompanied by the privatization of the infrastructure manager (IM) in the early 1990s. Some other countries soon followed for example with the gradual introduction of competition in the freight sector in Germany and then in some other Member States through the 1990s leading to many new freight operators (entering the market in these countries. These changes were accompanied by substantial increases in demand for both passenger and freight services in some countries (particularly in the UK). This compensated the sharp decline in passenger numbers seen in the early 1990s as shown in the figure below.

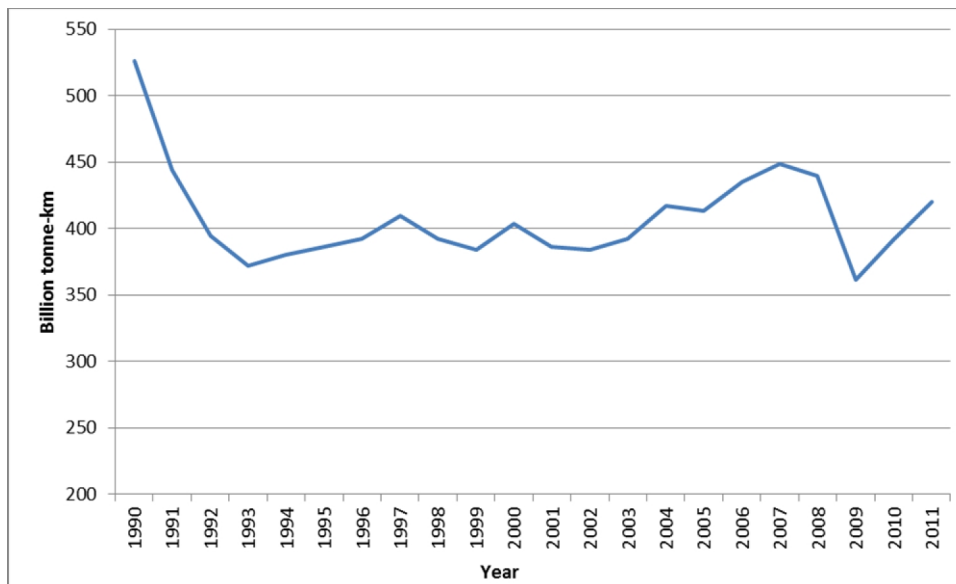
**Figure 2: Change in passenger numbers, EU27, 1990-2011**



Source: EC DG MOVE, Statistical Pocketbook 2013

A similar sharp decline was seen in the early 1990s in the freight sector with a slow recovery until the second half of the 2000s when the economic crisis once again depressed the rail freight market.

**Figure 3: Change in freight volumes, EU27, 1990-2011**

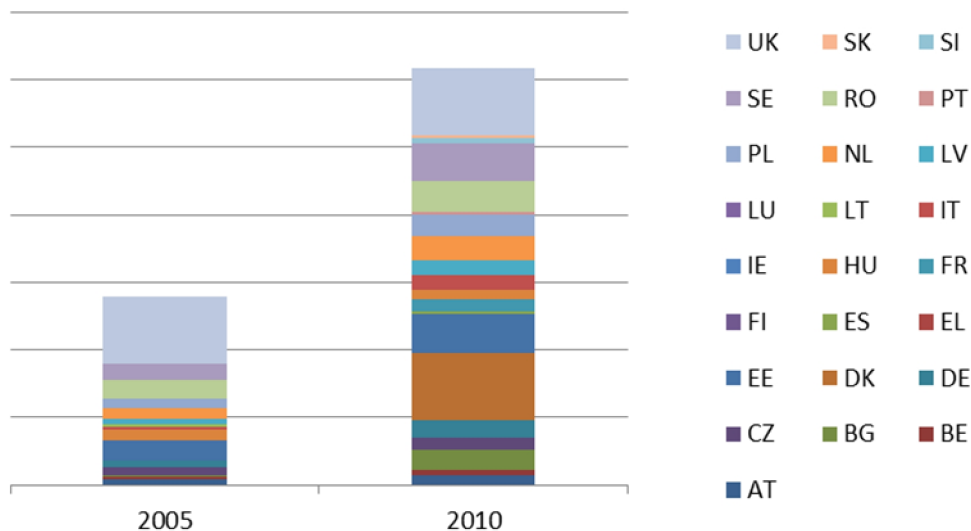


Source: EC DG MOVE, Statistical Pocketbook 2013

Since these initial steps, growth has languished in many Member States and the benefits of liberalization efforts (discussed in more detail in the following chapter) have not been as successful as hoped. Modal share across Europe has remained more or less stable with the road sector retaining about 73% of the market share of all transport sectors and the rail sector remaining below 7% (Eurostat).

In addition, market entry across Europe has been limited primarily to the freight sector where new entrants have taken significant market shares in some Member States. This can be seen in the figure below which shows substantial shifts in Denmark, Italy, The Netherlands, Poland, Romania and Sweden (as shown in the figure below).

**Figure 4: Change in market share of new entrants between 2005 and 2010**



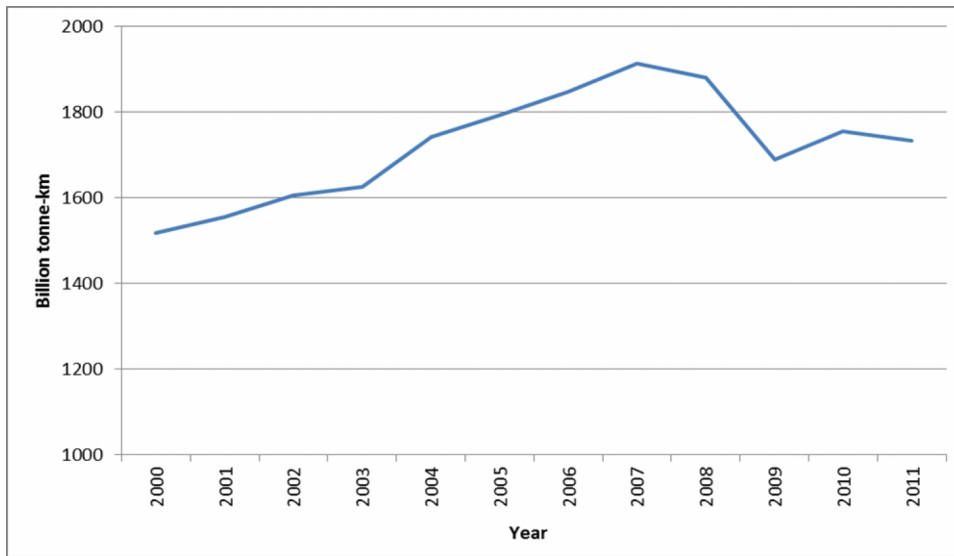
Source: Steer Davies Gleave analysis of Eurostat, UIC and other data.

The share of new entrants in some niche markets is much higher, for example passenger and freight services in the UK, key freight corridors in Italy, the high speed passenger line in Italy, the German freight market and the German regional passenger Public Service Contract market.

### 3. Evolution of the road market

Between 2000 and 2007, the years leading up to the start of the economic crisis, the market for road freight increased steadily. In 2004, the year of EU enlargement, the increase in freight volumes was particularly strong. However, similarly to the rail freight market, the economic downturn had a significant impact on freight transported by road. In 2010 the road freight market experienced a slight recovery, as shown in the figure below, but could not make up the loss of the two previous years. Moreover, a further – though slight – decline in road freight levels has been registered in 2011.

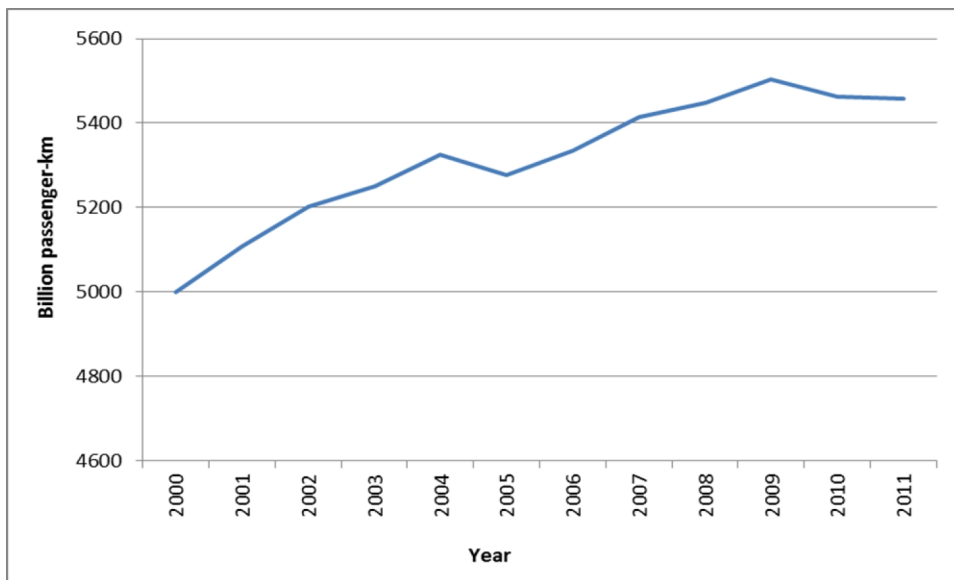
**Figure 5: Change in road freight volumes, EU27, 2000-2011**



Source: EC DG MOVE, Statistical Pocketbook 2013

In contrast to the market for freight, the volume of passenger kilometres travelled on road increased continuously over the same period, with a dip only in 2010 and no variation in 2011 (as shown in the figure below).

**Figure 6: Change in road passenger numbers, EU 27, 2000-2011**



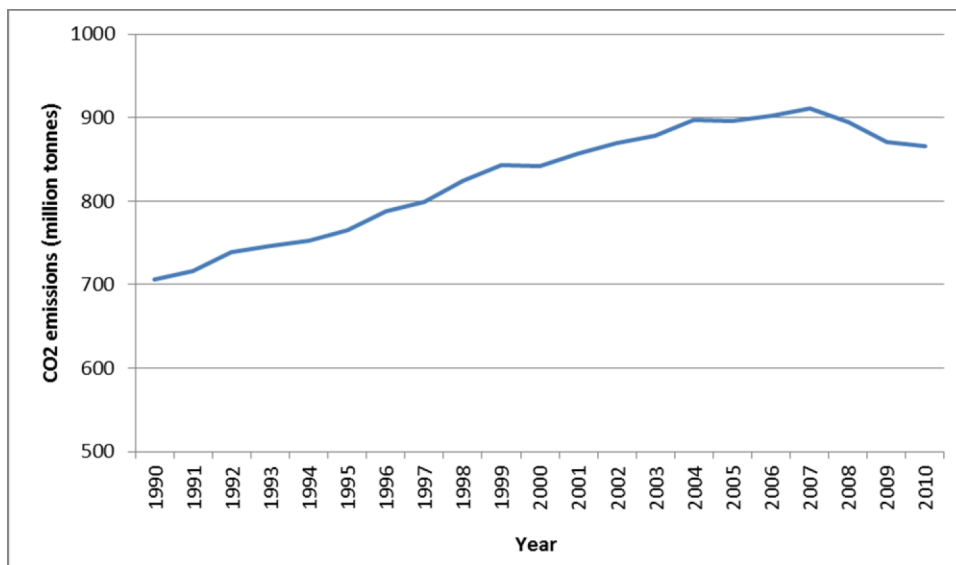
Source: EC DG MOVE, Statistical Pocketbook 2013

One of the key areas of intervention in the EU common transport policy is road safety. In 2003, the 3<sup>rd</sup> European Road Safety Action Plan (RSAP) set the challenging goal of cutting the number of road fatalities by 50% between 2001 and 2010. To achieve this goal, many actions have been taken at a European level, including harmonized safety standards for road tunnels, the requirement to use seat belts, or harmonized safety management on

TEN-T road networks. Despite a general growth of road traffic between 2001 and 2010, road safety in the EU improved substantially over the same period. The number of road fatalities fell to 31,000 in 2011, which corresponds to a decrease of 43% compared to the fatalities registered in 2001 but falling short of the target set in the 3<sup>rd</sup> RSAP. However, the situation varies substantially across the different EU MSs with southern and eastern MSs having higher fatality rates than the EU average. The European Union renewed its objective to reduce road fatalities by 50% by 2020, to be achieved mainly through an increased focus on the enforcement of traffic rules.

Another of the main targets of European transport policy is a reduction in the emission of greenhouse gases in the transport sector. Even though efficiency of motor vehicles increased substantially over the last two decades, CO<sub>2</sub> emissions of the road transport sector increased steadily over the same period, mainly to be attributed to the ever increasing volume of transported goods and travelled kilometres. The drop in CO<sub>2</sub> emissions in the road transport sector in 2008 and 2009 coincided with the decline in the road freight market as a result of the economic crisis (as shown in the figure below).

**Figure 7: Change in CO<sub>2</sub> emissions 1990-2010**



Source: EC DG MOVE, Statistical Pocketbook 2013

## 4. Approach to the analysis

The aim of the Cost of Non-Europe report is to review the gains of the creation of a single European market in the rail and road sector. The aim of this specific study is to analyse the expected benefit of deeper integration in these two sectors focusing on those areas where added value is likely to be the highest. In particular, this study seeks to identify and, where possible, quantify the remaining barriers and gaps in the internal market for rail and road by looking at those areas where liberalization has not been completed or where markets are not functioning effectively. The data available for the rail and road sectors are not as developed as in other sectors and as such this study is not meant to be exhaustive but to identify the main areas where deficiencies exist and provide some examples of how to close the gaps, to improve integration to the benefit of the entire internal market.

In carrying out this assignment Steer Davies Gleave has based its assessment on information and evidence gathered in previous studies it has undertaken in the road and rail sector and has modified and updated the analysis to better reflect the requirements of this specific study.

As a first step the assessment focused on identifying the main legislation in the two sectors in order to correctly define the baseline situation. The second step consisted of a desktop assessment of the gaps in this legislation relating to the completion of the single market, but also to the effective functioning of the market. The output of this task was a list of gaps that we identified and which we shared with key stakeholders to understand their views on the matter.

Given the limited timescales for the project we contacted a subset of key stakeholders in the rail and road sector to understand from them their views on our preliminary list of gaps. Discussions were held with the main representative bodies in the rail and road sector<sup>1</sup>. These conversations were very useful and allowed the list to evolve to a definitive list of gaps as set out in Chapter 3. As is set out in that chapter, some of these gaps in legislation actually relate to more than one transport mode and so have been treated independently to avoid double counting where quantifications have been made.

Based on this consolidated list of gaps the analysis proceeded to evaluate in a qualitative and quantitative manner the impact of filling these gaps in legislation. The qualitative evaluation is based on Steer Davies Gleave knowledge of the workings of the sector while the quantitative evaluation, where included, is based on findings from previous studies undertaken either by Steer Davies Gleave or by other authors and where possible modified and updated to varying degrees to ensure that the results match current market conditions and the specific requirements of the terms of reference. The quantification of economic benefits has been done using excel with differentiated models for the single gaps in legislation. Limited quantification has been included for the social impacts of the

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<sup>1</sup> Rail: CER, EIM, ERFA, EPF. Road: IRU and other national and international stakeholders involved in the road sector.

study; the same is true for the environmental impacts as it has not been possible to quantify them in an appropriate manner within the required timescales.

The detailed assumptions for the quantification exercise are included in Appendix 1.

Throughout this study we have focused on comparing the current situation with an optimal single market scenario to be able to identify what the cost of not having a single market is. As such some of the results and comments within this research paper may differ from results of previous studies to account for the evolution of the market since the studies were completed and to allow for different assessment horizon. The analysis that has been undertaken excludes these market player actions as the benefit of a full single market would address these market failures.

## **5. Structure of the remaining sections of the study**

The remainder of this document is structured as follows:

- Chapter 2 sets out the evolution of the legislative environment since the publication of the Cecchini report;
- Chapter 3 identifies the main gaps in legislation as they are at the start of 2014;
- Chapter 4 seeks to evaluate the Cost of Non-Europe of having these gaps in legislation; and
- Chapter 5 sets out the main conclusions for the study.

Appendix 1 of this report provides the hypotheses that have been used as the basis for the results found in Chapter 4.

## **II. The evolution of the Single Market to date**

This chapter sets out the progress that has been made to date in creating a single market in the rail and road sectors.

### **1. Rail**

#### **1.1. Introduction**

The European rail sector has undergone a number of changes over the last 20 years, with the aim of increasing liberalisation and creating a Single European Railway Area. The delivery of this vision has been progressed through a number of key policy initiatives relating to:

- Liberalisation and restructuring
- Interoperability
- Safety
- European Rail Traffic Management System (ERTMS)
- Access charging
- Decreasing the environmental impact of rail
- Investing in creating a Single Railway Area

These initiatives are interrelated and affect each other in different ways.

#### **1.2. Liberalisation and restructuring**

Following the liberalisation of other regulated markets in transport and non-transport sectors, the EU sought to extend similar provisions to the rail sector. This was done initially through the publication of Directive 91/440/EEC which provided certain access rights for operators wishing to offer international services and allowing the formation of international groupings to increase access competition in the market. Subsequently, the EU published Directive 95/18/EC on the licensing of railway undertakings and Directive 95/19/EC on the allocation of capacity and infrastructure charging.

These Directives had little impact on the evolution of the rail market with very few new entrant operators or services being added to the market. To counter this lack of progress, the EU introduced a series of Railway Packages (in 2001, 2004 and 2007) seeking to bring together previous Directives and update them to facilitate the development of the market. These Packages had a number of aspects but the main areas of intervention included:

- The opening of the Trans-European Network to international rail freight operators from any country and the entire rail network for international rail freight from March 2008, and subsequently allowing cabotage for all domestic national and international freight services;
- Directives on safety and interoperability and the creation of the European Railway Agency (with the aim of reducing technical barriers to entry);



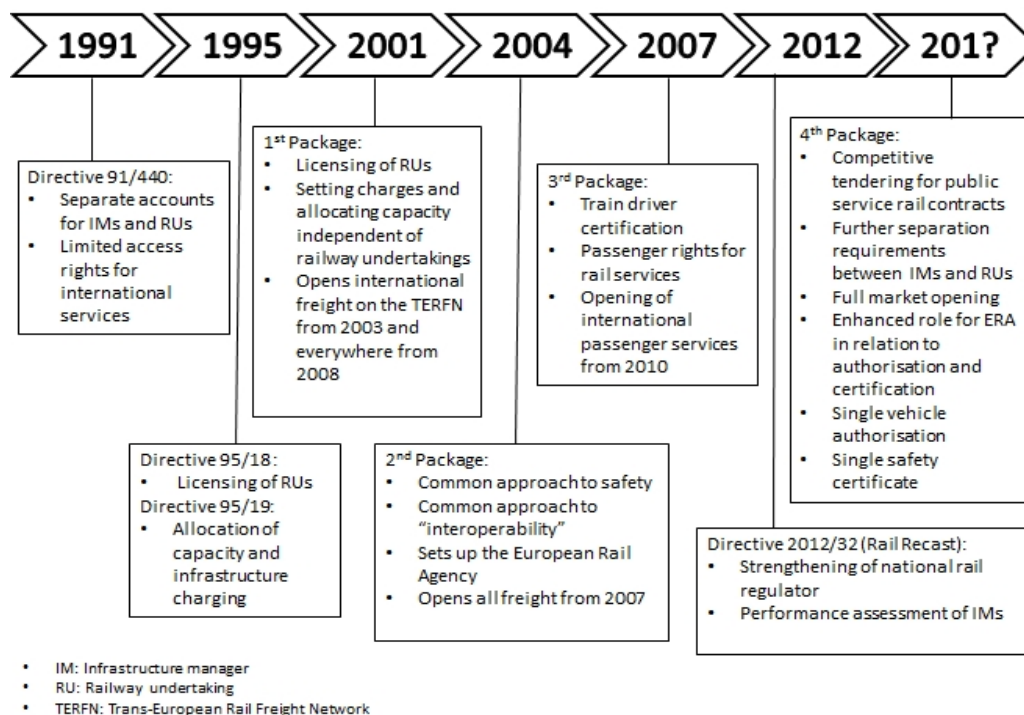
- Extending the liberalisation provisions to the passenger market allowing, from January 2010, market opening of international passenger services as well as introducing provisions relating to passenger rights in the rail transport sector;
- In 2012, the European Parliament and Council of the European Union agreed the Rail Recast which introduced further innovations including the strengthening of the national rail regulators and the assessment of the performance of the infrastructure managers.

Most recently (January 2013), the Commission published its proposals for legislative measures for the 4th Railway Package focusing on:

- Introducing competitive tendering for public service rail contracts, and opening the domestic passenger rail market (outside public service contracts);
- More stringent requirements relating to separation between railway undertakings and infrastructure managers and sanctions if these requirements are not met; and
- A stronger role for the European Railway Agency in order to decrease barriers in relation to safety and interoperability.

The provisions of the 4th Package have been agreed in the European Parliament although some of the main provisions have been watered down. In addition to these proposals, the Commission has also suggested a move towards a Single European Infrastructure Manager.

**Figure 8: Rail legislation since 1991**



Following the introduction of legislation for air passenger rights, Regulation 1371/2007 which came into force in December 2009, established the rights of rail passengers. The regulation covers a variety of rights including information provision, tickets, luggage, delays and cancellations, security, complaints and particular rights for disabled passengers and passengers with reduced mobility. The regulation allows several exemptions including urban, suburban and regional services. Domestic services are also permitted an exemption of five years which can be renewed twice. The figure below summarises the evolution of the Directives since 1991.

### **1.3. Interoperability**

The success of liberalisation is partly dependent on the removal of physical and technical barriers between Member States to allow trains to travel across national borders. The EU has sought to remove these barriers by pursuing a policy of interoperability through legislation and the creation of Technical Standards for Interoperability (TSIs). These TSIs initially focused only on the high speed network but were subsequently applied to the conventional network, rolling stock and telematics. They were intended to accelerate industry standardisation following slow progress by voluntary industry working groups, but they only apply to new or upgraded infrastructure. This reduces their financial impact but significantly lengthens the timescales for achieving full interoperability.

Regulation (EC) 881/2004 created the European Railway Agency (ERA) to facilitate the development of interoperability and the cross-acceptance of rolling stock (as well as having a key role in safety and ERTMS). ERA is currently responsible for organising the working groups that propose new TSIs, forwarding proposals through the Commission to the Railway Interoperability and Safety Committee (RISC) for approval and conversion to a Regulation.

While interoperability is increasing, there remain a number of barriers as a result of legacy national systems. Some of these cannot be altered until the infrastructure is upgraded; others relate more to practices within single Member States which, in some cases, are no longer necessary. These barriers continue to render international flows difficult (especially for rail freight that competes with road traffic); for example, locomotives have to be equipped with multiple signalling systems and authorised in multiple Member States separately. ERA has started to address a number of these barriers by creating a register of national rules. The next step is to identify which of these national rules can be removed without impacting the functioning of the national network and thus reducing barriers to entry.

The 4th Railway Package proposes an enhanced role for ERA in the authorisation process, making it the main body to which operators would address their authorisation requests. This would allow ERA to authorise a vehicle or train for multiple networks simultaneously, substantially reducing the direct and indirect costs of putting a train into service. While there is broad support for an enhanced role for ERA, it is likely that the National Safety Authorities (NSAs) will continue to be involved in vehicle authorisations.

## 1.4. Safety

Safety is a critical aspect of all transport service provision and is a highly sensitive issue in rail. Investment in recent years has improved safety substantially across the EU through such actions as the introduction of better signalling systems, the closure of level crossings and improved safety in tunnels. Nonetheless, accidents continue to occur and tend to generate a greater level of **political and media attention than accidents in some other transport sectors**.

The 2<sup>nd</sup> Railway Package introduced a Directive specifically on safety, focused on setting Common Safety Methods and Targets as well as requiring the creation of NSAs (mentioned) to ensure safety on national networks. These NSAs are tasked with granting safety certificates to railway undertaking as well as carrying out safety audits across the network. In recent years, some stakeholders have alleged that certificates are being used as a barrier to entry into some national markets. To counter this trend, as mentioned above, the 4<sup>th</sup> Railway Package proposes a greater role for ERA in issuing safety certificates with a view to providing greater certainty for those wishing to apply.

Directive 2007/59/EC introduced a common train driver licencing and certification system with the aim of establishing a more flexible labour market for train drivers and common standards for drivers across Europe, thus simplifying the operation of cross-border operations and improving safety.

## 1.5. ERTMS

The creation of a Single European Railway Area is a long term and ambitious project which has the aim of removing all technical barriers in the sector (the differences in the various national signalling systems are set out in the following chapter). Given the physical constraints that limit technical interoperability, the process must be implemented in steps. The first of these is the creation of a single signalling system across the EU, a goal being pursued through the creation of the European Rail Traffic Management System (ERTMS), comprising the European Train Control System (ETCS) and a mobile communication system for the railways (GSM-R). The system requires the installation of specialised equipment both on and beside the track and on-board trains. Since the concept was initially developed, the system has undergone a number of evolutions and the public and private sector have entered into a number of agreements to ensure coordinated deployment of this signalling system.

While ERTMS installation is progressing well (and is seen as a major technological achievement for Europe as it is being exported to other countries around the world), there remain a number of conflicts within the system resulting primarily from the installation of different, incompatible versions, in some cases on the same route. Nonetheless, deployment continues and the Commission has set up a number of ERTMS corridors to focus investment and deliver interoperability for all rolling stock deployed on them. The Commission is also considering options for legislation that would incentivise the uptake of ERTMS.

## **1.6. Access charging**

The 1<sup>st</sup> Railway Package and the Recast mentioned above have sought to introduce cost-reflective charging across the EU, although many operators continue to complain about the difference in access charges across Member States. While it is normal that the charges should be different across borders due to the different physical characteristics of the networks and the diverse nature of the national funding structures, the degree of variability is sometimes hard to justify. In response, the Commission has initiated infringement proceedings against some Member States for not setting up appropriately cost-reflective charging regimes or not having an appropriate performance regime. In practice, significant differences in access charges between Member States are likely to remain, not least because of different policies in relation to national funding of railway infrastructure.

## **1.7. Decreasing the environmental impact of rail**

Rail is considered the most environmentally friendly mode of mass transportation, producing less CO<sub>2</sub> emissions per passenger-km or per tonne-km than other modes depending on the load factor achieved (on average, a train journey results in one-third of the emissions of a private car and one-quarter of the emissions of an aircraft over the same distance). However, the carbon footprint of rail could be improved still further, for example through the introduction of new technologies and the replacement of older, diesel-powered rolling stock.

In December 2013, the European Commission adopted “Shift2Rail” a public-private partnership to invest €920 million in rail related research and innovation over a 7-year work programme. The Commission has committed €450 million and the remainder of the financing will come from the rail industry. The programme aims to improve the attractiveness of rail transport and will focus on five areas:

- Energy and more efficient technologies for high capacity trains;
- Advance traffic management and control systems;
- Cost efficiency – high capacity infrastructure;
- IT solutions for a seamless attractive railway; and
- Technologies for sustainable and attractive European freight.

At the same time, the wider environmental impact of rail, particularly in relation to noise, may need to be subject to further policy initiatives. In recent years, steps have been taken to reduce noise pollution through the introduction of sound barriers along rail routes as well as TSIs limiting the noise level of new trains. In addition, the Commission is seeking to understand the role that pricing might play in incentivising reductions in noise emissions, initially in relation to freight wagons. In the longer term, price-based incentives could be extended to cover different types of rail transport and other forms of pollution.

## **1.8. Investing in the Single European Railway Area**

The European rail network benefits from substantial government subsidies. Given current economic conditions across Europe, national governments are finding it increasingly difficult to provide adequate funding for necessary rail investment. National funding is supplemented by funding at the European level, sourced from the European Regional Development Fund, the Cohesion Fund, the TEN-T Programme and the European Investment Bank. The newly agreed Connecting Europe Facility (CEF) will provide funding for the infrastructure associated with the new TEN-T Guidelines regulation until 2020.

## **2. Road**

### **2.1 Introduction**

Road transport dominates the European freight and passenger markets. The road transport sector employs approximately 5 million workers and accounted for 46% of intra-EU goods transport in 2010 and over 80% of passenger transport (car, bus and coach).

To date the road transport market is probably the most developed Single European Transport Market. This is largely due to the actions already taken at EU and national level in the past decades on aspects such as:

- Access to profession ;
- Vehicle and infrastructure standard harmonisation ;
- Liberalisation of international transport operation ; and
- Harmonisation of social conditions of workers.

The intrinsic nature of a market that does not face critical technical and interoperability issues such as those in rail has also supported the creation of a Single Road Area in the EU.

Nevertheless, the road sector is subject to a series of EU policies that affect a number of transport sectors, relating in particular to health and the environment. These reflect concerns about the number of deaths and injuries that occur on EU roads every year and the impact of road transport on the environment through pollution and climate change emissions.

Although the number of fatalities occurring on EU roads decreased by 6% per year between 2000 and 2012, 28,000 fatalities occurred on the network in 2012 and estimates indicate that about 250,000 people were seriously injured. Moreover, road transport is the largest single emitter of greenhouse gas and polluting emissions in the EU, accounting for about 27% of total EU energy consumption.

Urban road transport is increasingly subject to EU policy initiatives as approximately a quarter of CO<sub>2</sub> emissions from transport, and 69% of road accidents occur in cities. However, the actions taken at the EU level in these areas need to be balanced against the principle of subsidiarity - that is, decisions should be taken as closely as possible to the

citizen and action at the EU level should only be taken after consideration of the scope for action at national, regional or local level.

## **2.2 Liberalisation of road freight market**

During the 1990s, significant steps were taken at the European level to liberalise international road freight transport, including the progressive removal of the quota system that previously governed access to the market. Further progress was made between 2000 and 2010, for example, through the introduction of a Community Driver Attestation (Regulation 484/2002) and the new provisions ruling cabotage operations (Regulation 1072/2009).

Key changes occurred in the road freight market as a result of this liberalisation process and from the progressive opening of the market to the States that joined the EU in 2004 and 2007. At present, EU13 operators account for about 66% of international road freight transport, which includes bilateral, cross trade and cabotage operations.

Though well developed, the liberalisation process is not yet complete. Hauliers still face limitations to the extent that they can take part in non-home markets: the current cabotage regime only allows three operations within seven days following an international transport operation.

## **2.3 Harmonisation of social standards**

Over the past twenty years, key legislative provisions have been passed at the EU level to harmonise driving time and rest periods, working time, enforcement, procedures and the use of the tachograph. Legislation on these issues has been periodically updated and amended to clarify intent and to encourage consistent implementation. For example, Regulation 561/2006 on the harmonisation of certain social legislation relating to road transport addressed the difficulties experienced in interpreting, applying, enforcing and monitoring certain provisions of the previous Regulation 3820/85. Similarly, Regulation 1071/2009, establishing common rules concerning compliance conditions relating to the occupation of road transport operator, reinforced the aim of the original Regulation, promoting fair competition amongst road transport companies.

With respect to the use of tachograph, the European Parliament and Council of the European Union agreed in May 2013 on new legislation, including the introduction of a digital tachograph. The new Regulation is expected to reduce fraud, lead to better working conditions and promote greater levels of safety in the sector.

## **2.4 Weight and dimension of vehicles**

To support the creation of a single internal market for vehicles, the Commission has taken a number of actions at the EU level, including through Directive 96/53/EC setting maximum common rules on weights and dimensions for heavy goods vehicles, and through Directive 97/27/EC setting requirements for type-approval of commercial vehicles (goods vehicles, buses and trailers) destined for the EU market. In April 2013, the Commission published proposals for a new Directive on weights and dimensions,

increasing the maximum weight allowed in certain circumstances and allowing for an extension of truck length for vehicles carrying 45-foot containers. The proposals also seek to clarify the use of 'mega-trucks' (vehicles that can be up to 25-metres long and weigh 60 tonnes) and limits their cross border use to two Member States. This issue is very sensitive for several Member States, the European Parliament and certain lobby groups due to environmental, safety and modal shift concerns. Others argue that the benefits associated with the increased cost-efficiencies outweigh the concerns.

## **2.5 Road charging**

Road transport operations impose costs on the wider society which, in most cases, are not taken into account in the operating costs that drivers or freight operators incur. Such externalities typically lead to an inefficient level of transport output, and an inefficient balance between transport modes. These costs include those indirect costs of traffic congestion, environmental impacts and road accidents imposed on other road users and society at large.

Since the late 1990s the EU adopted a common system (Directive 1999/62/EC) for charging heavy good vehicles for the use of certain road infrastructure. This Directive focused mainly on the recovery of infrastructure construction and operating costs and its application was limited to Trans-European Networks. The Directive was amended in 2006 (Directive 2006/38/EC) and in 2011 (Directive 2011/76/EU) to set the conditions for a more harmonised charging system across EU countries and to allow for the introduction of pricing schemes that take into account the negative effects of road transport activities on the environment.

The text adopted in 2011 – following the policy debate that followed the “Greening Transport Package” launched by the European Commission in 2008 – allows Member States to levy a charge to cover the costs of air and noise pollution; gives them greater flexibility to vary the charge by time of day; and provides strong incentives to hypothecate resulting revenues for investment in sustainable transport infrastructure (TEN-T) projects.

The European Commission is also encouraging the adoption of an electronic toll system which is interoperable across the EU. Directive 2004/52/EC lays down the conditions for the interoperability of electronic road toll systems in the EU and foresees the creation of a European Electronic Toll Service (EETS), allowing users to subscribe to a single contract with one EETS provider and, using a single on-board unit, pay tolls electronically throughout the whole EU. The Directive applies to all road vehicles, though timescales for implementation give priority of application for vehicles exceeding 3.5 tonnes and for all vehicles which are allowed to carry more than nine passengers (driver + 8). The Commission identified the technical specifications of the EETS in 2009 and set a target of three years for a system to be available for vehicles above 3.5 tonnes. A 2012 Communication from the European Commission described the progress achieved in the deployment of the EETS as disappointing.

## **2.6 Road safety**

Road safety remains a key challenge despite a near halving of the number of deaths registered as a result of road accidents in the EU since 2000. More than 28,000 people still die on EU roads each year and greater exposure is faced by more vulnerable road users such as cyclists and pedestrians.

The EU has pursued a number active and passive measures to increase road safety, such as setting tough standards for vehicles and infrastructure, educating drivers on better driving standards, and improving working conditions of professional drivers to allow for adequate resting periods. In addition, the Commission, primarily through the European Regional Development Fund, has provided substantial amounts of funding to improve road infrastructure (e.g. road widening, carriageway separation, the introduction of enforcement cameras, etc.) with the goal of increasing road safety.

The system of cross-border exchange of information on road safety related traffic offences introduced by Directive 2011/82/EC is expected to contribute to increased safety by improving enforcement. The UK and Ireland have opted out of this Directive but all other Member States were required to transpose it into law by November 2013.

## **2.7 Road transport environmental sustainability**

The environmental sustainability of road transport is a crucial issue that cuts across most of the policy areas described above as well as those relating to other transport modes. Since 2001, EU Transport Policy has promoted a shift from road to rail and targeted a decoupling of freight growth from GDP growth, to abate GHG and polluting emissions. In order to limit climate change below 2°C – a goal recently set by the EU – European emissions must be reduced by 80-95% below 1990 levels by 2050. By 2030, a reduction of GHG emissions to around 20% below their 2008 level will be needed.

A number of actions have been taken to improve the sustainability of road freight transport, including the update of the Eurovignette Directive and rules concerning weights and dimensions of vehicles discussed above. More measures will be required, however, as the sector accounts for more than three quarters of inland freight transport in the EU and about 94% of its CO<sub>2</sub> emissions.

As regards the passenger sector, in July 2012, the European Commission published proposals on the modalities for reaching the target it has set for CO<sub>2</sub> emissions for new passenger cars and light commercial vehicles by 2020. These are the first limits of their kind ever to be set by the Commission and also include fuel consumption limits. The target for cars is a 40% reduction on 2007 figures. While agreement has been reached by the Member States and the European Parliament on the rules for light commercial vehicles, the proposals for new passenger cars have stalled as Member States have not been able to reach agreement.

In 2014, the Directive on alternative fuels infrastructure (Clean Power for Transport) was adopted, which includes minimum infrastructure requirements for electric vehicle recharging points, liquefied natural gas (LNG), compressed natural gas (CNG) and



hydrogen filling stations. The aim of the Directive is not only to encourage consumers to use alternative fuels but also to boost the manufacture of these vehicles.

The European Commission is also stepping up its support to towns and cities in a new "urban mobility package" adopted on 17 December 2013. The Commission aims to reinforce the exchange of best practice, provide targeted financial support and invest in research and development. In addition, it is encouraging the development of "sustainable urban mobility plans" to stimulate a shift towards cleaner and more sustainable transport in urban areas.

## **2.8 Coach and bus services**

In comparison to the rail and air transport sectors, there is little European legislation applying to the bus or coach sectors. Some requirements regarding international carriage of passengers by bus and coach in the European Union are set out in Regulation 684/92, as amended by Regulation 11/98, and by Regulation 12/98 with respect to cabotage services. These Regulations define various types of services:

- Regular services, carrying passengers at specified intervals along specified routes, passengers being picked up and set down at predetermined stopping points;  
Special regular services, whose access is reserved to certain categories of passengers, such as workers, students or soldiers; and
- Occasional services, which do not meet the definition of regular or special regular services.

In addition, Regulation (EC) 1370/2007 and Regulation (EC) 181/2011 govern, respectively, the framework conditions for providing public transport services by road and the bus and coach passenger rights for regular services.

The limited amount of legislation passed at the EU level affecting this sector, along with the relatively unrestrictive conditions generally set at the EU level- such as those ruling the provision of local public transport services - has resulted in significant differences in the regulatory environment within which the bus and coach sector operates in different Member States. The variation in regulation is particularly significant for regular long distance coach services. The regulatory environment varies from liberalisation to concession systems and other forms of licensing restrictions. As for local public transport services, the framework is more standardized as Regulation (EC) 1370/2007 indicates the mandatory content of public service contracts and the procedures to be fulfilled for the awarding of the contract.

### III. Identification of gaps in legislation

The previous chapter identified the evolution of transport legislation in recent years. However, it is important to identify the gaps that still remain in legislation that must be addressed if a true single market in the rail and road sector is to be achieved. This chapter highlights the main gaps in legislation in the rail and road sectors, highlighting those areas of most importance and defining them in such a way so as to facilitate the evaluation of the cost of non-Europe described in the following chapter. Again, the two sectors will be treated separately although in the final section of this chapter we identify cross sector issues that may be further hindering the development of a single market.

Note that we define as gaps in legislation in two main categories:

- Any proposed provisions that have not yet become law. These are in the process of going through the European legislative process but, as we set out below, some of these provisions have been substantially watered down and as such create latent gaps in legislation that will still need to be addressed. For example, the 4<sup>th</sup> Railway Package in its current version (significantly modified in its passage through Parliament), is substantially below what the market needs to ensure a single market in the rail sector. As such it needs to be considered as a remaining gap in legislation.
- Those provisions that are not currently being considered in any legislative action but which could benefit the single market considerably.

We have also identified where legislation has not been applied effectively at a national level such that barriers to the creation of the single market remain. However, this is not the focus of the assessment as, particularly in the case of the rail sector, legislation that has been introduced, or is currently being proposed, is specifically designed to address issues arising as a result of the incorrect application of existing Directives. We have not assessed these as it is appropriate to assume that subsequent legislative acts at EU level will close any of these gaps.

#### 1. Rail

In the case of the rail sector, we have identified a number of gaps in legislation that result either from the gradual nature of market opening or from the implementation of legislation in a manner differing from what was originally intended in the first instance and then identify those areas that have not yet been addressed. These gaps are of a market, technical and administrative nature.

The main gaps relating to current legislation not going far enough are:

- Completing market opening
- Open access to Public Service Contracts
- National specific vehicle and safety certification
- Ensuring non-discriminatory access to infrastructure
- The single signalling system
- Passenger rights

Those areas that have yet to be addressed in legislation include:

- Varied access charges
- Differing technical standards across Europe
- The Legacy Rail system
- Common spare parts
- Common standards for rolling stock
- Single infrastructure manager
- Single operating language
- Missing links at borders
- Different working conditions

Each of these areas is discussed in more detail below.

## **1.1 Main gaps – existing legislation**

### **Gap 1: Completing market opening**

Rail continues to be subject to a number of limitations to competition within both national and international markets. While some limitations to competition are necessary to protect Public Service Contracts (PSCs, discussed in more detail below), there is no reason why commercial services on the rail network should not be open to competition.

Under open access, commercial operators are free to access to the rail network provided they comply with the necessary technical and safety requirements. Given the nature of the rail network, liberalisation has been more difficult to implement than in other sectors such as aviation. Directive 2004/51/EC, which came into force in January 2007, opened the rail freight market throughout the EU. This followed two previous Directives that initially opened the TEN-T network and international freight to competition. Directive 2007/58/EC introduced an open market for international rail passenger transport in 2010. These Directives have not been implemented fully in many Member States, and the Commission has initiated infringement procedures in many cases.

Domestic passenger services remain closed to competition in the majority of Member States. Approximately one third of such services in the EU operate on a commercial basis rather than under Public Service Contracts, and could therefore be subject to open access competition if the market were to be liberalised. However, in practice the incumbent operator holds a monopoly position in many domestic markets and, combined with declining passenger numbers in the majority of Member States, this has resulted in inefficiencies and low quality services. At the same time, in Member States where passenger markets have been opened such as the United Kingdom and Sweden, the number of passenger journeys by rail has increased significantly. While this growth cannot be attributed entirely to competition, it is nevertheless clear that liberalisation has encouraged rail travel by increasing choice and stimulating service innovation.

Different attitudes towards liberalisation among Member States have resulted in the adoption of a range of different organisational models for the rail sector across the EU, and this has tended to discourage investment in new operations in those markets with more restrictive organisational models (because of a fear of discrimination) as well as the development of a single market in rail services. The UK lies at one end of the spectrum,

with competition for franchised services and some open access operations as well as a fully independent infrastructure manager. By contrast, in the Republic of Ireland the national infrastructure manager and railway undertaking are vertically integrated and the domestic passenger market is closed. Most other Member States lie between these positions, with some parts of their network open to commercial operators, for example the high speed network in Italy. The European Commission's 4<sup>th</sup> Package proposals seek to introduce an open market for domestic passenger services, thereby completing the market opening process.

In order for the market to be fully open and accessible to competing operators, many other factors need to be addressed, for example vehicle authorisation, safety certification etc. These elements are described in more detail below.

## **Gap 2: Competition for Public Service Contracts**

Approximately two thirds of domestic rail services in the EU are operated under Public Service Contracts (PSCs) awarded to operators to perform Public Service Obligations (PSOs). PSOs are public passenger transport services operated in the general interest, defined by the relevant competent authority in each Member State. Regulation (EC) 1370/2007 - which lays down the conditions under which competent authorities, compensate operators for the costs incurred in undertaking public service obligations in the road and rail sector - already indicates competitive tendering as the procedure to be followed to award PSCs for public passenger services. However, Art. 5 point 6 of this Regulation includes a remarkable exception for heavy rail, allowing for direct award where national laws permit it. As a result, the vast majority of rail PSCs in Europe are awarded to the operator as a 'direct award', with no competitive tendering process, frequently giving exclusive rights to the part of the network covered by the contract to an incumbent. The operator in most cases is a state-owned entity.

Awarding authorities can specify minimum service levels and/or fare obligations in the contract, together with the amount of compensation required if applicable. The majority of PSCs in the EU are heavily subsidised by national governments, which can encourage inefficiency. The 4<sup>th</sup> Railway Package seeks to amend the Regulation and to introduce competitive tendering for rail PSCs except in the case of small-scale services. This is described as competition 'for the market' as opposed to open access operations which are competition 'in the market'. The Commission envisages that PSCs are more suitable for regional and suburban services as long-distance services are often commercially viable.

Competitive tendering is fully or partially used in eleven Member States, and a further five only reverted to direct awards after the competitive tendering process failed. The number of bidders is often low, which has often been attributed to the varying bidding procedures in the different Member States. A more consistent, Europe-wide approach and more uniform business conditions are needed to encourage new entrants. Availability of rolling stock and access to information systems are also barriers to new entrants, and social issues raised by the transfer of staff between organisations need to be addressed if competition for the market is to take effect across the EU. The current compromise text does not, however, compel competitive tendering, but just introduces text into legislation that removes the exemption for heavy rail.

### **Gap 3: National specific vehicle authorisation and safety certification**

Vehicle authorisation involves checking a vehicle's conformity with Technical Standards for Interoperability (TSIs) and its conformity with the national technical rules of the relevant Member State. The current system requires the applicant (generally the manufacturer or the railway undertaking) to comply with TSIs and with National Rules, and that compliance is confirmed by, respectively a Notified Body (NoBo) and a Designated Body (DeBo). Once the applicant has received the declarations of conformity from the relevant bodies, it then applies to the National Safety Authority or Authorities for vehicle authorisation.

This creates a cost to manufacturers and single operators as multiple certifications are needed for multiple countries. In addition, the current legal framework has led to differing rules and procedures in each Member State, with large variances in the processes, cost for authorisation and the timescales involved.

Current Commission proposals seek to remove this barrier by establishing a new role for the European Railway Agency (ERA) as a single authorisation body. It is likely that National Safety Authorities will remain involved in the authorisation process for the foreseeable future, but the majority of stakeholders agree that the ERA should be solely responsible for authorising vehicles. The current compromise text allows operators and manufacturers to continue to go directly to NSAs to obtain their vehicle authorisation as an alternative to going to ERA. Information from the industry has shown that if this option exists, applicants will continue to go to national authorities rather than to ERA for fear of delays in their applications and as such the main benefits from this initiative will not be realised.

The safety certificate currently has two parts:

- Part A: the acceptance of a Railway Undertaking's (RU's) Safety Management System as described in Article 9 and Annex III of Directive 2005/49/EC. The Part A certificate is valid throughout Europe providing the type and extent of the operation is unchanged. NSAs are therefore required to accept Part A certificates issued by other Member State NSAs should the RU request to operate on a different network within Europe.
- Part B: the acceptance of provisions adopted by the RU to meet requirements necessary for safe operation, as described in Annex IV of Directive 2004/49/EC. These cover compliance with network specific requirements for staff competence and management of rolling stock. The Part B certificate states the ability of the RU to comply with network specific rules applied in the Member State in which the RU operates. Therefore an RU can have a single Part A certificate but as many Part B certificates as the Member States in which it provides services.

Different NSAs have different approaches regarding the issuing of safety certificates. This is a result of divergent interpretation of EU legislation and different operating approaches, technical capabilities and the amount of resources dedicated to these activities.

As with vehicle authorisations, there is great variation in both the time required and cost charged by NSAs to issue safety certificates. Harmonising the approach to and cost of, safety certification would therefore remove an important technical/administrative barrier to entry. It should be noted however, that the current compromise proposal passing through Parliament allows operators to go to the national authorities rather than ERA to obtain these certificates. Similarly to vehicle authorisation this may dilute some of the benefits to the industry although the dilution effects are likely to be smaller in this case as the single safety certificate currently being developed by ERA will limit future variability.

#### **Gap 4: Ensuring non-discriminatory access to infrastructure**

Steps have been taken to reduce discrimination against non-national or non-incumbent rail operators. Directive 2001/14/EC requires the establishment of a Regulatory Body that oversees the application of the Community rules and acts as an appeal body, notwithstanding the possibility of judicial review. The primary aims of the Regulatory Body are to ensure non-discriminatory access to infrastructure, and that the Infrastructure Manager does not abuse its dominant position. The Regulatory Body must ensure independent and impartial oversight of the market in order to allow railway undertakings to gain access to national railway infrastructure on non-discriminatory terms, and compete effectively for rail traffic. The Recast of the 1<sup>st</sup> Railway package addressed deficiencies by requiring that the Regulatory Body is independent of the relevant government department as well as of the infrastructure manager and the railway undertaking. Currently, in most Member States, the Regulatory Body deals with access for freight operators only as the domestic passenger market remains closed. While it is too early to say whether this has been sufficient to create the necessary certainty, some stakeholders within the sector (including the main Representative Bodies) have suggested that the introduction of a European Regulatory Body for the railways would improve the situation further.

None of the other regulated sectors currently have a single, European regulatory body, although they all have close cooperation. It is true however that cross-border issues in other regulated sectors are lower than in the rail sector as they are almost all (telecommunications, energy, etc.) international businesses in their own right.

It has been proposed that the creation of a Single European Rail Regulator could further assist in breaking down national barriers both technical and market driven. The main argument revolves around the uncertainty surrounding investing in the rail sector that requires substantial upfront payment and investment which is not likely to be profitable in the first three to five years. Uncertainty surrounding potential discrimination from incumbent operators as a result of a European regulator that would not need to take national concerns into consideration when making its decisions may be considerably reduced and could result in increased investment in the sector.

Many Member States have adopted a holding company structure to their state railway operations, whereby the infrastructure manager and railway undertaking operate as separate legal entities but are both owned by the same parent organisation. Some stakeholders argue that non-discriminatory access cannot be guaranteed wherever there is some degree of vertical integration. Others argue that vertically-integrated systems can

allow non-discriminatory access if effective mechanisms are introduced to protect the non-incumbent operator. In the cases where the infrastructure manager and operator have been unbundled, the alignment of incentives to both parties is still necessary in order to increase efficiency and deliver reliable and attractive services for passengers.

#### **Gap 5: The single signalling system**

One of the key technical barriers to be addressed concerns the signalling systems used across the EU. At present, there are over twenty different train control systems in Europe. When a train travels from one Member State to another, it must change system, leading to increased time and costs. Discussions on a common European system began in the late 1980s, although progress has only been made over the last decade and full deployment of such a system is still a long term prospect.

The European Rail Traffic Management System (ERTMS) is designed to remove the technical obstacles to interoperability of train control command systems, and is supported by the European industry. ERTMS has two main components, the European Train Control System (ETCS), providing a standard for in-cab train control tied to trackside infrastructure, and GSM-R providing a standard for mobile communications for train operations. Three Memorandums of Understanding have been signed by railway undertakings and the European Commission, in 2005, 2008 and 2013. The aim of these agreements was to encourage further deployment of ERTMS.

The EU has already agreed to the deployment of ERTMS on six freight corridors, and financial incentives were provided to assist implementation. ERTMS was also designated a Priority Project of the Trans-European Transport Network and a European Coordinator was appointed to work on further developing the roll-out of the programme in 2009. In the same year, an ERTMS Deployment Plan was agreed by the EU, stipulating deadlines of between 2015 and 2020 for the installation of ERTMS on a number of freight lines. The majority of these Deployment Plans are behind schedule.

The roll-out of ERTMS will bring benefits to the rail market other than interoperability. A single control system will also increase capacity on the European rail network and is likely to improve safety levels. It will also provide for a more open market for the producers of command system equipment as well as lower production costs. The deployment of ERTMS is dependent on Member States working cooperatively with the rail industry. The European Commission is also preparing implementing acts aimed at accelerating its roll out through the provisions in the Rail Recast requiring differentiated access charges for ERTMS. The options include imposing an annual levy on operators for non-equipped rolling stock or giving a bonus to operators with ERTMS-equipped rolling stock. However, at present operators lack the incentive to install ERTMS on their rolling stock other than partial funding that is provided through the Cohesion, ERDF and TEN-T/INEA budgets.

While delays are occurring in the roll-out of ERTMS, the technology itself is a great success across the world with the signalling being used in China as well as in South America and interest being shown in other parts of the world.

## **Gap 6: Passenger rights**

Regulation (EC) 1371/2007 introduced a number of common passenger rights into the rail sector seeking to mimic those that have been implemented in the aviation sector. Although still in its infancy, the level of application of these requirements has been high as shown in the Steer Davies Gleave Evaluation of the application of the Regulation<sup>2</sup>. The main issue that remains with this Regulation is that Member States can opt out of large sections of the Regulation for a limited (but renewable) amount of time meaning that although there is an EU vision of passenger rights, it is not implemented in the same way across the EU as a whole.

In addition, some areas of passenger rights do not go far enough. In particular there is no obligation to inform passengers of their rights in a common language (or at least in more than just the local language) or to standardise the information that is provided to passengers in relation to delays and assistance. These aspects do not necessarily need to be mandated through legislation and can be agreed by companies in parallel to legislation although it would be difficult to ensure application to all operators (especially new entrants) without some form of obligation.

There is also no obligation on the creation of an integrated ticketing system across Europe. The 4<sup>th</sup> Railway Package proposal states that Member States may wish to introduce such integrated ticketing, but there is no obligation to do so. It is not clear whether any form of obligation is necessary in this area. This is more likely to work effectively through allowing the market to provide this service, especially through internet based solutions in the same way that market players now offer different aviation airline solutions. At most, the industry may wish to consider the introduction of requirements to operators to open up access to their ticketing systems (for a fee) to allow “ticket integrators” to propose cross-border solutions to potential passengers.

## **1.2 Main gaps – new legislation**

### **Gap 7: Varied access charges**

Railway undertakings are charged by infrastructure managers to use the network and Directive 2012/34/EC obliges infrastructure managers to produce a Network Statement detailing the charges applicable to the network. In practice, the level of access charges across Member States varies substantially as shown in the figure below.

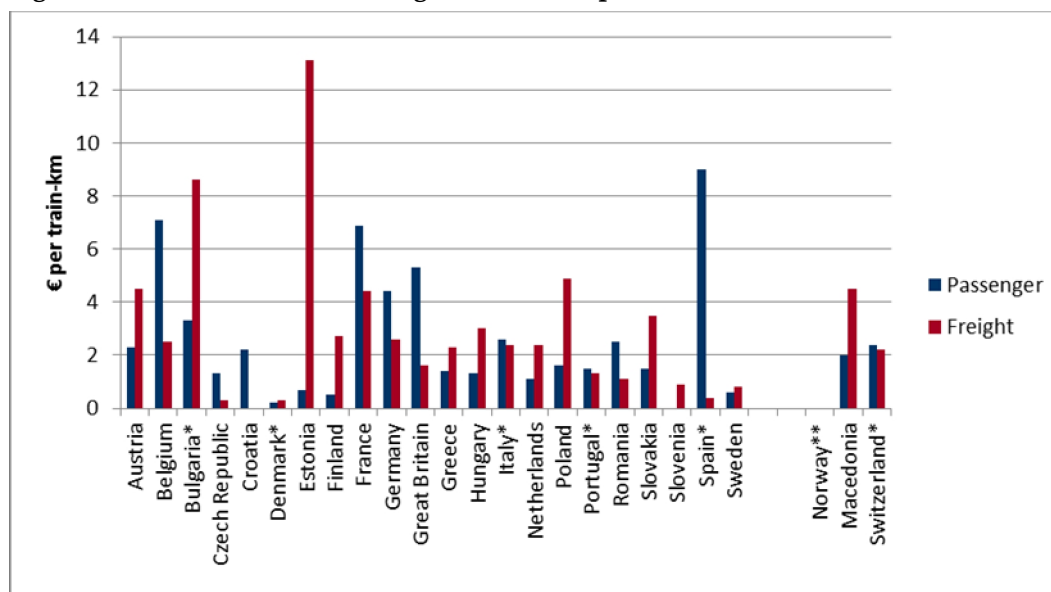
While some differences in charges are inevitable given differences in network characteristics and underlying costs, a common approach to the calculation of access charges would benefit all Member States.

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<sup>2</sup> Steer Davies Gleave (2012), *Evaluation of Regulation 1371/2007*, undertaken on behalf of the European Commission-DG MOVE. Publication available at: <http://ec.europa.eu/transport/themes/passengers/studies/doc/2012-07-evaluation-regulation-1371-2007.pdf>



**Figure 9: Variation in access charges across Europe**



Note: \*Average from multiple sources including Network statements, 2013 IRG Market Monitoring Report, IBM Liberalization Index, Media CER, ECMT (2008), RAILCALC project, International Transport Forum and OECD, the Italy average data does not include the passenger charge for the HS line which is currently at about €13 per train-km; \*\* Track access is generally not charged in Norway.

Under the Directive, charges for both access to the network and to service facilities must reflect the 'cost that is directly incurred as a result of operating the train service'. Most Member States have based their charging regime on marginal cost pricing and some have taken external effects, such as accident costs and noise differentiated charges, into account. Different Member States segment the market in different ways and the frequency reviews of charges also varies considerably - some Member States carry out annual reviews while others undertake reviews at intervals of several years. Infrastructure managers usually receive a considerable amount of government funding as the access charges received do not cover the costs of maintaining, renewing and enhancing the infrastructure.

The charging structure can also be a barrier to entrants in the market. For example, one Member State attempted to implement a two-tier structure, with fixed charges and variable usage-based charges for some users and a higher fixed charge for others. This was found to discriminate against smaller scale operators.

#### **Gap 8: Different technical standards across Europe**

The historical development of rail systems within national borders has meant that national technical requirements have been developed independently, with little thought to the impact on operations across borders.

These technical constraints act as a barrier to the development of a single market since:

- The availability of rolling stock that can cross borders is typically limited.
- Ensuring that vehicles and equipment are authorised to operate in a number of Member States is relatively onerous.

The Interoperability Directive (2008/57/EC) defines a number of essential requirements to be met for interoperability including safety, reliability, environmental protection and technical standards. The ERA is responsible for the development of these TSIs. However, even where TSIs exist, they do not cover the entire network and only need to be implemented when a network is being upgraded or newly built.

Where a TSI does not exist, Member States are required to notify the National Rule describing the standard. The objective of National Rules is to provide an additional control to safeguard the implementation of TSIs. National rules can be divided into National Technical Rules (NTRs) and National Safety Rules (NSRs). The ERA is currently facilitating the process of notification of NTRs by the Member States, with the ultimate goal of removing the majority, if not all, NTRs. However, the process is slow, with substantial progress restricted to a subset of NTRs. Moreover, given the lack of documentation, it is particularly difficult to obtain a clear understanding of which NTRs exist in different Member States and to determine which ones are no longer relevant and can therefore be removed.

The ERA has encouraged progress in this area by instigating National Reference Documents but these currently only encompass vehicle design rules. In addition, the work of the Cross Acceptance Unit is helping to establish effective equivalence between national rules where possible. However, this is, of necessity, work in progress and dependent on voluntary agreements between the Member States.

Acknowledging that some national rules are likely to remain for a number of years, there is a gap in current legislation relating to the geographical extension of TSIs. The current limits on TSI scope create uncertainty in the market. Only with the scope extension of TSIs can long term interoperability be achieved.

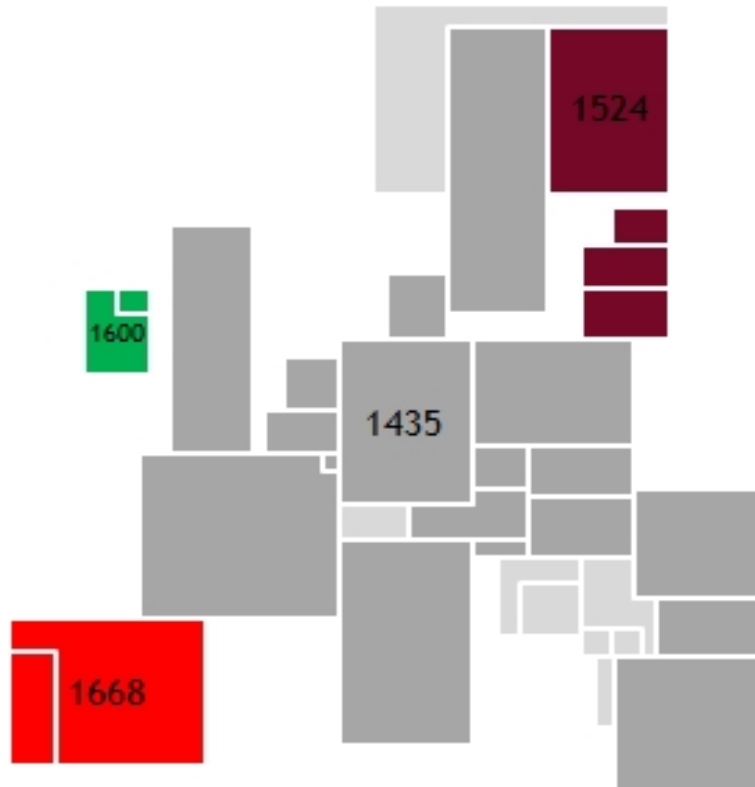
### **Gap 9: The legacy rail system**

As a result of the nationally focused rail development already noted, there are many differences in Europe's railway networks, including different track gauges (the distance between rails on the track), electrification regimes and voltages, signalling, loading gauge and the design of rolling stock.

For example, while most Member State rail networks use the standard gauge of 1,435mm, several countries use a broader gauge and small narrow gauge networks also exist. The Baltic Member States of Estonia, Latvia and Lithuania use the same broad gauge as Russia, of 1,520mm. Finland uses a slightly wider gauge of 1,524mm and the Republic of Ireland and Northern Ireland use a gauge of 1,600mm. The Iberian gauge used in

Portugal and Spain measures 1,668mm. All high-speed networks, including those on the Iberian Peninsula, use the standard gauge.

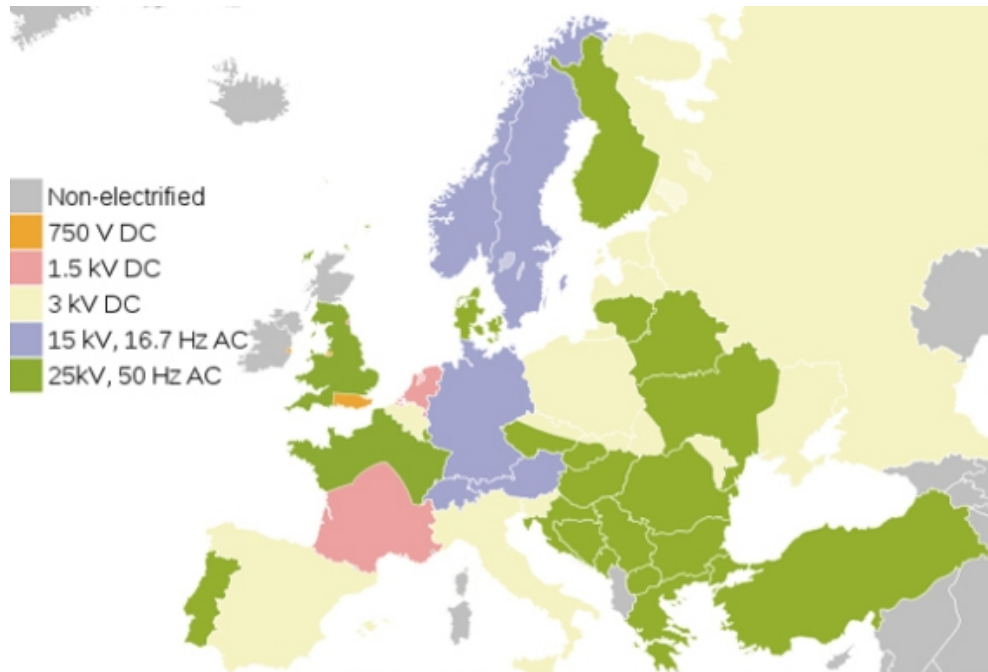
**Figure 10: Different track gauge across Europe**



**Source:** Steer Davies Gleave elaboration

Motive power also differs both within and between Member States. While some rail services remain powered by diesel locomotives, the majority of services in Europe are now electrified. Many different electrification systems exist, with various voltages used and some Member States opting for direct current and others for alternating current. Some electrified lines, particularly urban lines, use a third rail system to transmit the power while others use overhead lines.

**Figure 11: Different electrification systems across Europe**



Source : Railway Technology website <http://www.railway-technology.com/features/feature104304/feature104304-2.html>

These variances in infrastructure clearly hinder the development of an internal market. Notwithstanding the development of TSIs, there is currently no legislation in place that aims to remove these barriers and require that one specific gauge and power supply is used across the entire European network. The cost of complying with such legislation would in any case be prohibitive (even though the renewal and upgrade of all European infrastructure will need to take place sooner or later), and the incremental approach underpinning the implementation of TSIs is therefore the only realistic way forward for the foreseeable future. We discuss the possible costs and benefits related to the closing of this gap in the following chapter.

#### **Gap 10: Standard technical parts**

An area where the single market is still well behind in the rail sector is in relation to the standardisation of technical parts. We have been informed that some incumbent operators have hundreds of different wheel sizes for their passenger and freight rolling stock which is increasing their costs and making the railways less competitive. Harmonising these technical spares and common parts could benefit the industry as a whole. This should cover both rolling stock parts as well as infrastructure components where, in some areas, different parts are creating compatibility issues (not least in relation to ERTMS mentioned above).

This does not require specific legislation and is something that could reasonably be achieved through industry cooperation and through the standardisation bodies, at most with assistance from legislators in guiding the general approach to standardisation. It is important to note that this gap is more easily achievable than retrofitting the entire legacy

system identified in the previous gap. It is also a significant step in the direction of a fully interoperable railway and as such would accelerate the filling of the previous gap. We discuss in the following chapter the costs and benefits of such an approach.

#### **Gap 11: Standardisation of rolling stock**

Rolling stock is often very different across Member States with often similar trains being specified to different standards. While some of this is due to safety and network related requirements (for example in relation to station platform heights or different signalling standards) there are also a number of service related specifications that mean that a train needs to be re-designed for each customer and that a large share of each train is different for different customers. This is more the case in relation to multiple units than in relation to locomotives and passenger coaches.

Creating a common understanding of how trains should be specified while still allowing certain options to be made available to customers would decrease the design cost of rolling stock while still allowing procuring authorities to choose some bespoke elements and manufacturers to differentiate themselves. This is not something that can be legislated, but is something that the industry would be best placed to address together, as a first step through coordinating the requirements of local authorities in terms of train specification. This standardisation is a further step in the direction of creating an interoperable railway in line with the contents of Gap 9. It is also a gap that is less difficult to fill although it will require time to be effective as it will need to follow the natural renewal patterns of rolling stock.

#### **Gap 12: Single infrastructure manager**

The 4<sup>th</sup> Railway Package proposal suggests that there could be increased cooperation between infrastructure managers. Although it has been discussed in the past there is no legislation to date that proposes the creation of a single infrastructure manager across Europe. While this may benefit the industry as a whole through common buying potentially reducing costs of investment, renewal and maintenance, it is difficult to see how a single infrastructure manager could be created that would effectively manage national specific infrastructure problems.

The industry may wish to increase the steps taken in relation to cooperation and seek to align interests in order to increase the competitiveness of the rail sector. However the possibility of common buying should be considered in the light of potential competition concerns.

#### **Gap 13: Single operating language**

One of the barriers that hinders cross border services is the fact that each national market speaks its national language in communicating between train and infrastructure (and passengers). In the aviation industry this has been solved with the international language for communication being English.

In the rail sector local languages remain essential. For example a Eurostar train driver will need to speak English, French and Flemish to operate their services. Train drivers wishing to operate in Germany need to sit a competency language examination to be able to drive trains on the German network. This creates a barrier to entry for operators and an increased cost to the industry which could be addressed by the choice of a common language across the sector or through the use of alternative languages such as pictograms to ensure that a common language is used.

It is unlikely that it will be possible to mandate this through legislation, however the various operators could find a solution which could also be an intermediate solution allowing a single language to be used within a certain macro-region of the EU that covers more than one Member State.

#### **Gap 14: Missing links at borders**

EU funding, and especially INTERREG funding has been directed at cross-border projects between regions and countries. However there remain a large number of border crossings where with little investment important gains in cross-border services could be made both for freight and passenger services. The creation of a Single European Railway assumes that there are no more borders for the railways and as such that there would also no longer be missing links at borders. This gap can be seen as another step in the process of creating an interoperable railway. These links could come in the form of:

- the creation of interchange stations at borders,
- building the infrastructure necessary to allow the crossing of borders without stopping (such as installing gauge changing tracks or lengthening power supply infrastructure into neighbouring MSs, ensuring last mile infrastructure meets the requirements of bordering countries, etc.) or
- creating a cross-border service that connects two key towns or cities that are currently only connected by road (although the rail infrastructure is there).

The European Commission should take a more prominent role in identifying what these missing links are and targeting investment in these areas. This is not a legislative gap, but an administrative gap which can be easily filled with attention focused on targeting those areas that create the biggest benefit with the least input.

#### **Gap 15: Different working conditions**

Different working and social security conditions in various Member States are also affecting the competitiveness of rail with other transport modes. For example, there are different provisions in national legislation in relation to the transfer of staff when PSC services pass from one operator to another. Some Member States require all staff to be transferred to the new operator, others do not have this requirement, others still state that the employee has the right to remain with the previous operator irrespective of whether that operator now runs the service or not.

Any harmonisation of these conditions needs to be dealt with as a wider issue looking at worker rights and obligations and cannot be dealt with exclusively focusing on the rail (or road) sector. As such we have not made any proposals in this area within this study.

### **Other gaps**

For intermodal competition the costs of transport should be reflected in its price in an undistorted way. Is railway in disadvantageous position vis-à-vis other modes, in particular road transport, and is there the need to provide greater incentives to use rail transport? This could concern infrastructure funding, taxation, charging for the use of infrastructure etc. However, for example funding and taxation are either outside the EU's competences or subject to unanimity in the Council making appropriate solutions difficult to define.

## 2. Road

Also in the case of the road sector, we have identified a number of gaps in legislation that result either from the gradual nature of market opening or from the non-satisfactory implementation and enforcement of existing legislation. In addition to this we also identify those gaps that have not yet been addressed at all by the sector. These gaps are of a market, technical and administrative nature and involve EU institutions and other actors such as single MSs and local authorities.

The main gaps relating to current legislation not going far enough or not being properly enforced are:

- Completing market opening
- Harmonisation of social legislation in road transport
- Enforcement of rules
- Vehicle standards on maximum weights and dimensions of road vehicles
- Vehicle standards to promote cleaner, safer and more intelligent vehicles
- The setting of a price for road charging policy
- The development of interoperable technologies for road charging policies
- The recourse to innovative solutions to reduce road safety risks

Those areas that have yet to be addressed in legislation include:

- The safety risks still faced by “vulnerable road users” (i.e. cyclists, pedestrians, children and older people)
- The poor environmental performance of road transport
- Road passenger rights

Each of these areas is discussed in more detail below.

### 2.1 Main gaps – existing legislation

#### Gap 1: Completing market opening

The Single European Transport Market is relatively well developed in the road transport market, but the market is still not fully open or harmonised across the EU.

This is particularly the case for cabotage in road freight, rules for which are set out in Regulation (EC) No 1072/2009, which increased certainty by removing national interpretations of the previous rules. The Regulation still limits road hauliers to three cabotage operations in seven days and has not been implemented homogeneously. First, Member States have different rules for the partial loading of cabotage operations (multidrops). Second, Member States have implemented different enforcement, monitoring and sanction regimes for cabotage. Third, there is limited cooperation between the authorities responsible for the enforcement of the rules in different Member States. In addition there are differing views on the extent to which hauliers’ clients should be responsible for breaches of the rules or insurance requirements. Harmonisation of these rules would benefit the market as a whole.



International bus and coach transport has been largely liberalised, with operators permitted to provide international services subject to national authorisation. However, minimal legislation at a European level has led to different regimes in each Member State. Some have opened the market for commercially viable services or introduced tendered franchises. Others have highly regulated markets with direct award of Public Service Contracts. The volume of cabotage passenger services in most Member States is minimal.

Full domestic liberalisation could bring a range of benefits including more services and greater cost efficiency. This would need to be implemented carefully, to protect transport integration and the coordination of services. For a fully open and accessible market, operators should also have access to the terminal infrastructure. In some areas with poor rail infrastructure and low volumes of rail services, there is also potential to reduce subsidies to rail services by using bus or coach services as an alternative.

## **Gap 2: Harmonisation of social legislation in road transport**

The EU has established a framework of social conditions to promote the wellbeing of drivers and to maintain the attractiveness of the profession as well as to promote fairness in competitive conditions across the EU. Current differences in working conditions applied to drivers employed in different Member States raise concerns from an economic, social and environmental point of view. A harmonised and well-functioning labour market is crucial for social and working conditions of professional drivers. Since the liberalisation process started in the 1990s, the road freight transport sector has seen some radical changes, but the liberalisation process has not been accompanied by a parallel process of social harmonisation in employment conditions which in consequence have worsened for both resident and non-resident professional drivers.

Poor harmonisation has resulted in differences in labour and social market structures and varying levels of effectiveness of driving behaviour enforcement mechanisms in different Member States. These disparities have created incentives for transport companies to adopt dumping practices such as using drivers who falsely claim to be self-employed in other Member States.

These unfair practices are symptomatic of a more general decline in standards within the driving profession, including a deteriorating working environment, longer working hours, less stable employment, declining levels of income, and deteriorating driving skills.

Greater harmonisation of social and employment legislation and enforcement practices, sanctions and penalties across the EU Member States could help reduce differences in social and employment standards and enforcement priorities. Strategies which could facilitate the legal framework harmonisation include: creation of a European register of transport companies; enhancement of cooperation between Member States and between different authorities; introduction of reporting mechanisms on the application of Directive 96/71/EC on the posting of workers; standardisation of common interpretation of EU legislation; increasing existing cooperation between Member States through the work of European associations (such as CORTE, TISPOL and ECR); and completion of international research projects.

### **Gap 3: Enforcement of rules**

A harmonised and effective enforcement system is crucial for the prevention of illegal practices. At present standards differ between countries and sanctions and penalties for infringement of social, technical, safety and market rules are not harmonised across all Member States. The human and financial resources dedicated to the enforcement of these rules also vary considerably, leading to wide variation in the probability of infringements being detected and the resulting penalties. This has led to increased safety concerns, unbalanced competition and different administrative regimes.

Tachographs provide enforcement authorities with the data needed to verify compliance with driving time and rest period legislation. Adherence to these rules should increase safety due to lower levels of driver fatigue and should also guarantee reasonable working conditions for drivers. Tampering with tachographs has also been used to cut costs and gain unfair competitive advantage. While recent legislation has introduced a smart tachograph, which records vehicle locations using satellite positioning, additional checks for overloading and linking weight sensors to the tachograph could further control driving and resting times.

A European register of road transport undertakings was established in 2013 to provide a platform for the exchange of information of infringements by non-registered undertakings. The Commission has proposed to use this register in the future to enable enforcement authorities to carry out targeted roadside checks using real time information. These initiatives should bring about faster checks and a reduction in the administrative burden for compliant firms.

Member States have chosen different entities for, and developed approaches to, the enforcement of social legislation. The harmonisation of enforcement officer training and required competencies would contribute to a more even application of EU legislation in Member States. The Commission could facilitate further information and best practice sharing between Member States to encourage uniformity in the implementation of the legislation.

### **Gap 4: Vehicle standards/1: Maximum weights and dimensions of road vehicles**

Heavy goods vehicles, buses and coaches must comply with certain rules on weights and dimensions for road safety reasons and to avoid damage to roads, bridges and tunnels. Directive 96/53/EC, conceived in the 1990s to accompany the opening of the international road transport market, sets minimum standards and maximum sizes and weights for vehicles requiring access to the road networks of all the Member States. It limits trucks to 18.75 metres in length and 40 tonnes in weight, excluding 'mega trucks' of up to 25-metres in length and 60 tonnes in weight. Member States are allowed to exceed the limits set by the Directive 96/53/EC for transport within their borders, but only Sweden, Denmark, the Netherlands and Finland have decided to do so nationally.

Increasing the maximum permitted weights and dimensions for trucks could bring considerable cost reductions to road freight transport, but further analysis is needed of the potential effects on the environment and safety as well as on the competing rail mode.

The European Commission aims to increase rail freight for environmental reasons and the introduction of megatrucks could result in a transfer of traffic from rail to road. Conversely the introduction of megatrucks would reduce the number of heavy goods vehicles on Europe's roads and hence reduce fuel consumption and emissions. Several stakeholders also believe that longer and less manoeuvrable vehicles would increase the risk and severity of accidents.

Significant changes would also be needed to the road network including new specifications and standards and higher maintenance. Tunnels and bridges may be unable to accommodate megatrucks and decisions would have to be taken as to whether the investment required to make them accessible would be worthwhile. Some stakeholders have suggested in previous studies that the most suitable solution would be to introduce megatrucks on a restricted basis, e.g. on motorway and national roads only.

The wide range of stakeholder opinions demonstrates the controversial nature of the subject. Trials are currently underway in several Member States and further research should provide more information. Further analysis is also needed on whether the technical provisions on megatrucks should be set by the EU or by the Member States on the basis of the principle of subsidiarity.

#### **Gap 5: Vehicle standards/2: Cleaner, safer and more intelligent vehicles**

Road transport systems need to become safer and more secure. Significant progress has been made in research and development of new materials, systems and ICT tools that could contribute to improving the economic, environmental and safety performance of the road sector, helping to reduce congestion, polluting and CO<sub>2</sub> emissions as well as road accidents. The technologies are available but deployment needs to be accelerated.

As the technologies develop, it is necessary to ensure that the systems are interoperable and built with open system architecture. Organisations such as ERTICO, the network for Intelligent Transport Systems and Services stakeholders in Europe, are working towards accelerating the development and deployment of ITS in Europe. The potential for cooperative systems for more intelligent vehicles include:

- Monitoring – real-time vehicle-based data offering traffic and incident information;
- Safety Applications – warnings for wrong turns and local hazard alerts;
- Traffic Management – controlling vehicle-traffic interaction for smoother driving.

New technologies can greatly assist the European Union in meeting its ambitious targets for greenhouse gas reductions and reducing dependency on fossil fuels. More intelligent vehicles can contribute to a reduction in energy consumption and improvements in energy efficiency. The European Commission is promoting greater use of hybrid and electrical vehicles in the European market. Freight operators and road hauliers are encouraged to plan their routing so as to optimise fuel consumption. Enhanced traffic management systems could also improve energy efficiency.

The European Commission has provided substantial financing for research and innovation in road transport as part of the Seventh Framework Programme and will

continue to do so under Horizon 2020. The European Investment Bank also provides loans for research. This investment has great potential to fully develop technology that will assist in safer and greener transport. For example, the 'European Green Vehicles Initiative' is a public-private partnership concentrating on the energy efficiency of vehicles and alternative powertrains. Under the Smart, Green and Integrated Transport call for the Horizon 2020 Work Programme 2014-2015, funding is available for research in traffic safety and the following areas:

- Technologies for low emission powertrains;
- Advanced bus concepts for increased efficiency;
- Global competitiveness of automotive supply chain management;
- Cooperative ITS for safe, congestion free and sustainable mobility.

The Commission's Transport White Paper of 2011 set an objective of a 60% reduction in greenhouse gas emissions in the transport sector by 2050, based largely on a reduction of road transport and an increase in transport on rail and water. Vehicle emission standards have also become stricter and improvements have been made in fuel quality, reducing gas and particulate emissions. While greenhouse gas emissions from transport increased by a third between 1990 and 2007, they have since declined, but further initiatives will be needed to achieve the 2050 target.

As part to the strategy to reduce road transport's contribution to climate change, between 2008 and 2011 the EU set legally-binding targets for average GHG emissions. For new cars, these were 130 grams of CO<sub>2</sub> per km by 2015 and 95g grams of CO<sub>2</sub> per km in 2020, and for new vans they were 175 grams of CO<sub>2</sub> per kilometre by 2017 and 147 grams of CO<sub>2</sub> per kilometre by 2020.

The European Commission has set out the manner in which the 2020 target for CO<sub>2</sub> emissions for cars and light commercial vehicles should be achieved. This has progressed to an agreement between Member States and the European Parliament for light commercial vehicles but no agreement has been reached for car fleets.

For air quality, Directive 2008/50/EC, proposed by DG Environment, sets out limits for particulate matter and other pollutant gases. Many Member States have not reached the agreed World Health Organisation air quality standard targets. Despite the success of existing legislation in reducing concentrations of particulate matter, sulphur dioxide, lead, nitrogen oxides, carbon monoxide and benzene, the limits for ozone and fine particulates are often exceeded. For example, 17 Member States are currently subject to infringement proceedings for PM10 non-compliance, an area where road transport and industrial processes are the second largest contributors – with a share of 14.4% and 15.1% each in EEA countries<sup>3</sup> – after the residential, commercial and institutional sector, accounting for 41.9%.

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<sup>3</sup> Source EEA (2012) - Emissions of primary particulate matter and secondary particulate matter precursors (CSI 003/APE 009).

At the end of 2013 the European Commission launched the Clean Air Policy Package<sup>4</sup> proposing a number of measures, including the Clean Air Programme for Europe setting out new interim objectives aimed at reducing health and environmental impacts by 2030, accompanied by emissions reduction targets for key pollutants and the policy steps that will need to be taken to achieve the objectives.

#### **Gap 6: Road charging/1-Setting the price**

The European Commission supports the approach where road users, not taxpayers, pay for road infrastructure and its maintenance; also known as the ‘user pays’ approach. The Commission also promotes the ‘polluter pays’ principle which internalises the external costs of road transport such as noise pollution. In the light of this, Member States have adopted different approaches to road charging, with a variety of tolling systems and vehicle segmentation in place across Europe.

Directive 2011/76/EC, the so-called “Eurovignette Directive” sets a harmonised charging system for the TEN-T road network, which can be extended by Member States to other road sections, and which permits the introduction of pricing schemes covering both the cost of infrastructure use and the negative effects of road transport activities on the environment. Member States are not obliged to implement road charging, but the Directive provides certain basic rules if they wish to do so. These include that tolls are distance-based and depend on the type of vehicle, and that vignettes are tiered for the duration of use and the vehicle’s emission class. Member States have adopted approaches ranging from higher tolls at peak periods to vignette systems, including a common vignette across five Member States. Drivers travelling between Member States may encounter a range of different tolling systems. There is also no EU framework on pricing policy for urban or local road user charges or for permits for access to the increasing number of low emissions zones.

The variety of road charging arrangements in Europe means that users do not receive, across the EU, consistent price signals and incentives to more sustainable use of the infrastructure. Vignette schemes do not provide incentives for minimising the distance travelled, and tolls that differentiate by vehicle type but not by infrastructure use fail to reduce congestion, the costs of which are estimated to be in the order of €100 billion per year in the EU (1% of EU GDP).

Lack of harmonisation in the type of charges levied (vignettes, tolls differentiated or not) could be addressed at the EU level, to ease the free movements of goods and passengers, and might also allow progress towards pricing schemes that best address the “user pay” and “congestion/polluter pay” principles. Road charging tools to internalise environmental costs would need to be coordinated with other instruments already in place or to be introduced, such as energy production taxation that might be better tailored to address this point.

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<sup>4</sup> COM/2013/0918 final – Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – A clean Air Programme for Europe. More information available at: [http://ec.europa.eu/environment/air/clean\\_air\\_policy.htm](http://ec.europa.eu/environment/air/clean_air_policy.htm)

## **Gap 7: Road charging/2-EETS technologies**

Efficient transport networks are essential to the competitiveness of EU. Road transport continues to grow, with congestion and bottlenecks appearing more widely across the network. Road tolling can make a major contribution to the management of demand and capacity.

The various European electronic toll collection (ETC) systems introduced at local and national levels from the early 1990s onwards are generally non-interoperable and each require vehicles to be fitted with a different electronic tag. International hauliers currently need 11 different on-board units and tolling contracts and 6 vignettes to cover the whole network.

The European Electronic Toll Service (EETS) aims to ensure interoperability of tolling services on the entire European Union road network. The goal of EETS is to enable road users to pay tolls easily throughout the EU with only one subscription contract with one service provider and a single on-board unit (OBU). This goal will be challenging as different technology is used to collect toll payments electronically even after the promulgation of Directive 2004/52/EC that limit these to three: Dedicated short-range communications (DSRC), Global Navigation Satellite System (GNSS), and Global System for Mobile (GSM). Each technology is best suited to a certain context and no single approach is suitable for every tolling scheme and road network. This factor creates problems regarding the interoperability of the European network.

In the last few years, several pilot projects have been conducted into the issues of interoperability between different ETC systems and between charging schemes using the same ETC system. In communication COM (2012)474, the Commission proposed a stepwise approach of first establishing blocks of EETS at the Regional level (REETS). REETS emerges as a kick-start deployment of EETS, which could facilitate the implementation of electronic toll collection across Europe by undertaking it in steps.

Enforcement is also an issue. Current regulations and national laws make it difficult to penalise foreign toll evaders because of the limited cooperation between national authorities in enforcement, and because evidence gathered in one Member State is not always sufficient in another Member State. Greater coordination of enforcement actions at the transnational level will be necessary in future. Tolls are also currently defined as taxes, charges or fees in different legislation and there would be benefits from the harmonisation of the fiscal framework.

EETS policy would also benefit from ensuring a minimum penetration rate for ETC technologies, such as car manufacturers providing ETC technology, removing the need to obtain an aftermarket OBU and making it easier to have a common European standard. Another approach would be introducing a European electronic licence plate with GSM-DSRC technology. These approaches would also require a legislative background to promote the installation of these services in new vehicles. Even if not applied to vehicles manufactured before the legislation is enacted, the approach would enable the creation of a European vehicle fleet equipped with this technology in the near future. It would be

also be beneficial to coordinate EU policy intervention in this area with other actions regarding the use of ITS technology in the road sector, such as those for safety purposes discussed below.

#### **Gap 8: Road safety/1-Technology**

Technology is expected to contribute considerably to road transport safety. Wider deployment of Intelligent Transport Systems (ITS) that can detect incidents, identify their causes, request medical intervention, support traffic supervision, and provide information to road users in real time will improve traffic safety.

A vehicle containing eCall equipment automatically calls the nearest emergency centre if the vehicle is involved in a crash. A 2013 Commission proposal called for mandatory deployment of interoperable EU-wide eCall for passenger cars and light commercial vehicles by 2015. It also provides the location of the crash for the emergency centres, providing quicker response times for emergency services. There are three elements to the deployment: equipping vehicles with the system; ensuring that the mobile phone network is capable of transmitting the message format; and ensuring that the emergency centres are able to handle the messages. The technology has been endorsed by the Commission since 2005 but uptake with a voluntary deployment strategy has been low. Roll-out for the technology for all vehicles including HGVs and motorcyclists would further benefit road users.

Directive 2010/40/EC gave power to the Commission to adopt functional, technical, organisational and service provision specifications for the compatibility, interoperability and continuity of ITS through the European Union. The specification and deployment of systems which provide data and information exchange between different vehicles, between vehicles and infrastructure, and between different infrastructure is a high priority. Other possible measures include equipping and retrofitting vehicles with Advanced Driver Assistant Systems such as Pedestrian Recognition, Lane Departure Warning and Anti-Collision Warning systems.

## **2.2 Main gaps – new legislation and other measures**

#### **Gap 9: Road safety/2-Vulnerable users**

Vulnerable groups (motorcyclists, moped riders, cyclists and pedestrians) represented 45% of all road deaths in 2008 despite comprising only a small proportion of road users. 47% of all road deaths in urban areas in 2008 were either cyclists or pedestrians, whose safety is mainly related to urban management, where most responsibilities lie with local authorities. 20% of all road deaths in 2008 were elderly people: fragile users such as the elderly, children and persons with reduced mobility are also at a higher risk of being involved in road traffic accidents. There is scope for concerted action between the EU, national governments and local authorities to reduce the number of accidents involving vulnerable and fragile users.

As far as possible, safety principals that have been applied to national road networks should also be applied to secondary road networks. Introduction of safer road

infrastructure for vulnerable road users, particularly in urban areas, could also greatly reduce their involvement in road accidents, although Member States would need to analyse the costs and benefits associated with infrastructure such as pedestrian crossings and segregated lanes for cyclists.

The processes and quality of driver training and education programmes currently vary between Member States, with young novice drivers at most risk of an accident. Broader driving skills such as evaluating road safety risks could be included in the licencing examination to improve driver awareness. In addition, as the population of Europe is ageing, continuing training after the award of a licence could also be considered in order to maintain aptitude. An overall harmonisation of the training programme for non-professional drivers and further cooperation between Member State testing authorities would increase cost efficiency and improve road safety.

Motorcyclists are the highest risk group amongst road users. Several steps could be taken to improve their safety, including raising awareness of motorcyclists among other road users. Recent negotiations on EU legislation for roadworthiness tests obliges Member States to introduce periodic tests for heavy motorcycles if they have not done so to date or the requirement to demonstrate that alternative measures have been implemented to the same level of effectiveness. Further technological developments increasing motorcycle safety and reducing the effects of motorcycle accidents could also have a positive impact.

#### **Gap 10: Road transport environmental sustainability/1-Subsidiarity and local action**

With urban and metropolitan areas being responsible for a quarter of transport-related GHG emissions and most accident damage, the EU is giving an increasing role to local authorities in minimising these impacts, although harmonisation in this field presents a number of challenges.

An example of existing fragmentation in this field is the “Low Emission Zones”. Over 70 cities and towns in eight Member States operate or are preparing Low Emission Zones (LEZs) in which access by vehicles is limited according to several parameters: the emissions of the specific vehicle, the area of residence, the category of the vehicle and their dimension. The existing LEZs vary in their size, toll payment methods, pricing and enforcement options, thus creating a patchwork of schemes that can generate confusion for road users.

The role of the EU in local affairs is limited both by the principle of subsidiarity and by the different institutional framework behind transport policies and choices in the Member States. For example the selection and funding of local, urban and metropolitan transport schemes and projects is managed locally in Italy but nationally in the United Kingdom.

Between 2000 and 2010 the management of local and urban transport externalities by the Commission was driven by a “best practice approach”. The Commission has already funded research projects such as ELTIS and CIVITAS, with the aim of identifying and sharing best practices across Europe. It could move to greater interaction with local



authorities, harmonising the management of transport-related externalities as much as possible within the principle of subsidiarity.

The mainstream European movement involving local and regional authorities, the Covenant of Mayors, is committed to increasing energy efficiency and the use of renewable energy and represents a step in this direction, but the effectiveness of the initiative is limited by its voluntary nature. Other actions at EU level include providing a framework for sustainable urban mobility plans across the EU and potentially linking the provisions of funds to specific measures. This area could be studied further in the coming years.

#### **Gap 11: Road transport environmental sustainability/2-Policy coordination**

Coordination is needed to achieve the challenging goal of improving the sustainability of road transport, which is currently the largest contributor to environmental and climate change impacts in the transport sector. A number of EU policy initiatives have been established to facilitate coordination but the effectiveness of initiatives across different areas – transport, environment and health – has been limited.

Overall greenhouse gas emission reduction and renewable energy increase targets for the EU were established in the 2020 Climate and Energy Framework. The three main targets for 2020 were:

- 20% reduction in EU greenhouse gas emissions from 1990 levels
- 20% share of EU energy consumption from renewable resources
- 20% improvement in the EU's energy efficiency

The Commission has recently published a proposal seeking to set targets for 2030 accelerating the reduction in greenhouse gas emissions to 40% and increasing the share of renewable energy to 37%, but removing Member State specific targets. These frameworks clearly cross many policy sectors and Member States may choose how they wish to achieve their targets. As part of the Clean Air Policy Package mentioned previously the Commission proposed a number of measures, including the Clean Air Programme for Europe setting out new interim objectives aimed at reducing health and environmental impacts by 2030, accompanied by emissions reduction targets for key pollutants and the policy steps that will need to be taken to achieve the objectives. The implementation of the package is expected to avoid 58,000 premature deaths and deliver air quality improvements of between €40-140 billion per year up to 2030<sup>5</sup>. This is clearly a challenging target that requires substantial cooperation between Member States.

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<sup>5</sup> See COM/2013/0918 final and related press release available at: [http://europa.eu/rapid/press-release\\_IP-13-1274\\_en.htm](http://europa.eu/rapid/press-release_IP-13-1274_en.htm)

### **Gap 12: Road transport environmental sustainability/3-Promoting shift towards more sustainable modes of transport**

In the inland freight transport sector, rail can be competitive with road for long distance trips, while road is in most of the cases the best solution for “last mile” deliveries. However, on long distance carriages the competitiveness of the rail sector suffers as a result of the road sector not paying for all its externalities. Although some transport flows (heavy aggregates and commodities) can only be delivered by rail, and some small consignments can only be delivered by road, there is a large middle ground where road competes directly with rail for key freight flows. There is a current lack of appropriate road user charging to allow for these two markets to compete on a level playing field. In addition to this, it is important to note that some actions that could be introduced to improve the efficiency of the road transport market, e.g. further liberalisation of road freight transport market, could further increase the competitiveness of the road sector and eventually induce a modal shift from rail to road.

In the case of “last mile”/“final” deliveries a number of solutions can be adopted to make logistic greener, including encouraging the use of electric/low emission road vehicles or, eventually, bike cargo for final deliveries; incentivizing night-time deliveries to reduce the impact on urban road congestion; the creation of dedicated delivery areas; etc. It must be pointed out that a number of EU initiatives have, in the past, supported the development of greener logistic solutions across EU cities, but so far the results seems to have been rather limited.

As for passenger transport in the case of international long distance journeys road transport is in many circumstances more competitive than rail, not only in terms of fares, but also looking at travel comfort as often rail routes require a change of service in one or more stations, while coach transport offer direct services.

However it is at the local level that the external impact of road transport seems more challenging: here great effort needs to be made to reduce the current imbalance towards cars and other motorized private vehicles in favour of more sustainable modes of transport such as public transport, cycling and walking.

### **Gap 13: Road passenger rights**

Road passengers have not seen many benefits from the adoption in the coach and bus market of equivalent legislation to that introduced in the aviation and, recently, rail sector. There is substantial scope for improvement to ensure that passengers have, and more importantly, are aware of their passenger rights while travelling.

As mentioned for the rail sector, in some areas passenger rights do not go far enough. In particular there is no obligation to inform passengers of their rights in a common language (or at least in more than just the local language) or to standardise the information that is provided to passengers in relation to delays and assistance or to travel conditions, applied fares, etc. These aspects do not necessarily need to be mandated through legislation and can be agreed by companies in parallel to legislation.

## IV. Evaluation of the Cost of Non-Europe

Having identified the main gaps in legislation set out in the previous chapter, this chapter seeks to evaluate the cost of non-Europe resulting from these gaps. As per the previous chapter the findings are divided between rail and road. The information that is provided within this chapter is based on qualitative and, where possible, quantitative analysis. Where quantitative analysis has been provided details of the approach and methodology are included in Appendix 1 to this report.

The quantification has been carried out to varying degrees of certainty. The case study gaps in the rail and road sectors identified below are supported by detailed support studies usually prepared over a 12 month period and, although they have been modified as part of this analysis, provide a more robust estimate of the likely future cost of non-Europe. Those non-case study gaps identified below are based on robust assumptions but less analysis than what is available for the case study gaps and as such can be considered as having a lower degree of certainty.

All potential benefits from the filling of the gaps are calculated in NPV terms between 2015 and 2035. Appendix 1 also provides the benefits in annual terms where available.

### 1. Rail

The previous chapters have shown that a number of steps have been taken in the rail sector to create a single European Rail Area. Significant steps forward have been made since the publication of the original Cecchini Report but many gaps still remain. The efforts identified in previous chapters have sought primarily to introduce liberalization in the sector and start to address the barriers to entry in the market, but the historical, public sector nature of the sector, as well as the fact that some elements (mainly the physical infrastructure) are a natural monopoly, has meant that more than 20 years of legislative instruments have not created as open a market as necessary.

Furthermore, the role of independent regulation in the railways is not as developed as in other sectors creating significant uncertainty in a large number of Member States. This can be seen in the limited amount of private capital that is invested in the rail sector both on the infrastructure and the operations side when compared to other network industries. Private capital and investment has entered in those markets where market certainty is higher, for example in the UK where an open market in the freight sector has allowed for substantial freight entry and growth and where a number of private operators entered the passenger market through open competition for passenger PSCs. The same is true in some regional passenger PSC contracts in Germany where non-incumbent operators have a significant market share. It is also true, however, that since the initial liberalization efforts in the UK and in Germany in the market for passenger PSCs much of the private capital has been replaced by public money as publicly owned (but non-incumbent) operators have won many of the PSCs (ARRIVA was bought out by DB, the German incumbent, NETINERA is part owned by Trenitalia, the Italian incumbent; Keolis is owned by the French incumbent SNCF; Abelio is owned by the Dutch incumbent NS). Irrespective of the ownership structure of these PSC service

providers the use of open competitions for these contracts has on average had a positive effect on the market and this is discussed further below.

This has also been the case in the freight sector where the privatization of a number of the national freight companies was followed by their acquisition by national, public state railways (primarily DB).

Outside the PSC market, new entry in the passenger market has been limited, primarily as a result of the lack of liberalization and the persistence of barriers to entry (discussed below) but also as a result of the uncertainty in the markets. Notable exceptions to this are NTV (the open access, private, high-speed operator in Italy, in which SNCF has a minority stake), Westbahn in Austria, Leo Express and the Student Agency in the Czech Republic and the Hamburg-Koln Express in Germany to name the main ones. All of these operators have had a difficult start-up period as a result of the actions of the incumbent operators.

## **1.1 Main impacts - Existing legislation**

Given this background this section seeks to identify the main economic impacts of filling the gaps identified in the previous chapter with a particular focus on a subset of case studies and a more high-level analysis for the remaining gaps.

### **Case study 1 - Gap 1: Completing market opening**

In the previous chapters we have seen that while the market can be considered open for freight on rail this is not true for passengers. Completing market opening in this case refers to ensuring that there are no market restrictions placed in the provision of passenger services outside those relating to the provision of PSCs where there would be competition for the market as set out in Gap 2 below. Ensuring that services do not compete with PSC services is an important restriction to maintain as competing services would challenge the economic viability of a PSC service and potentially have a negative effect on the public purse in the form of increased subsidies within the contract.

Allowing open access to commercial services would bring benefits to users. It is likely to lead to an increased level of quality of service in terms of service frequencies, destinations, train comfort and reduced fares. Evidence from the UK shows how the introduction of open access operations improved service frequencies in many cases and increased the number of destinations served by operators along with an improvement of the on-board experience. Evidence from the entry of NTV in Italy shows that the quality of services (both of the incumbent and the new entrant) increased substantially through increased service frequencies and train comfort. In addition, the NTV experience has shown that competition in a market can bring a fall in average fares of as much as 30% (leading to an increase in demand of similar levels). This is a special case for a number of reasons, not least because it relates to a the highly lucrative high speed rail market, but it would not be extreme to assume that average fares would fall by about 10% across all commercial services if they were liberalised and, in fact, competition in the Czech Republic has, to date, brought at least this level of fare reductions.

Market opening could also lead to an increase in market share for the rail sector. It has been suggested that the entry of NTV, and in particular the subsequent fall in fares, has led to the market share of air and road falling. On the core Milan-Rome route the market share of the air sector has fallen from above 65% to about 30% with the rail sector now moving to above 65%. Although this is not entirely due to intramodal competition, but also due to significant reductions in journey times as well as other external factors (the problems with Alitalia).

The fall in fares has a knock on effect on economic activity as it decreases the cost of travel and increases demand. In addition, the arrival of a new operator leads to the creation of a number of temporary and permanent jobs. Temporary jobs are created as a result of the acquisition of new rolling stock to run the competing services (all new operators to date have started services with new rolling stock or have ordered new rolling stock to come into service shortly after the start of business). Permanent jobs are created as a result of the creation of the new operator. These new jobs will not be significant and may be countered by a fall in jobs at the incumbent operator in its drive for efficiency following new entry. To date, the entry of NTV has led to a net increase in employment both directly within the railways and in the sectors supplying the new entrant.

In addition to employment aspects, the incumbent operator may choose to introduce other efficiency savings to improve its competitive position with respect to new entrants; this may have a knock on effect on the quality of service offered by the incumbent.

As part of the Impact Assessment support study that Steer Davies Gleave undertook for the European Commission in relation to the 4<sup>th</sup> Railway Package we estimated the total benefit from further market opening. For the purpose of this study we have slightly modified this analysis to account for the recent developments in the market, in particular in relation to the manner in which new entrants have changed the landscape. This analysis has also looked at the most beneficial option rather than allowing for imperfections to persist in some areas as this analysis needs to identify the cost of not having an ideal solution. As a result, we have estimated that the total net benefit of the introduction of further market opening (in terms of allowing unrestricted access to commercial services) could amount in NPV (Net Present Value) terms to between €3 billion and €6 billion between 2015 and 2035. The main hypotheses behind the modelling exercise are set out in Appendix 1.

Any resulting increase in demand is likely to have a positive, knock-on effect on reducing CO<sub>2</sub> emissions as passenger and freight traffic is removed from the road network and shifts to rail. This has been taken into consideration in the analysis and the estimate set out above includes an economic saving from CO<sub>2</sub> emissions whose NPV is in the range of €65 to €108 million over the same period. This will also have an impact on congestion although given the small amount of modal shift that this policy initiative is likely to achieve the reduction in environmental costs from road use are likely to be small.

## **Case study 2 - Gap 2: Competition for Public Service Contracts**

As mentioned in previous chapters, current legislation (including the current compromise position for the 4<sup>th</sup> Railway Package) does not require competitive tendering for PSCs in the rail sector. As such this remains an important gap that needs to be filled to create the single market in the rail sector. Over the past 20 years competitive tendering has been introduced in the UK, in some parts of Germany and in a small number of other areas across Europe. The introduction of compulsory competitive tendering across Europe will substantially increase the amount of contracts that are available.

The Impact Assessment carried out by the European Commission for the 4<sup>th</sup> Railway Package showed that where there has been competitive tendering of PSCs in Germany, public authorities have saved between 20% and 30% in PSC costs. In some markets these potential savings have been traded off for improvements in quality and/or increased service frequencies. Improvements in quality have come through the renewal of the rolling stock fleet, the addition of new, on-board services, improved cleaning, etc. Furthermore, increased service frequencies have had a positive effect on demand for rail services. Demand has also increased as a result of exogenous factors such as general economic activity.

In addition, where investment in rolling stock is necessary for a PSC (something that is likely to be the case in many of these tenders) this will also have an impact on economic activity resulting from increased manufacturing as well as an increase in temporary jobs to accompany the increase in manufacturing. It is unlikely that, on average, the total number of jobs within the PSCs will change as most tenders are likely to have some form of social protection clause ensuring that all operational staff is transferred to any potential new operator. Any small decrease in jobs in those Member States that choose not to implement some form of social clause is likely to be cancelled out by the increase in jobs in other PSCs that decide to specify increased services. The cost savings that the tendering authorities achieve is likely to be spent in other budget items or reinvested in the railway, this is likely to have a positive knock-on effect on employment levels, and however we have assumed that this is zero for this analysis to provide a more cautious result.

Compulsory competitive tendering of PSCs will also lead to some increased costs resulting from those outlays relating specifically to participating in the tender (and, for the contracting authority, organizing the tender). These are not insignificant and have been included in the calculations set out below.

For competitive tendering of PSCs to be effective and reap the most rewards it is essential that the tenders are specified appropriately. This means ensuring that the tender size is large enough to warrant an open competition but small enough so that non-incumbent operators can find the means to participate effectively. The tender must also ensure that there are no barriers to the use of important infrastructure such as maintenance depots and that there is a level playing field in relation to access to rolling stock. In the analysis Steer Davies Gleave prepared for the Impact Assessment Support Study for the 4<sup>th</sup> Railway Package we identified all of these areas as potential residual barriers to entry

and sought to quantify the likelihood of them occurring. This study requires us to evaluate the cost of non-Europe and by proxy to identify the potential benefit of a fully functioning Europe and as such we have assumed that these limitations have been addressed and that a real market exists for these tenders. As a result of this the calculations set out below provide a different net benefit to the values identified in the Impact Assessment Support Study for the 4<sup>th</sup> Railway Package.

Given the information set out above, we believe that between 2015 and 2035 the potential benefit from introducing compulsory competitive tendering is likely to be between €10 billion and €25 billion in NPV terms. The methodology that has been used to arrive at this range is set out in Appendix 1.

Included in the results set out above are an estimated €172 million to €431 million of benefits from reduced CO<sub>2</sub> emissions, calculated in NPV in the 2015-2035 period. These benefits result from a minimal level of modal shift but mainly from the introduction of cleaner and more fuel efficient rolling stock which could reduce the carbon footprint of the railways (where diesel locomotives/trains are being used) as well as reduce the noise related pollution originating from the railways.

### **Case study 3 - Gaps 3: National specific vehicle authorization and safety certification**

As has been mentioned previously technical and physical barriers remain a fundamental element limiting the creation of a single market in the rail area. These two gaps identified administrative barriers that have built up as a result of the physical infrastructure barriers. These two administrative processes are introducing significant additional costs to operators as new rolling stock needs to be authorized in multiple countries separately implying a cost to the operator in terms of direct administrative costs and indirect costs related to lost revenue while the locomotive or train is being authorized. The differentiated safety certification process introduces the same degree of problems.

Through the creation of a single vehicle authorization process managed by the independent European Railway Agency (ERA) and the single safety certificate issued by ERA, certainty in the entire process should increase substantially reducing timescales and the cost of bringing a train into service and bringing a service on-line. For this to be effective, ERA will still need to continue to use the expertise within individual National Safety Authorities to ensure that the rolling stock is compatible with national networks, but the uncertainties that currently exist around rolling stock authorisation and safety certification would be removed by creating a single, independent entity at supranational level to make the final decision on these requests and removing the national influences that affect the decision of some NSAs.

As part of the Impact Assessment Support Study into the future role of the European Railway Agency Steer Davies Gleave looked at these two aspects in detail with the aim of identifying the benefits of harmonizing the process and removing these administrative barriers. As part of this cost of non-Europe study we have taken the analysis provided within the Impact Assessment Support Study and updated where possible to reflect changes in the market and the different timescales for this study. The analysis that has

been produced identifies the benefits of solution whereby ERA is the only body receiving requests, and not the current comprise solution going through Parliament where applicants can continue to approach the NSAs if they intend to operate their trains solely on one network.

Based on these inputs we believe that by addressing Gap 3 between 2015 and 2035 benefits for the European economy could be in the order of € 980 million. Further details relating to the main hypotheses used for this analysis are set out in Appendix 1, which provides specific information on expected gains from the amendment of both the authorisation and safety specification process.

## **1.2 Non case study gaps – existing legislation**

### **Gap 4: Ensuring non-discriminatory access to infrastructure**

As set out in the previous chapter some aspects of the structure of the industry have led to some stakeholders complaining about the lack of non-discriminatory access to the infrastructure. The main areas that are identified are the lack correct incentives through independent regulation and the lack of full unbundling.

The first of these two relates to the next step of independent regulation discussed in the previous chapter that is the creation of a European Rail Regulator. The full benefits of having effective national regulatory authorities has not as yet been identified and the aspects of the Recast relating to independent regulation have not as yet lead to significant changes in market conditions so it is not possible estimate the economic benefits. However, it is clear that having such an entity increases the certainty for investors as well as provides some degree of assurance that the dominant position of the incumbent operator or the infrastructure manager is not abused. Having a supranational body at European level to oversee the market as a whole may increase this certainty further as it will not be guided by specific national interests. This certainty should lead to increased entry into the market as the investment in this sector is less speculative. If this was to occur there would be a knock on effect on employment and other indicators similar to those identified in Gap 1 following the liberalisation of commercial services, however it is difficult to see how additional benefits from a European Regulator could increase the benefits set out in Gap 1 by more than 2%. Taking this 2% as a ceiling, European Regulation could bring additional benefits of between €53 million and €114 million in NPV terms between 2015 and 2035 in the case of 85% and 75% of incumbent share respectively.

The second key barrier here is the relationship that some incumbent operators maintain with national infrastructure managers, in particular through what is commonly known as holding structure. Many stakeholders (in particular new entrants and their associations) have complained that this does not guarantee the necessary transparency in the market and that only full vertical separation can ensure that the interests of the incumbent operator and infrastructure manager are distinct and not to the detriment of potential new entrants or other market players.



In the Briefing Paper that Steer Davies Gleave prepared for the TRAN Committee in 2011<sup>6</sup> the main advantages of separation were identified as being the following:

- Increased transparency
- Increased cost efficiency
- Guaranteed neutrality of the infrastructure manager
- Increased certainty for market entrants leading to greater competition

The main disadvantages of this separation were identified as:

- Transitional costs in passing from a vertically integrated to vertically separated railway
- Loss of economies of scope
- The introduction of information asymmetry
- Decreased incentive to invest in infrastructure
- Double marginalisation (where different monopolist along the chain charge their own margin)
- Coordination problems
- Lower level of reliability

In the Impact Assessment Support Study undertaken for the Commission in relation to the 4<sup>th</sup> Railway Package, we reviewed these advantages and disadvantages and modified them where necessary and estimated the potential benefit to society from compulsory full unbundling. We noted in that study that unbundling could potentially lead to benefits of between €2.5 billion and €6.5 billion between 2015 and 2035 on its own, but that tying this with Gaps 1 and 2 mentioned above could increase such benefits by between 10 and 50% leading to a range of between €2.75 billion to €9.75 billion. The current compromise position for the 4<sup>th</sup> Package is less stringent and does not require full separation and thus the benefits from the current position will be much smaller than those identified earlier in this paragraph.

In the event that this separation leads to increased modal shift there will also be environmental benefits from filling this gap although there is no evidence to support this at the moment.

#### **Gap 6: Passenger rights**

In the previous chapter we identified the lack of appropriate passenger rights as an important gap. Extending the requirements of Regulation 1371/2007 to all rail services and all Member States will benefit all passengers. Ensuring the harmonisation of common information provision across borders and requiring that all information is provided in a second language will also have a significant impact on the travelling public. The economic benefit of these initiatives will be small however and will only have a small impact on encouraging modal shift or connectivity between different locations. It is likely that the majority (if not all) of these benefits are cancelled out by the additional costs related to implementing the Regulation for all rail services and improving information provision to passengers. In any case, it is unlikely that the net benefit would be negative and as such it is an initiative worth pursuing.

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<sup>6</sup> The impact of separation between the infrastructure manager and railway undertakings in the European Union (2011)

In terms of integrated ticketing, allowing system (ticket) integrators access to rail ticketing systems across Europe will benefit passengers as they are able to buy tickets across Europe. This also has the benefit of bringing money into the railways as these ticket integrators would pay for the privilege of selling tickets (although this would be a transfer from other sectors and so should not be considered as a net benefit to the economy as a whole). The cost of this to current operators would be minimal or non-existent as many already allow this through such portals as RailEurope.

Going further than this in terms of ticketing would however incur significant costs which would exceed the benefits to customers. Requiring that all ticket offices across Europe sell tickets for anywhere in Europe would require the upgrading of all ticketing systems as well as terminals in ticket offices. This is not an obligation in other transport sectors also because the benefits of doing this are much lower than potential costs.

While these initiatives will have a significant impact on the accessibility of rail services the economic impact is likely to be minimal. We believe that these actions would, at most, lead to an increase in demand of 1% across Europe. This, coupled with different average ticket prices per passenger, current passenger figures (2012) and the potential cost of providing increased information to passengers (taken from information included in the Steer Davies Gleave study on the implementation of Rail Passenger Rights Regulation) would lead to an NPV benefit of between €0.2 billion and €4.5 billion between 2015 and 2035.

### **1.3 Main impacts - New legislation**

#### **Gap 7: Varied access charges**

The variability of access charges across the EU makes different flows more or less viable as discussed in the previous chapter. A more harmonised approach with a common process for the determination of infrastructure charges could lead to greater certainty for all operators. The potential benefits are hard to quantify but a harmonised approach (which does not mean equal access charges as each network has different cost recovery requirements and different infrastructure maintenance costs) would help in the creation of the single market. The economic impacts would however be minor.

#### **Gap 5 and 8 to 12: the harmonisation of technical aspects**

As has been mentioned in previous chapters the heart of the problem for the railways lies in the lack of interoperability between the various national railway systems. This gap is the single biggest gap and the current accounting value of the European railways amounts to well over €300 billion<sup>7</sup>. This includes infrastructure that has been extensively depreciated and, as such the replacement value is likely to be at least 10 times that figure (€3,000 billion). This is not a value that can be invested in the short term given what is currently spent on the railways:

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<sup>7</sup> Steer Davies Gleave estimate based on the asset value of the largest infrastructure managers and the total length of lines across Europe.

- The largest infrastructure managers spend between €4 bil. and €6 bil. Each, per annum, on new investments which amounts to over €50 bil. across Europe<sup>8</sup>.
- Total expenditure on all ongoing activities (excluding investments) amounts to over €30 bil. per annum across Europe (including ongoing maintenance costs).

However, it is important to note that the entire railway will need to be renewed in some form or another within the next 100 years and so the €3,000 billion will need to be spent in any case. The full benefits from this action would only eventuate once the entire system is harmonized as intermediate changes create much smaller benefits as legacy systems would continue to be needed on the ground and on rolling stock to guarantee continued operation of the railway. However, action can only reasonably be taken through these intermediate steps. These actions create obligations that need to be met in the short term (through changes in rules or regulations) but are only implemented fully in the long term. Below we build on the gaps we identified in the previous chapter identifying what benefits can be achieved in the short term (2015 to 2035 as for the rest of the report) which would then be multiplied up following system wide interoperability.

The main short term benefits from closing these technical gaps are set out below.

#### *Rolling stock*

The removal of wider technical barriers will reduce costs for operators wishing to buy or lease rolling stock in the following areas:

- On-board signalling costs could fall by as much as 75% for cross border installation and 50% in terms of authorisation. Assuming a Europe-wide fleet of 60000 vehicles<sup>9</sup> that need signalling systems and assuming that between 5% and 15% of those vehicles require ERTMS installation for cross border services and that the cost of installation of ERTMS equipment varies between €200,000 and €400,000, the NPV benefit of installing only one system on those vehicles could be between €200 million and €1.3 billion over the 2015-2035 period.<sup>10</sup> Given that some ERTMS deployment plans go well beyond 2035, full, network wide, installation could increase this value further, both in terms of savings to existing operators which could, in turn, make some marginal freight traffic more profitable encouraging a shift to rail traffic. In the longer term period (where the full benefits could be better extracted) the benefits could be between 50% and 100% higher than the figure above, potentially giving an NPV of between €300 million and €2.5 billion after 2036.
- There are no estimates relating to the standardisation of rolling stock, but design costs are a significant component of rolling stock costs so assuming an average cost reduction of 10% resulting from reduced design costs and assuming that between 2015 and 2035 between 20% and 30% of all rolling stock will need to be

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<sup>8</sup> As above, Steer Davies Gleave estimate based on the level of investment of the largest infrastructure managers and the total length of lines across Europe

<sup>9</sup> Approximation based on UIC data (2012)

<sup>10</sup> Note that this is a very high level estimate and requires verification through a detailed impact assessment.

replaced, the NPV benefit could be between €4 billion and €9 billion.<sup>11</sup> As per the ERTMS point above, in the longer term, the benefits of standardisation increase further as more rolling stock is replaced. As such, the benefits post 2036 could also be between 50% and 100% higher leading to potential savings in NPV terms of between €6 billion and €13.5 billion.

### *Infrastructure*

The adoption of a single signalling system will have a significant impact on maintenance costs for infrastructure as infrastructure managers will no longer need to maintain parallel signalling systems. It is difficult to estimate the degree of savings but we have been told by stakeholders that moving to ERTMS signalling, and in particular to ETCS level 2 or above could save 10-15% in signalling maintenance costs once legacy systems have been turned off. This switch off is not likely to occur in most Member States before 2035, although some such as Belgium and Denmark (and Switzerland) are ahead of other Member States in ETCS national deployment. However, we do not have information on current signalling maintenance expenditure to be able to apply to the planned savings mentioned above.

Furthermore, it is likely that the single signalling system will also result in increased capacity in the majority of Member States, in some Member States this could be as much as 20%. This will increase the revenue of the infrastructure manager and create wider benefits to the economy. Looking at total current revenue of the infrastructure managers across the EU and assuming that at most capacity can increase by 20%, that this is possible in only 50% of Member States, that only 50% of that extra capacity is then sold annually the annual benefit to the infrastructure manager in capacity terms is likely to be between €0.7 billion and €0.9 billion per annum at EU level following full deployment, although as mentioned above, this is not likely to be achievable before 2035.

Finally, rolling stock procurement costs are likely to fall with the removal of legacy signalling systems although we have not included a calculation in relation to this as it could potentially double count the benefits set out in the rolling stock standardisation calculations set out above.

The standardisation of technical parts for infrastructure should also lead to a reduction in costs for the infrastructure manager, we have not been able to identify a study that has estimated this value but a cautious estimate could be in the order of 5% to 10% of total materials costs across Europe. As per some of the other savings set out above, the full benefits of this would only be realised beyond the analysed period as only a small portion of the network would be renewed before 2035 with the harmonised standards.

### *Operations*

Reduced training costs from having a single common language for the railways or a single language for regions could lead to savings to cross border operators although the saving would be minimal as drivers would still need to attend at least one training

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<sup>11</sup> Note that this is a very high level estimate and requires verification through a detailed impact assessment.

course. The benefits would come primarily from having fewer drivers to run cross border services. However other restrictions, primarily related to working time legislation would limit the amount of efficiencies that could be made and the benefits may be cancelled out by reduced employment having a knock on effect on economic activity. Taking the total level of employment across the EU in the rail sector and assuming that only a proportion of these are drivers that cross borders the benefits of such a switch could be anywhere between €11 mil. and €194 mil. depending on the amount of training that is dedicated to language specific elements. This would be a one-off gain and not ongoing.

Increased capacity resulting from a single signalling system could benefit operators in allowing them to run more trains and raise revenue. Some of this would be passed to the infrastructure manager in terms of increased access charges and this is what has been quantified above. The increase in services should benefit both passengers and freight customers and potentially increase the competitiveness of rail. This additional benefit has not been quantified.

#### *Cross border links*

Appropriately targeted investments in cross border links could also have a positive effect on the competitiveness of rail. In this case, targeting EU funding aimed at resolving key bottlenecks at or around borders could have a significant impact. This is not limited to interventions at border crossings, but should include investments around these borders.

For example, freight trains traveling on the Rotterdam to Genoa Corridor can travel for 90% of the corridor with maximum lengths exceeding 700 meters. The maximum length allowed in the Italian section is below 600 meters, meaning that a train that needs to go as far as Italy needs to be shorter than what is allowed for most other networks along the Corridor creating inefficiencies for the operators. Targeted investment on the Italian section of the Corridor (which is currently planned for the coming years) could result in more wagons, and therefore more goods, being transported with only a marginal increase in the costs for operators but a significant increase in revenues. The CODE 24 project, co-funded by the INTERREG fund, is currently identifying what the main bottlenecks are and the cost of these bottlenecks. Once this project is complete it will be possible to estimate the cost of non-Europe in this area in relation to the main freight corridor across Europe.

Using EU funds to subsidise some cross border passenger rail services would also lead to increased connectivity between Member States and allow journeys to be made without using the car resulting in an environmental benefit for the Union as a whole.

#### *Single infrastructure manager*

We identified this as a potential gap and should consider it along with all the technical aspects discussed in this section. While there may be some coordination benefits associated with this solution it is likely that the costs associated with creating a single infrastructure manager far exceed the benefits from further coordination. The benefits from increased coordination can be achieved through greater industry cooperation rather than through the creation of new entity.

#### *Other impacts*

In addition to the above detailed points a single, harmonised technical rail market is likely to produce the following outcomes in the very long term:

- Increased competition and entry resulting from a substantial reduction in (technical) entry barriers;
- Increased competitiveness of the railway supply industry;
- Increased leadership of European companies in supplying products for the worldwide rail industry;

All these factors could then have a positive impact on wider economic activity and employment in the sector.

### **1.4 Summary of benefits**

This section has shown that in the railways there are a number of significant gaps that need filling and that filling these gaps can bring significant benefits. Bringing together the analysis undertaken for the case studies the potential economic benefit of closing these gaps in legislation is likely to amount to **between €20 billion and €55 billion in NPV terms between 2015 and 2035** when the single benefits are summed arithmetically.

It is likely however that this measurable amount is only a small proportion of the benefits that could be achieved with a single European railway and that the non-measurable benefit could be up to 10 times the values stated here although more detailed figures on this cannot be produced.

Table 1: Summary of key rail gaps and impacts

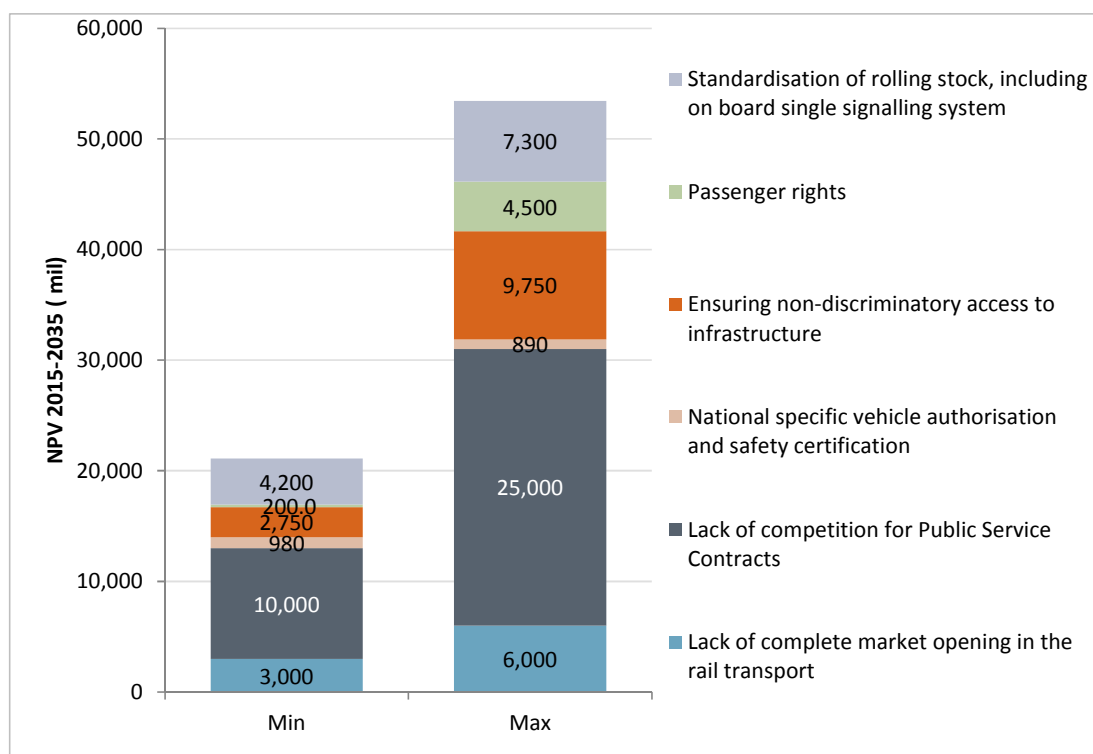
Gap	What needs to be done	Nature of the intervention needed to fill the gap	Status of implementation	Potential impact with no action	Potential impact with action
Lack of complete market opening in the rail transport	Complete the liberalisation process of passenger and freight rail services	EU legislative intervention accompanied by increased implementation of EU legislation at the MS level in these areas: (i) ensuring that there are no market restrictions placed in the provision of passenger services outside those relating to the provision of PSCs; (ii) allowing open access to commercial services	Ongoing	Little change in new entry and less choice for passengers and freight customers	The total net benefit of the introduction of further market opening (in terms of allowing unrestricted access to commercial services) could amount in NPV terms to between <b>€3 billion and €6 billion</b> between 2015 and 2035
Lack of competition for Public Service Contracts	Provide more consistent, Europe-wide approach and more uniform business conditions to encourage new entrants. Availability of rolling stock and access to information systems are also barriers to new entrants, and social issues raised by the transfer of staff between organisations need to be addressed if competition for the market is to take effect across the EU	EU legislative intervention accompanied by proper implementation of EU legislation at the MS level	Ongoing. The European Commission's 4th Package proposals seek to introduce an open market for domestic passenger services, thereby completing the market opening process. The current compromise text for the does not, however, compel competitive tendering substantially softening the requirement	High cost of some PSO services will remain and the potential benefits of up to 30% of contract costs will not be achieved	Between 2015 and 2035 the potential benefit from introducing compulsory competitive tendering is likely to be between <b>€10 billion and €25 billion</b> in NPV terms. Included in the results set out above are an estimated €172 million to €431 million of benefits from reduced CO2 emissions
National specific vehicle authorisation and safety certification	Harmonising the approach to, and cost of, vehicle and safety certification	EU legislative intervention	Ongoing. Current Commission proposals as part of the 4th Railway package seeks to remove existing barrier by establishing a new role for ERA as a single authorisation body. The current compromise though allows operators to go to the national authorities rather than ERA to obtain these certificates	continued existence of technical barriers making the introduction of rolling stock complicated and high cost	Between 2015 and 2035 benefits for the European economy could be <b>around €980 million</b> in NPV terms
Ensuring non-discriminatory access to infrastructure	Have effective independent regulation; unbundling (separation of incumbent operators from infrastructure managers)	EU legislative intervention	Ongoing.	Uncertainty will remain in the industry where full separation is missing potentially having a negative effect on future investment in the sector	The introduction of an European Regulator could bring additional benefits of between <b>€53 million and €114 million</b> in NPV terms between 2015 and 2035 in the case of 85% and 75% of incumbent share respectively. Unbundling tied with the completion of the liberalisation process and the further recourse to competitive PSOs could increase the benefits from closing those gaps by between 10 and 50%, leading to an additional NPV in the range of <b>€2.75 billion to €9.75 billion between 2015 and 2035</b>
Varied access charges	Harmonisation of existing access charge structure and procedure	New EU legislative intervention	Not in pipeline yet	Continued varied access charges making business difficult for international operators but with little economic impact	A more harmonised approach with a common process for the determination of infrastructure charges could lead to greater certainty for all operators. The economic impacts would however be minor and have not been quantified

Gap	What needs to be done	Nature of the intervention needed to fill the gap	Status of implementation	Potential impact with no action	Potential impact with action
Passenger rights	Extend existing legislative provisions to other areas/fields (e.g. integrated ticketing and communication of information) and harmonise application across the EU	New EU legislative intervention accompanied by proper implementation of EU legislation at the MS level	Part ongoing, part not in pipeline yet	A less than perfect passenger experience that leads to some travellers choosing to use other modes of transport	Extending the requirements of Regulation 1371/2007 to all rail services and all Member States will benefit all passengers. Ensuring the harmonisation of common information provision across borders and requiring that all information is provided in a second language will also have a significant impact on the travelling public. We expect that addressing this gap will lead to a NPV benefit of between <b>€0.2 billion and €4.5 billion</b> between 2015 and 2035
Different technical standards across Europe	Further harmonisation of technical standards	New EU legislative intervention	Ongoing	Harmonisation will happen in any case in the very long term, no action is not an option as TSIs already allow for long term action	Specific impacts on rolling stock, infrastructure and operation harmonisation quantified below
The legacy of the rail system	Harmonisation of gauge and power source of rail networks in the EU	New EU legislative intervention	Ongoing through TSIs	The cost of replacing legacy rail systems would be prohibitive, and the incremental approach underpinning the implementation of TSIs is therefore the only realistic way forward for the foreseeable future	Specific impacts on rolling stock, infrastructure and operation harmonisation quantified below
Standardisation of rolling stock, including on board single signalling system	Deeper standardisation of rolling stock	Rolling stock: Further industry cooperation. On board signalling system: ongoing through ERTMS development	Rolling stock harmonisation: not in pipeline yet. On board signalling: ongoing	Continued higher costs for local authorities and operators as a result of diversified rolling stock	Creating a common understanding of how trains should be specified while still allowing certain options to be made available to customers would decrease the design cost of rolling stock while still allowing procuring authorities to choose some bespoke elements and manufacturers to differentiate themselves. We estimate that the standardisation of rolling stock could lead to a NPV between <b>€4 billion and €9 billion</b> over the 2015-2035 time horizon, with the potential to lead to a NPV benefit between €6 billion and €13.5 billion after 2036. In addition to this, the installation of a common signalling system would lead to a NPV in the order of <b>€200 million and €1.3 billion</b> over the 2015-2035 period, with the potential to lead to an additional NPV benefit of between €300 million and €2.5 billion after 2036.



Gap	What needs to be done	Nature of the intervention needed to fill the gap	Status of implementation	Potential impact with no action	Potential impact with action
The single signalling system	Introduction of a single european signalling system		Ongoing through ERTMS development	Higher costs for operators as well as for Ims	The adoption of a single signalling system will have a significant impact on maintenance costs for infrastructure as infrastructure managers will no longer need to maintain parallel signalling systems. It is difficult to estimate the degree of savings but a reduction around 10-15% in signalling maintenance costs once legacy systems have been turned off can be expected. Yet this switch off is not likely to occur in most Member States before 2035. Moreover the increased capacity resulting in the majority of Member States is likely to lead additional benefits between €0.7 billion and €0.9 billion per annum, although this is not likely to be achievable before 2035
Standard technical parts	Deeper standardisation of technical parts (e.g. wheels, infrastructure components, etc.)	Further industry cooperation	Not in pipeline yet	Continued multitude of parts leading to higher costs in the rail sector for all parties	The standardisation of technical parts for infrastructure should also lead to a reduction in costs for the infrastructure manager, although the full benefits of this would only be realised beyond the analysed period as only a small portion of the network would be renewed before 2035 with the harmonised standards. A potential cost reduction in the order of 5%-10% can be expected after 2035
Single operating language	Move towards the introduction of a common language in the rail industry	Further industry cooperation	Not in pipeline yet	Higher costs and higher training requirements to be able to run trains internationally	Reduced training costs from having a single common language for the railways or a single language for regions could lead to savings to cross border operators although the saving would be minimal
Missing links at borders		The European Commission should take a more prominent role in identifying what are the existing missing links at borders and targeting investment in these areas. This is not a legislative gap, but an administrative gap which can be easily filled with attention focused on targeting those areas that create the biggest benefit with the least input.		Continued barriers at borders making the creation of a Single European Railway ever more difficult	Appropriately targeted investments in cross border links could also have a positive effect on the competitiveness of rail. In this case, targeting EU funding aimed at resolving key bottlenecks at or around borders could have a significant impact. This is not limited to interventions at border crossings, but should include investments around these borders

**Figure 12 : Summary of expected savings by addressing existing gaps in the EU rail sector**



## 2. Road

The previous chapter identified a number of gaps that are challenging the full integration of the EU in the road transport market. These gaps are due to the lack of complete market opening, full harmonization of social standards and enforcement of rules, as well as to differences in the promotion of cleaner and safer vehicles or in the achievement of road safety targets.

In many cases these gaps generate costs that could potentially be removed in the presence of increased harmonization between MSs facilitating convergence towards best practice.

However, there is often disagreement on the role the EU could play in making the most of the potential benefits and as such each of the areas needs to be assessed on a case by case basis. This is also necessary as single MSs or regional and local authorities are best placed to tackle efficiency, safety or environmental issues in the road sector.

Given this background this section seeks to identify the main economic impacts of filling the gaps identified in the previous chapter.

### 1.1 Main impacts – existing legislation

#### **Gaps 1, 2 & 3: Completing market opening, harmonisation of social legislation & enforcement of rules**

As mentioned in Chapter 3, the road market is probably the transport market with the highest level of integration across the EU. Nevertheless full integration has yet to be achieved and it is argued that, especially in the freight sector, this limits the efficiency of the market.

The reasons behind the current requests for further liberalisation in the road freight cabotage market are twofold. On one hand, there is the need to improve the efficiency of the market by reducing empty runs and contributing to the optimization of load factors of single vehicles. On the other hand, there is the overarching goal of creating a European Single Transport Area where road hauliers from different MSs are free to access the transport profession in different countries as well as to undertake transport operations across the EU.

It is clear that the two issues - empty running and full market integration - have a different standing in the EU policy debate. Moreover, although they are linked to each other, they need to be tackled in a distinct manner and are subject to different timescales.

In relation to empty running, a study recently carried out by Steer Davies Gleave for the European Parliament<sup>12</sup> shows that, though existing cabotage rules could be better tuned to smooth the efficiency of the market, this issue is usually higher in national transport

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<sup>12</sup> European Parliament (2013), Development and Implementation of EU Road Cabotage.

(where they account for 27.3% of all vehicle-km) as opposed to international transport (where they represent only 13.6% of flows). In addition the problem seems more relevant for own account transport (30.6%) than hire or reward operations (21.4%). Overall, we estimate that to date, the presence of empty runs generates a direct cost of about €50 million to €60 million per year in the road freight transport market.

To tackle this issue – and in light of the efficiency goal – the study recommended that other actions should be taken aimed at targeting the specific areas where the inefficiency occurs (such as the “own account transport” sector) or at promoting new technology that optimize the use of vehicle fleets. These should be undertaken in parallel to the refinement of cabotage rules.

The liberalisation of road cabotage is also seen as a means of achieving the overarching goal of full market integration in the EU road market. However, as also pointed out by the International Transport Forum<sup>13</sup>, a fully integrated EU road freight market would first need a greater degree of harmonised framework conditions in particular related to the harmonisation of socio-economic-legal conditions, complementary to liberalisation and a prerequisite for fair competition. For example the hourly labour costs of cabotage operations in the EU run from €12 per hour for Polish drivers to more than €30 per hour for French drivers.

If further harmonisation is not achieved, there is the serious risk that, given the significant national differences in social legislation (and associated costs), success of road hauliers in an open and competitive EU market would not be as a result of their relative economic efficiency, but rather their ability to get access, legally or illegally, to the most favourable labour provisions. A study published in 2013 by the European Parliament on social and working conditions of EU road professional drivers<sup>14</sup> argues that the existing differences in labour and social market structures as well as in the effectiveness of enforcement mechanisms across the EU Member States leaves space for some transport companies to adopt unfair competition and social dumping practices (such as “letter-box companies”, the use of drivers who falsely claim to be self-employed, performance-based employment schemes).

Such unfair competition should not be a deterrent to further market opening, but rather suggests the need for a gradual, managed process where liberalisation and harmonisation of the rules are carried out together. A first step is to make sure that none of the actors seek to “cheat”. This can be guaranteed through appropriate enforcement and ensuring that the entire supply chain is liable for any illegal activity (as is already the case in some Member States).

Although the EU has started harmonising enforcement practices in the areas of working and driving times, such practices remain very heterogeneous across MSs. Furthermore, the implementation of any harmonization relies on the resources available to each MS and their willingness to act. In addition to this, the mobility of the road freight sector

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<sup>13</sup> International Transport Forum (2009), The construction and operation of the road freight transport market in Europe, Forum Paper 2009-1.

<sup>14</sup> European Parliament (2013), Social and working conditions of road transport hauliers.

makes harmonisation even more challenging. The EU has taken significant steps<sup>15</sup> towards the harmonisation of checks and penalties relating to the working time regulation and should extend this approach to other areas of road transport regulation<sup>16</sup>.

If a common approach is agreed, the opening-up of the road haulage market could lead to efficiency improvements that will allow the industry purchasing transport operations to gain from lower costs, resulting in increased profitability for them and increased economic activity. Allowing newer MSs to enter the EU road cabotage market is an example of a gradual and partial opening of the market between countries with very heterogeneous socio-economic conditions. This has led to positive outcomes – such as the reduction in transport costs experienced in several EU15 MSs and/or new business opportunities created for EU12 hauliers. The drawbacks to this have been reduced profitability of EU15 operators, safety concerns, the risks of driver shortages, etc.

We estimate that the full liberalisation of the road freight transport market could lead to a NPV benefit in the range of €50-€90 billion over the 2015-2035 period, corresponding on average to a 2% improvement with respect to the baseline scenario reflecting what would happen if current trends would continue in the coming years. Benefits from addressing this gap would come through increased competition and would be higher in the short-medium term thanks to the reduction of operating costs that would be gained through a deeper penetration of EU13 transport hauliers. Nevertheless the gains would level out in the longer term once existing differences in labour and operational costs between different MS will disappear<sup>17</sup>. More information is provided in Appendix 1.

For the future, the most appropriate approach seems to be a gradual and flexible opening of the road market accompanied by further harmonisation of social legislation and enforcement.

Which policy options and measures are chosen to implement this approach need to be selected carefully and reflect the short/medium and long term transport goals of the EU as a whole.

#### **Case study 2 - Gaps 4 & 5: Vehicle standards: maximum weights and dimensions of road vehicles, & cleaner, safer and more intelligent vehicles**

“A competitive and resource-efficient transport system” is a pillar of the 2011 Transport White Paper. Its ultimate target is to achieve a 60% reduction in greenhouse gas

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<sup>15</sup> See for example Directive 2006/22/EC, as amended by Directive 2009/4/EC and Directive 2009/5/EC, which determines the minimum level of enforcement required to ensure compliance with the rules set out in Regulation (EC) 561/2006 (driving times and rest periods) and Regulation (EEC) 3821/85 (tachograph).

<sup>16</sup> See on this also the recommendations published in Bayliss, B.T. et al. (2012), Report of the High Level Group on the Development of the EU Road Haulage Market, June 2012.

<sup>17</sup> The estimate has been carried on considering potential economic and environmental gains due to a change in road freight operating costs and in improved loading efficiency against a baseline scenario replicating for the figure the trends registered in recent years. It does not contain an assessment of indirect impacts on other productive sectors, neither an investigation on road safety outcomes.

emissions by 2050 - a challenging target to which all modes of transport need to contribute. To meet this goal, the main characteristics of both freight and private road transport vehicles needs to be improved: innovative solutions have to be implemented which also take into consideration other goals, such as safety.

In the freight sector, the Commission recently proposed an approach aimed at adapting the current rules covering heavy goods vehicles (the 'weights and dimensions' Directive 96/53/EC), so that aerodynamic improvements can be made.

At present, though, as pointed out by a note published by the European Parliament<sup>18</sup>, the maximum length and weight limits set by this Directive mean that improvements in vehicles' aerodynamic performance and related road safety aspects - accompanied by the installation of alternative, more environmentally friendly propulsion systems - can only be introduced to the detriment of vehicle capacity.

There is currently an ongoing debate on the actions that need to be taken to best address this issue, with the Commission proposing a package aimed at amending existing rules. The Commission estimates that the preferred policy option could lead to an improvement of the carbon footprint of 27 million tonnes per year for trailers - corresponding to about € 540 million per year - and might also have a high positive effect on road safety (between 300 to 500 less fatalities per annum) with a better designed tractor unit - which would correspond to a gain in the order of €470 - €670 million per annum to the EU as a whole<sup>19</sup>. In discussing this proposal, the Council of the European Union recently proposed an eight-year delay before the new rules would come into force<sup>20</sup>, a move that the European Commission would like reconsidered when the revised dimensions are taken to the European Parliament (EP) this summer.

The industry shares the aim of improving the aerodynamics of trucks, but claims that the best way to achieve this is through a more flexible approach that removes some of the existing regulatory restrictions, rather than by imposing a fixed design. Based on experiences in other countries, ACEA (the European Automobile Manufacturers' Association) suggested that in reviewing the Directive, a stable and flexible approach - such as the "Performance based approach" in place in Canada - should be followed in the EU, also to avoid putting at risk the international competitiveness of an industry whose net trade balance accounts for €6 billion<sup>21</sup>. The association recognizes that improvements to the rear of the truck - corresponding to 5-6% of fuel economy - could be

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<sup>18</sup> [http://www.europarl.europa.eu/RegData/etudes/note/join/2014/514085/IPOL-JOIN\\_NT\(2014\)514085\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/note/join/2014/514085/IPOL-JOIN_NT(2014)514085_EN.pdf)

<sup>19</sup> Computed using a value of statistical life per death of € 1.34 million, as reported by the National Observatory for Road Safety, France, 2012

<sup>20</sup> See: Council of the European Union PRESS 226, available at:

[http://www.consilium.europa.eu/uedocs/cms\\_Data/docs/pressdata/en/trans/143084.pdf](http://www.consilium.europa.eu/uedocs/cms_Data/docs/pressdata/en/trans/143084.pdf)

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[http://www.acea.be/uploads/publications/201306XX\\_Truck\\_ofthe\\_Future\\_Weights\\_\\_Dimensions.pdf](http://www.acea.be/uploads/publications/201306XX_Truck_ofthe_Future_Weights__Dimensions.pdf)

implemented on 100% of the box body fleet within three to four years, as these can be introduced on existing vehicles. By contrast, improvements to the front, are claimed to have more limited effects on fuel consumption (from 1% to 3%, with the best vehicles currently on sale gaining only 1%) and could be fully realised only once the existing fleet has been renewed, a process that would take about 20 years.

The change of the existing features of road vehicles and standards would need to pass through the review of rules, standards, and procedures. A study recently carried out by the Institute for Technology Assessment and Systems Analysis (ITAS) and the Karlsruhe Institute of Technology (KIT)<sup>22</sup> for the Science and Technology Options Assessment unit of DG Internal Policies of the EU Parliament, shows that the introduction of cleaner vehicles across all transport modes has the potential to lead, by 2050, to a consumption of 117 million toe/year and a production of 265 million tonnes of CO<sub>2</sub> per year (112 of which attributable to car fleets), which corresponds to a reduction of 45% and 75% (35% for cars) of energy consumption and CO<sub>2</sub> production, respectively, compared to the "business as usual/reference scenario". These results, obtained through an extremely technology optimistic scenario which the authors themselves state are very challenging, give the flavour of the existing high potential of improvements present in this area. We estimate that the reduction in emissions driven by a radical change in the type of fuels and propulsion technologies in use, lightweight construction, efficient design of vehicles, etc. foreseen in this study would lead to an overall abatement of 5,052 million tonnes of CO<sub>2</sub> over the 2015-2035 period; a figure that, considering an average external cost of € 20 per tonne of CO<sub>2</sub> emission, would result in a NPV gain of up to € 60 billion over the same time horizon. However, it must be pointed out that these figures do not take into account the costs associated to the implementation of the actions needed to achieve this scenario, or other economic and social impacts related to it and therefore the overall benefit to the economy as a whole will be lower than this figure.

ITS vehicles and infrastructure technologies represent another area where it is worth considering increased coordination at the EU level as this could help reduce congestion and improve safety. The real time information provided by most EU toll road operators or the speed measurement devices can be considered useful examples in this area. Given the different types of ITS traffic information solutions in place and the different challenges regarding congestion that are faced by single MS within their regional and local areas, it is not possible to estimate the costs that could be attributed to the lack of an EU framework in this area could bring. The Commission has started investigating the potential for further coordination and cooperation between MSs in this field. A public consultation on this topic was launched at the end of 2013, although at this stage it doesn't seem clear if the best way to tackle this issue would be through some form of public/legislative intervention or through the natural development of the market.

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<sup>22</sup> European Parliament (2013). Eco-efficient transport.

## 1.2 Non case study gaps

### Gaps 6 & 7: Road charging: setting the price and EETS technologies

Different solutions have historically been adopted by MSs with respect to the funding and financing of road transport infrastructure. Through the Eurovignette Directive the EU has introduced, and fine-tuned over years, a common approach for the TEN-T road network which it is now extending to other sections of the national networks.

It is not currently clear whether the different national systems aimed at funding road infrastructure create a cost gap that would be worth filling to benefit EU citizens in forthcoming years. Currently there are two forms of charging/taxes in the road sector: fixed taxes levied on vehicles (e.g. the annual circulation tax and registration tax) and variable taxation (e.g. fuel tax and distance related tax or toll). In most countries, the tax income generated by taxation on vehicle and road usage is not specifically earmarked for road – with the exception of tolled motorways – but it is used to fund the general public budget that will then assign a budget for road investment and maintenance programmes. Therefore any policy action taken at the EU level in this area would first need to consider each national system and its current infrastructure cost recovery profile, bearing in mind that it could impact subsidiarity principles in relation to national fiscal policy, and related compensation and re-distributive choices.

Tackling road environmental externalities also needs to be considered in detail. The current Eurovignette provides a general framework for the taxation of the externalities generated by HGVs on TEN-T and other sections of national road networks where it has been identified by MSs. The current debate focuses on whether a similar principle should extend to other types of road users (including private drivers, public transport, etc.) and/or types of roads. This would benefit from a more detailed evaluation.

Indeed at the local level a number of schemes are emerging across the EU aimed at limiting access to certain categories of vehicles and/or charging them fees to enter and drive in specific areas. On this topic there is clearly a lack of coordination and harmonisation across EU MSs and the Commission has recently published a Communication “Together towards competitive and resource-efficient urban mobility” pointing out that the growing diversity of implementation of different access regulation schemes can lead to a lack of economies of scale and a fragmentation of the single market. The Commission acknowledges that while the decisions about access regulations should be taken at the local level, “non-binding guidelines would, however, allow cities and Member States to benefit from experiences elsewhere, and, where appropriate, foster a more common approach to issues such as vehicle categories, road signs, information provision, enforcement, exemptions, and pricing”<sup>23</sup>.

No clear evidence can be found on the costs generated by not having a harmonised framework for electronic tolling interoperability across the EU. Although Hamilton et al.

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<sup>23</sup> COM(2013) 913 final, Together towards competitive and resource-efficient urban mobility, December 2013.



(2013) states that<sup>24</sup> the potential benefits of electronic tolling interoperability can be achieved on a smaller, regional scale arguing also that the EU legislation in this field could lead to a social loss ranging from €100 million to just above €500 million annually.

#### **Gap 8 & 9: Road safety: technology and vulnerable users**

Malta, the UK and Sweden are the three countries with the safest road networks in 2012, with 30 or less deaths per million inhabitants. Denmark, Ireland, the Netherlands and Spain follow, with a road mortality rate below 40 deaths per million inhabitants. Sweden has the lowest number of road deaths per vehicle-km, followed by Ireland, Great Britain, Finland, and the Netherlands. Road risk per kilometre travelled in Poland is more than five times as high as in Sweden<sup>25</sup>.

Differences between countries can arise from differences in aspects such as the share of most vulnerable users (i.e. motorcycling, cycling or walking), the traffic density, the distribution of traffic between motorways (which have higher safety performances) or rural roads, and the method for estimating the number of vehicle-km travelled.

If all EU MSs achieved to date the same level of road safety performance of the best performing ones, about 14.000 lives could be saved, corresponding to about € 19 billion<sup>26</sup>.

If the long term goal of achieving zero road deaths in the EU indicated in the EU Transport White Paper was met by 2040, we estimate that about 164,000 additional lives could be saved, which would result in a NPV benefit of about €150 billion over the 2015-2035 period. These figures are merely indicative of the size of potential benefits that could be achieved. They do not take into account the costs of the measures needed to be implemented to achieve such a target nor other positive impacts that could be expected through the reduction of serious and other injuries or of accident damages.

It can be seen therefore that EU citizens suffer a gap of not having the same level of road safety across all EU countries. There is a general agreement on the fact that, although EU action is fundamental to set a harmonised framework and lead the process, MSs have a key role in filling the existing gap, as it is their responsibility to enforce rules in areas such as speeding, driving under the influence of drugs or alcohol and seat belt use, to quote only those causes that contribute the most to accident statistics.

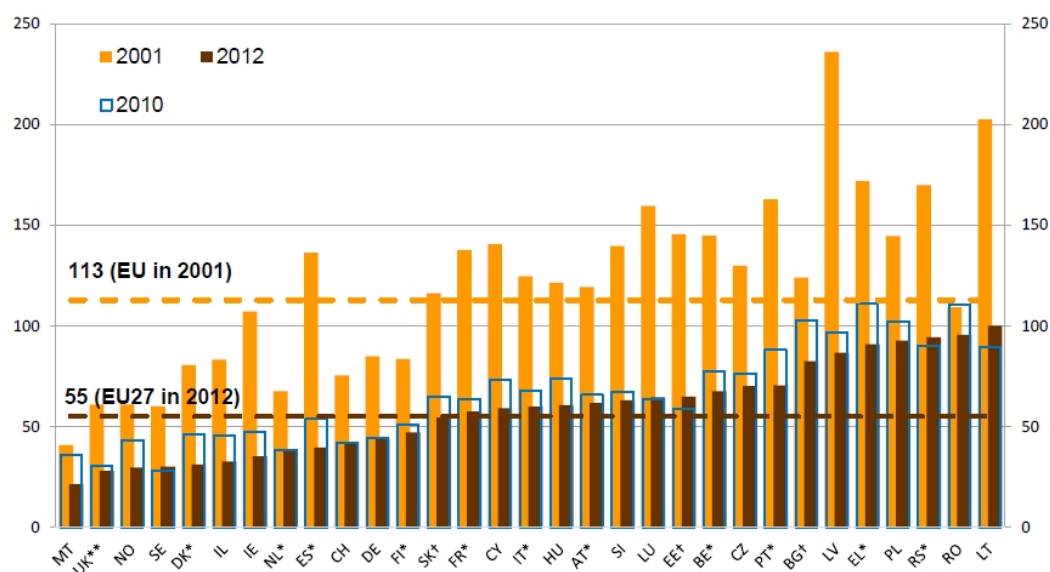
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<sup>24</sup> Hamilton, Carl & Eliasson, Jonas (2013), Costs and benefits of the European directive on road tolling interoperability, published on Transportation Research Part C: Emerging Technologies, Vol. 30.

<sup>25</sup> ETSC (2013), 7th Road Safety PIN Report.

<sup>26</sup> This estimate values human costs in road crashes on the basis of the values recommended by Bickel, P. et al (2006) 'HEATCO deliverable 5. Proposal for harmonised guidelines.' EU-project developing harmonised European approaches for transport costing and project.

**Figure 13: Road deaths per million inhabitants in 2012 (with road deaths per million inhabitants in 2001 and 2010 for comparison)**



Source: ETSC (2013)

With 15% of all road fatalities represented on average by motorcyclists and 21% by pedestrians, these categories, usually quoted as vulnerable users, are those that will need particular attention in coming years and their protection needs to be taken into consideration when measures that challenge their safety are under discussion. For example cyclists are the most exposed to the risk of being involved in an accident with HGVs turning due to blind spots: over the last three years, cyclists accounted for about 80% of road users involved in accidents with HGVs for near-side turns in Denmark. In the Netherlands and Belgium this percentage was about 45% and in Great Britain close to 40%. Therefore, in the amendments under discussion regarding the weight and dimension of vehicles, attention to their impacts on vulnerable users as well as potential mitigation measures need to be considered including the use of Fresnel lenses distributed by Transport for London in 2008 to HGVs working on the Olympic site in London.

#### **Gap 10 & 11 & 12: Environmental sustainability: subsidiarity, policy coordination and promoting shift towards more sustainable modes of transport**

The study undertaken for the Institute for Technology Assessment and Systems Analysis (ITAS) and the Karlsruhe Institute of Technology (KIT) mentioned above estimated that if EU and national policies promoted modal shift towards more sustainable modes of transport, the car modal share could be reduced from 70% in 2010 to 58% in 2050 and the share of trucks be equal to 50% in the 2050s, against a 57% share in the reference scenario. This would lead to a reduction of energy consumption of 53% with respect to the reference scenarios, equalling a total production of 152 million tons/year, an outcome that would be accompanied by a reduction of 69% in CO<sub>2</sub> emissions. We estimate that the reduction in emissions driven by this significant modal shift would lead to an overall abatement of 6,957 million tonnes of CO<sub>2</sub> over the 2015-2035 period; a figure that,

considering an average external cost of € 20 per tonne of CO<sub>2</sub> emission, would result in a NPV gain of up to €85 billion over the same time horizon. However, it must be pointed out that these figures do not take into account the costs associated with the implementation of the actions needed to achieve this scenario, or other economic and social impacts related to it.

Although this scenario has been computed as a frontier reference case rather than as an achievable goal, its results suggest that significant steps can be taken to improve the sustainability of transport and incentivizing a shift from road to other more sustainable transport modes. In order to create a more balanced utilisation of transport modes, strong cooperation is needed between different EU institutions (e.g. DG MOVE, DG ENERGY, DG ENVIRONMENT, DG HEALTH and CONSUMERS etc.) and the various levels of governments.

To date, EU policy has focused predominantly on trans-European corridors and – given the subsidiarity principle - taken very limited action at the urban level, where the effects of strong concentrations of pollutants produced by road vehicles – such as PM<sub>5</sub>, PM<sub>10</sub>, NO<sub>x</sub> etc. - are more dangerous.

The expected benefits of limiting the use of private cars in urban areas can have a positive impact on the economy, the environment and health. Congestion in the EU is often located in and around urban areas and costs nearly €100 billion, or 1% of the EU's GDP, annually<sup>27</sup>. When computing the health impacts of car usage, figures usually focus on the external, negative effect, drivers that impact society resulting from fuel emissions but neglect the health effects on drivers and car occupants that do not do physical activity for their trip instead of driving. The WHO estimates that about 900,000 deaths per annum in Europe are due to lack of physical activity, pointing out that just 20 minutes per day of moderate exercise would help reduce this risk and stating that this could be easily achieved by switching some short car journeys with walking or cycling<sup>28</sup>.

The EU – along with national and local authorities – should consider developing a new strategy and integrated vision that encompasses economic, transport, environmental and health policies, to support the shift towards more sustainable transport modes, with a special focus on “active travel” (walking and cycling). New tools and actions need to be developed to incentivize and reward those that have implemented measures resulting in a proven shift towards more sustainable modes of transport.

### **Gap 13: Road passenger rights**

As per the rail transport services, it is necessary to improve and harmonise the way information on road transport (e.g. public transport information, parking information, bike sharing schemes, etc.) is provided to users across the EU. This can be achieved through both legislative and industry interventions.

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<sup>27</sup> [http://ec.europa.eu/transport/themes/urban/urban\\_mobility/index\\_en.htm](http://ec.europa.eu/transport/themes/urban/urban_mobility/index_en.htm)

<sup>28</sup> [http://www.who.int/healthinfo/global\\_burden\\_disease/global\\_health\\_risks/en/](http://www.who.int/healthinfo/global_burden_disease/global_health_risks/en/)

For example legislative intervention at the EU level could be introduced to mandate that standard information on service, fares, etc. regarding public transport services in cities above a certain threshold (e.g. 100,000 inhabitants) are provided in a second language. Other actions, which could be undertaken directly by local authorities or operators, potentially with the financial support of the EU, should promote the diffusion of information in a second language on other road transport services – such a parking, bike sharing schemes, etc. - available in the cities of the EU. This would be particularly useful for cities that attract a substantial number of foreign visitors for commercial or business activities and could be part of a joint initiative of the EU in the field of transport and tourism.

### **Other areas of intervention**

With the aim of supporting a wider take-up of “active travel”, further harmonisation at the EU level on the standards adopted by different MSs on cycling or pedestrian infrastructure should be considered. Existing rules and standards vary significantly across the EU and some MSs do not allow solutions that are common in other parts of Europe. In order to do this, EU guidelines/soft measures could be introduced to promote a more homogeneous identification of rules to be respected in the planning and design of cycling and pedestrian infrastructure.

## **1.3 Summary of benefits**

This section has shown that in the road sector most of the outcomes of EU integration have already been achieved, though there are still some gaps that, if filled, could bring additional benefits. Bringing together the analysis undertaken for the case studies the potential economic benefit of closing these gaps in legislation and achieving the full liberalisation of road freight transport could lead to a net benefit in the range of €50-€90 billion.

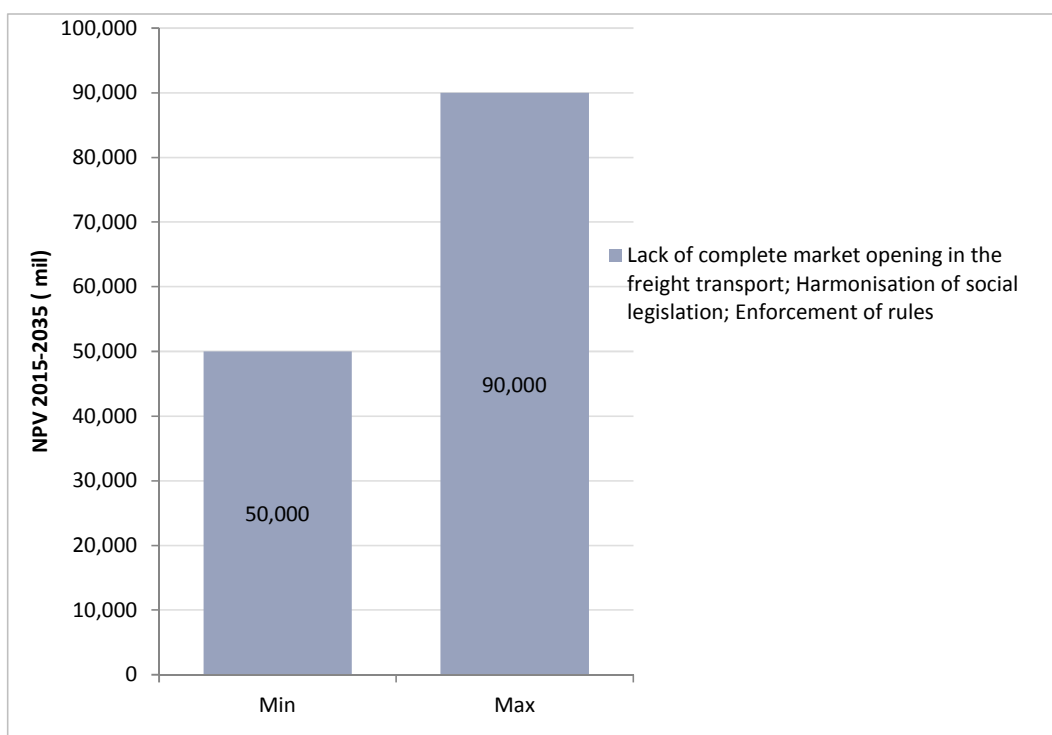
The areas where further EU integration and standardization would lead to higher benefits are those related to the reduction of the environmental impact of road transport and to the improvement of its safety performance. Overall by addressing these two gaps together, the EU could potentially achieve a benefit whose NPV is in the order of more than € 200-250 billion in the 2015-2035 period. This would be mainly driven by the reduction in premature deaths caused by the environmental pollution generated by road users and by the abolishment of road deaths. More precisely these figures have been computed by adding the additional potential benefits expected by moving towards a “Zero vision road safety target” (estimated to be around 150 billion) to those that could be gained by tackling the environmental sustainability of road transport, estimated in the range of €60 to €85 billion. However, it must be pointed out that these figures do not take into account the costs of the measures needed to achieve the ambitious targets behind these scenarios and, as such, need to be considered only as an indication of the scale of the problem to be addressed.

At the same time, a point to be made is that while the completion of market opening is certainly an area that needs deeper EU integration, the best way to address the

environmental and road safety gaps needs to be assessed on a case by case basis as the role the EU could play can range from a “soft” coordination of MS policies and actions, to the imposition of specific regulation and standard.

The following table provides an overview of the gaps identified for the road sector, the type of actions to be undertaken – distinguishing between legislative and non-legislative measures - the current status of implementation, the potential costs of non-intervention and the benefits of tackling the issue.

**Figure 14 :** Summary of expected measurable savings by addressing existing gaps in the EU road sector



**Table 2: Summary of key road gaps and impacts**

Gap	What needs to be done	Nature of the intervention needed to fill the gap	Status of implementation	Potential impact with no action	Potential impact with action
Lack of complete market opening in the freight transport	Removal of existing restrictions on cabotage rules	EU legislative intervention	EC carrying out assessment of road freight transport market and impact of Regulation (EC) 1072/2009. At the end of the process the EC may propose a revision of current cabotage regime	Additional cost of about €50-60 million year in road freight transport due to lack of full market opening	€50-€90 billion benefits over 2015-2035 compared to no action. Social dumping and safety concerns are potential drawbacks of a full market opening which is not accompanied by the harmonisation of social rules and enforcement
Harmonisation of social legislation	Further harmonisation of social rules to accompany market opening	EU legislative intervention and coordination of MS actions	Ongoing assessments at EU level	Illegal competition, social dumping, risk of driver shortages in some MS	Accompany market opening with deeper harmonisation of social standard. Reduce risks of social dumping
Enforcement of rules	Further cooperation and coordination among MS and between different enforcement bodies within single MS	EU guidelines and actions to promote MS further cooperation and coordination	Ongoing assessments at EU level	Creation of an unbalanced playing field, safety risks	Sets the condition for a homogenous playing field in the road haulage market and improve road safety
Inefficient vehicle design and standard	Revision of 'weights and dimensions' Directive 96/53/EC	EU legislative intervention	EC proposed text in 2013	Higher environmental and social costs. Lower market efficiency	Preferred option suggested by the Commission estimates € 540 million per year of avoided environmental costs and between €470-€670 million per year of avoided safety costs
Cleaner vehicle	Massive review of rules, standards and procedures	EU legislative intervention on standard, industry R&D, local actions	A number of actions have been taken or ongoing at the EU level for the different types of vehicles and propulsion systems. Significant steps forwards can be reached though only with strong cooperation with industry and high commitment at MS and local level	Higher environmental costs	The reduction in emissions driven by a radical change in the type of fuels and propulsion technologies in use, lightweight construction, efficient design of vehicles, etc. foreseen could lead to an overall abatement of 5,052 million ton of CO <sub>2</sub> , over the 2015-2035 period; a figure that would result in a NPV gain of up to € 60 billion.
Intelligent vehicle	Promote diffusion of Intelligent Transport System technology on vehicle	Need to evaluate if there is the need of some form of public/legislative intervention or if the natural development of the market would lead to satisfactory results	A number of actions have been taken or ongoing at the EU level for the different types of vehicles	Higher economic, environmental and safety costs	Difficult to quantify. Potential reduction in climate change and emissions; reduced congestion due to better traffic management; improved safety due to technologies that help to reduce accident risks

Gap	What needs to be done	Nature of the intervention needed to fill the gap	Status of implementation	Potential impact with no action	Potential impact with action
Road charging: setting the price	Consider further harmonisation of road taxation rules across the EU, including emerging local charging schemes on congestion or emission zones	Any policy action taken at the EU level in this area would first need to consider each national system and its current infrastructure cost recovery profile, bearing in mind that it could impact subsidiarity principles in relation to national fiscal policy, and related compensation and redistributive choices. As for emerging local charging schemes or restriction zones, EU citizens would benefit of some standardization. The EU could promote non-binding guidelines to foster a more common approach	Implemented harmonisation of pricing rules on TEN-T through the Eurovignette Directive	Possible market inefficiencies due to different rules, though they are difficult to assess in quantitative terms	Creation of a more homogenous road transport market with more standardised and shared rules for EU drivers
Road charging: EETS technologies	Improve interoperability between different charging schemes	EU legislative intervention	Under discussion	No clear evidence can be found on the costs generated by not having a harmonised framework for ETS	Smooth the functioning of the EU road market and make it easier for freight and passenger vehicles to drive across the EU
Road safety	Make sure that MSs dedicate sufficient effort and resources to enforce rules in areas such as speeding, driving under the influence of drugs or alcohol and seat belt use, etc.	Publication of guidelines and best practices. Promotion of coordination and cooperation between MS. Assess how to support MS that might find budget and financial constraints in dedicating resources to road checks.	Work in progress. Further attention is needed on the lack of resources at MS level to enforce rules	Persisting different in safety performance across EU MS. Missing the achievement of the EU road safety targets of no fatalities set for 2020.	Moving towards the no fatality target. Reducing injuries and improve safety of more vulnerable users. If the long term goal of achieving zero road deaths in the EU was met by 2040, about 164,000 additional lives could be saved, which would result in a NPV benefit of about €150 billion over the 2015-2035 time horizon.
Environmental sustainability	Strong cooperation among different EU institutions (e.g. DG MOVE, DG ENERGY, DG ENVIRONMENT, etc.) and various levels of governments need to be set	EU legislative intervention accompanied by softer measures. The EU should consider to develop new tools and actions to directly incentivize and reward those actors that have implemented measures resulting in a proven shift towards more sustainable modes of transport and, particularly, active travel (walking and cycling)	Work in progress. Further attention is needed to the local dimension of decision and measures	Persisting high economic, environmental and health negative impacts from transport activities	Improving the sustainability of the transport sector and the quality of life of EU citizens. Contribute to the reduction of health risks due to limited physical activity. A radical change in modal shift could lead to an overall abatement of 6,957 million ton of CO2 over the 2015-2035 period, which could result in a NPV gain of up to € 85 billion over the same time horizon.
User rights - transport information	Improve and harmonise the way information on road transport (e.g. public transport information, parking information, bike sharing schemes, etc.) are provided to users. Particular attention needs to be given to cities that attract foreign visitors (touristic places, capital and major cities, etc.)	Legislative intervention to require that information on public transport services in cities above a certain threshold (e.g. 100,000 inhabitants) are provided also in English. Promote the diffusion of information on road transport services (e.g. parking, bike sharing schemes, etc.) in English	Not in pipeline yet	Persisting barriers in getting information on functioning of local transport system for non-native speaking visitors	Facilitating the way EU citizens get access to road transport services and facilities across the EU. Support the use of more sustainable modes of transport

Gap	What needs to be done	Nature of the intervention needed to fill the gap	Status of implementation	Potential impact with no action	Potential impact with action
Not harmonised road infrastructure design	Further harmonisation at the EU level on the standards adopted by different MS on cycling or pedestrian infrastructure	EU guidelines/soft measures to promote a more homogeneous identification of rules to be respected in the planning and design of cycling and pedestrian infrastructure	Not in pipeline yet	Persisting different standards. The existing rules in some MS do not allow to implement solutions that elsewhere in Europe are adopted	More uniform market, which would create a single transport development planning market in the EU and give to some MS the possibility to mutuate solutions that have been proved to work elsewhere



## V. Conclusions

### Main findings

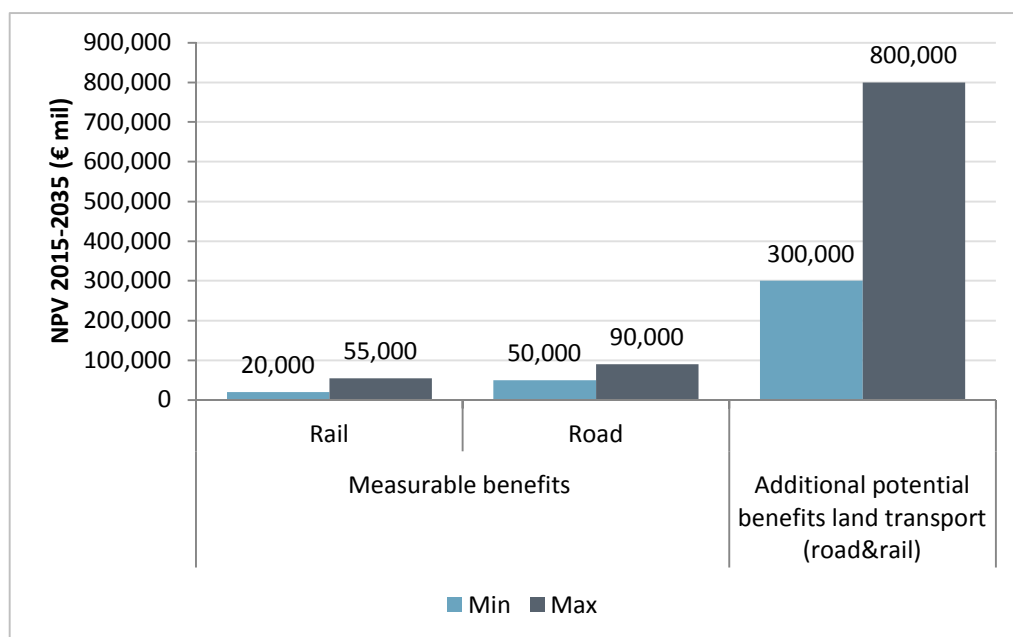
This report has shown that the costs of not having an integrated Europe in the rail and road sector are significant. The quantifiable, foregone benefits from not filling the main gaps in legislation are substantial. These benefits may be only the tip of the iceberg in the two sectors, and particularly in rail given the technical barriers that remain.

As part of this study we have estimated that the measurable potential benefits from filling the gaps in rail can amount to between €20 billion and €55 billion until 2035. As for the road sector, we have estimated that further integration can lead to a net benefit of about 2% in NPV over the 2015-2035 period, corresponding to about €50-€90 billion. In total, by adding rail and road transport, the **measurable benefits** for land transport are estimated in the range of €70-€145 billion.

As we have discussed in previous chapters there are also a number of additional benefits that will also accrue. Some are specific of the rail or road sector and include those relating to further integration in the rail sector and reduced deaths in the road one. Others cut across both themes and include such things as the improvement of the environmental sustainability of land transport (through the introduction of cleaner road vehicles and modal shift towards more sustainable modes of transport) and of information provided to passengers. These benefits cannot be measured in detail, however in course of the study we have commented on the potential outcomes that could be expected in addressing them in future years, in particular that long term rail benefits could be up to 10 times those set out above (€200 billion to €550 billion), while those related to the road sector could be in the range of €200-€250 billion. Overall, once the overlaps between estimated benefits in the road and rail sectors have been taken out (i.e. cross sectoral issues such as modal shift), we estimate that in total the **additional potential benefits** for land transport, calculated in NPV terms, could raise to between €300 billion and €800 billion by 2035.

We note that recent steps taken in the rail and road sectors have moved the EU closer to these desired levels but have not made it all the way meaning that it is likely that the majority of the benefits are back loaded. Nonetheless, significant progress has been made since the original Cecchini Report was published in 1988. The sectors may not have gone as far as was hoped back then, but improvements have been made and some areas within these sectors can now be considered contestable markets while previously they were not.

**Figure 15: Summary of expected savings by addressing existing gaps in the EU land transport**



The challenge remains to ensure that progress continues to unlock all the measurable and non-measurable benefits that can bring increased prosperity to the EU as a whole. In doing this, it is important to note that not all gaps necessarily need increased EU legislative intervention for them to be filled, but could be better addressed through other measures. This is particularly true in the road sector where different socio-economic and cultural aspects across EU MSs are at the heart of existing gaps in areas like road safety or environmental performance of transport. Here the added value of EU integration would probably need to be taken forward through softer measures such as the coordination of national actions at a European level and the dissemination of best practice, building on the lessons learned from the actions already taken in recent years.

**Table 3: Summary of actions to be taken to fill existing gaps in the EU rail sector**

	Approval of new legislation under discussion at EU level	Approval of new legislation at EU level	Other measures at the EU level (guidelines, soft measures, etc.)	Industry coordination/ action
<b>RAIL</b>				
Lack of complete market opening in the rail transport				
Lack of competition for Public Service Contracts				
National specific vehicle authorisation and safety				
Ensuring non-discriminatory access to infrastructure				
The single signalling system				
Passenger rights				
Varied access charges				
Different technical standards across Europe				
The legacy of the rail system				
Standard technical parts				
Standardisation of rolling stock, including on board signalling				
Single operating language				
Missing links at borders				

**Table 4: Summary of actions to be taken to fill existing gaps in the EU road sector**

	Approval of new legislation under discussion at EU level	Approval of new legislation at EU level	Other measures at the EU level (guidelines, soft measures, etc.)	Industry coordination/ action
<b>ROAD</b>				
Lack of complete market opening in the freight transport				
Harmonisation of social legislation				
Enforcement of rules				
Inefficient vehicle design and standard				
Cleaner vehicle				
Intelligent vehicle				
Road charging: setting the price				
Road charging: EETS technologies				
Road safety				
Environmental sustainability				
User rights - transport information				
Not harmonised road infrastructure design				

## References

Bayliss, B.T. et al., *Report of the High Level Group on the Development of the EU Road Haulage Market*, June 2012.

COM 913 final, *Together towards competitive and resource-efficient urban mobility*, December 2013.

EEA (2012) - *Emissions of primary particulate matter and secondary particulate matter precursors* (CSI 003/APE 009).

ETSC, *7th Road Safety PIN Report*, 2013.

European Parliament, *Social and working conditions of road transport hauliers*, 2013.

European Parliament, *Eco-efficient transport*, 2013.

Hamilton, Carl & Eliasson, Jonas, *Costs and benefits of the European directive on road tolling interoperability*, published on *Transportation Research Part C: Emerging Technologies*, Vol. 30, 2013.

International Transport Forum, *The construction and operation of the road freight transport market in Europe*, Forum Paper 2009-1, 2009.

Steer Davies Gleave, *Development and implementation of EU Road Cabotage*, prepared for European Parliament, March 2013.

Steer Davies Gleave, *Evaluation of Regulation 1371/2007*, prepared for European Commission, July 2012.

Steer Davies Gleave, *Further Action at European Level Regarding Market Opening for Domestic Passenger Transport by Rail and Ensuring Non-Discriminatory Access to Rail Infrastructure and Services*, prepared for European Commission, November 2012.

Steer Davies Gleave, *Impact assessment support study on the revision of the institutional framework of the EU railway system, with a special consideration to the role of the European Railway Agency*, prepared for European Commission, June 2012.

Steer Davies Gleave, *The impact of the separation between infrastructure management and transport operations on the railway sector in the European Union*, prepared for European Parliament, April 2011.

Railway Technology website <http://www.railway-technology.com/features/feature104304/feature104304-2.html>

[http://www.europarl.europa.eu/RegData/etudes/note/join/2014/514085/IPOL-JOIN\\_NT\(2014\)514085\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/note/join/2014/514085/IPOL-JOIN_NT(2014)514085_EN.pdf)

[http://www.acea.be/uploads/publications/201306XX\\_Truck\\_ofthe\\_Future\\_Weights\\_Dimensions.pdf](http://www.acea.be/uploads/publications/201306XX_Truck_ofthe_Future_Weights_Dimensions.pdf)

UIC statistics 2013

Eurostat

## Appendix 1 – Quantitative assessment

This appendix sets out the assumptions and methodology used to develop the quantitative assessment set out in the main section of the document.

As mentioned in the report, the quantitative assessment has been based on studies and models that Steer Davies Gleave prepared previously, where assumptions have been modified to reflect updated data, these assumptions have been included in this appendix, along with the main assumptions that drive these models. For the full list of detailed assumptions at the basis of the previous studies, please refer directly to those individual studies referenced below and in the bibliography. For the road sector and other rail gaps, the information available is more limited and as such the quantification has been more high level.

### Rail

This section includes a quantitative review of the main costs of not having a single European market in the rail sector based on the understanding of the gaps identified.

This quantitative analysis has been developed in two separate steps:

- Definition of a baseline for each case study gap.
- Definition of a “Full Europe” scenario where the desired benefits from the completion of the single market can be achieved.

In the “Full Europe” scenario, annual benefits are calculated over a mid-term period (2015-2025) and over a long-term period (2015-2035). For each gap, annual benefits are used to compute the Net Present Value (NPV) of filling the gap, by means of the following expression:

$$NPV(i, N) = \sum_{t=1}^N \frac{NCF_t}{(1+i)^t} = \frac{NCF_1}{(1+i)} + \frac{NCF_2}{(1+i)^2} + \dots + \frac{NCF_N}{(1+i)^N}$$

Where:

- $i$  = discount rate (4%);
- $N$  = number of periods in the time horizon ( $N=11$  with respect to the 2015-2025 period, and  $N=21$  with respect to the 2015-2035 period);
- $NCF_t$  = net cash flow (cash inflows – cash outflows) at time  $t$ .

For an easier comprehension and comparison of the Net Present Values, we proceeded to compute, for each NPV, a rough index representing the *average annual NPV* over the considered period:

$$\text{Average annual NPV} = \frac{NPV(i, N)}{N}$$

The average annual NPV is computed dividing the NPV for the number of periods by which the considered time horizon is composed – that is, 11 years with respect to the 2015-2025 period or 21 years with respect to the 2015-2035 period.

## Gap 1: Completing market opening in rail

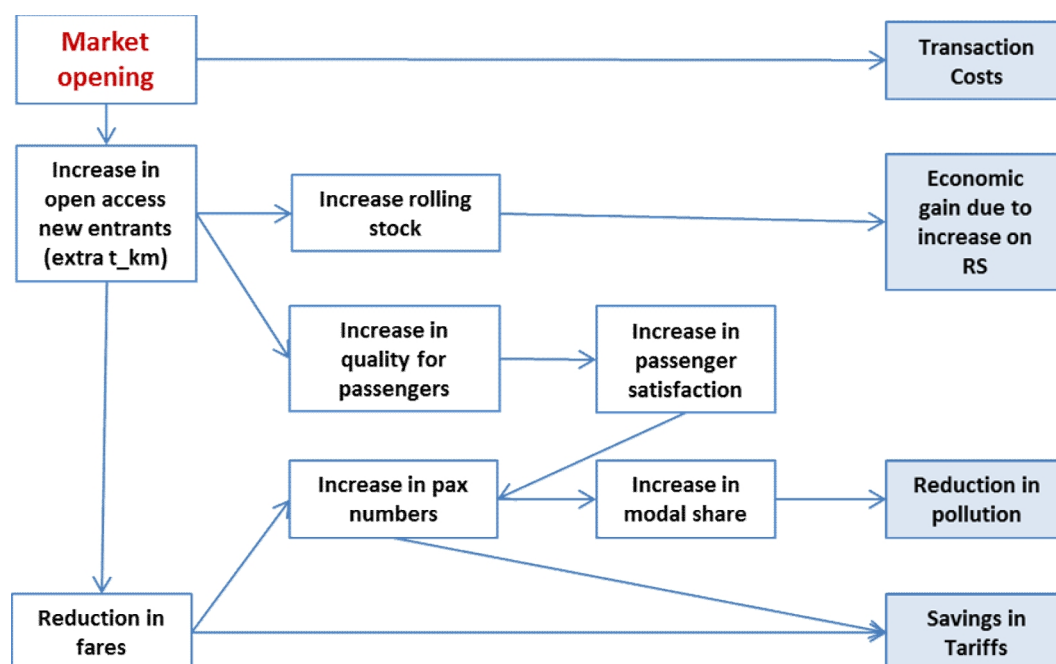
### Methodology

The introduction of new entrants will lead to a higher service quality and lower fares, resulting in increased demand and rail market share. This will however also result in a small increase in transactions costs. Overall, it will generate additional benefits from:

- reduced fares,
- reduction in pollution, and
- increased economic benefits associated to the additional Rolling Stock requirements.

The following diagram shows the logic behind our assessment.

FIGURE A.16: “OPEN MARKET” COST SAVINGS DIAGRAM



### Baseline

The passenger market has only partially been liberalised and as a result, most Commercial services are still operated by the Incumbent Operator. The baseline that has been assumed for the model leaves this generally unchanged with a market share remaining at the levels set out in the table below.



**TABLE A.5: KEY COMMERCIAL METRICS**

<b>Commercial metrics (2009)</b>	<b>Incumbent</b>	<b>New Entrant</b>	<b>Total</b>	<b>% Incumbent</b>
Passenger-km (billion)	154.8	10.9	165.8	93%
Passenger train-km (million)	1,037.6	77.5	1,115.1	93%
Capital expenditure (€ billion)	1.8	0.1	2.0	93%
Operating expenditure (€ billion)	20.2	1.0	21.2	95%
Passenger revenue (€ billion)	20.2	1.2	21.4	94%

*Source: "Further Action at European Level Regarding Market Opening for Domestic Passenger Transport by Rail and Ensuring Non-Discriminatory Access to Rail Infrastructure and Services" (SDG for EC- November 2012)*

### **Full Europe Scenario**

The full opening of the market will result in an increasing percentage of Private participation in commercial services. It has been assumed that from 2017 (used as the first possible date of entry into force of legislation aimed at opening the market for commercial services) the market share of incumbents will decrease gradually, and by 2026 it will be between 75-85%. This range has been assumed as it is likely that new entrants will enter those commercial services markets which are likely to give the highest reward. Where there has been new entry into commercial services in the rail sector, incumbents have retained this level of market share and similar levels have also been seen in other network utilities.

The entrance of new operators will improve service quality, resulting in a higher demand; train-km and even higher passenger-km (due to yield optimisation). Moreover, the new entrants will be more efficient than incumbent operators, leading to substantial reductions in operating costs, which would partially translate into lower fares to the user. This will also put some pressure on the incumbent operators, who will also optimise their operations. The following table shows the main assumptions on demand, revenue and costs impacts.

**TABLE A.6: KEY DEMAND METRICS**

<b>Impact of full opening</b>	<b>Change for Incumbent</b>	<b>Change for New Entrant</b>
Passenger-km (new entrants)	0%	5%
Passenger train-km (new entrants)	0%	3%
Capital expenditure / train-km	0%	0%
Operating expenditure/ train-km	-3%	-20%
Passenger revenue/ pass-km	0%	-10%

As a result, and following the methodology described in the diagram above, we have estimated the following costs/savings to the overall transport Market:

### **I Fare Savings to users**

The introduction of new entrants would result in increased ridership and reduced fares on these services as has been seen in Member States where competition has been introduced. Evidence in some Member States has shown that average fares

have fallen by as much as 30%, and on average by at least 20%. To provide a more cautious estimate we have assumed that fares will fall at most by 10%.

#### ■ **Environmental Savings**

It has been assumed that the additional train demand will be captured from road and air traffic, and therefore would lead to a reduction on CO<sub>2</sub> emissions. The assumptions adopted to quantify this have been as follows:

**TABLE A.7: ENVIRONMENTAL RELATED ASSUMPTIONS**

Million Tonnes CO <sub>2</sub> /bil. Pax-km	0.068
Value of emissions (€/CO <sub>2</sub> Tn)	58

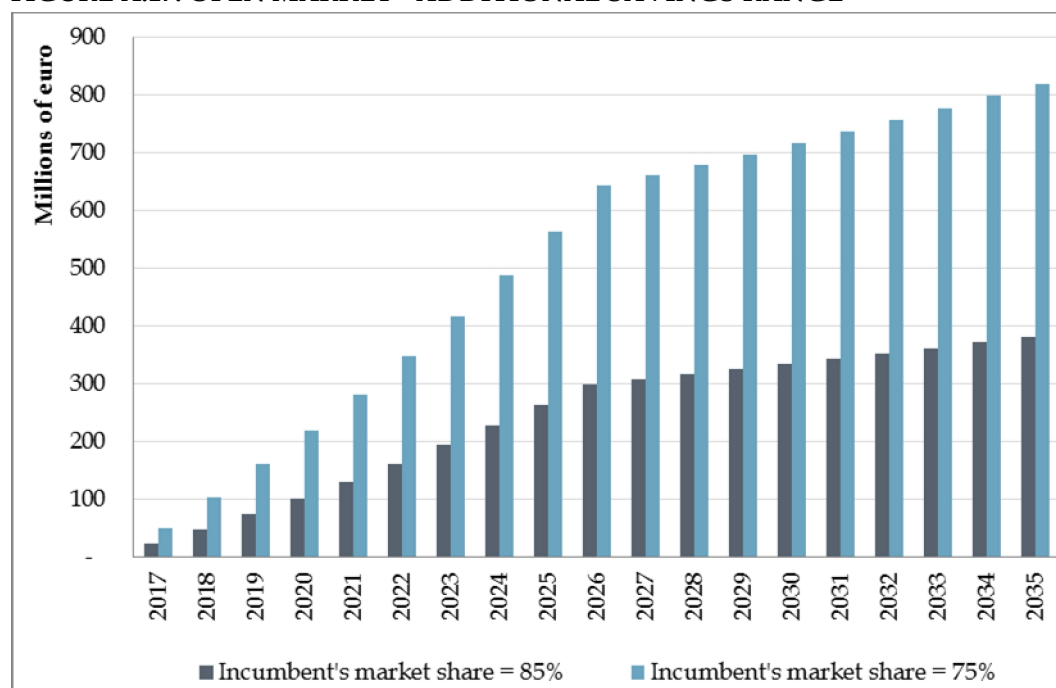
Source: "Further Action at European Level Regarding Market Opening for Domestic Passenger Transport by Rail and Ensuring Non-Discriminatory Access to Rail Infrastructure and Services" (SDG for EC- November 2012)

#### ■ **Transaction Costs**

The transaction costs associated with full market opening were estimated as part of the Impact Assessment for the Fourth Railway Package (mentioned above) to be about €1.7-2.3 million per annum.

As a result, it is estimated that the full opening of the market will lead to annual savings of between €381 million and €820 million by 2035, which corresponds to a NPV in the range of €2.6 billion to €5.7 billion over the 2015-2035 period. The following graph shows the savings range depending on the incumbent's market share assumptions (75-85%). The following tables show that savings are mainly related to reduction on fares.

**FIGURE A.17: OPEN MARKET - ADDITIONAL SAVINGS RANGE**



Source: elaboration by Steer Davies Gleave

**TABLE A.8: ANNUAL NET BENEFIT (INCUMBENT'S MARKET SHARE = 85%)**

Year	Savings on tariff	CO2 emissions	Jobs RS	Trans. Costs	Total
2015	0	0	0	0	0
2016	0	0	0	0	0
2017	23,158	579	86	-170	23,653
2018	47,500	1,188	177	-345	48,520
2019	73,071	1,828	272	-524	74,647
2020	99,918	2,499	372	-709	102,081
2021	128,290	3,209	478	-899	131,078
2022	158,129	3,956	589	-1,096	161,578
2023	189,495	4,740	706	-1,300	193,642
2024	222,447	5,564	829	-1,511	227,330
2025	257,050	6,430	958	-1,731	262,707
2026	293,369	7,338	1,093	-1,960	299,840
2027	301,337	7,538	1,123	-2,000	307,998
2028	309,521	7,742	1,154	-2,042	316,375
2029	317,927	7,953	1,185	-2,087	324,978
2030	326,562	8,169	1,217	-2,135	333,813
2031	335,432	8,391	1,250	-2,187	342,885
2032	344,542	8,619	1,284	-2,243	352,202
2033	353,900	8,853	1,319	-2,268	361,803
2034	363,512	9,093	1,355	-2,268	371,691
2035	373,385	9,340	1,392	-2,268	381,848

*Values are in thousands of euro. Source: elaboration by Steer Davies Gleave*

**TABLE A.9: ANNUAL NET BENEFIT (INCUMBENT'S MARKET SHARE = 75%)**

Year	Savings on tariff	CO2 emissions	Jobs RS	Trans. costs	Total
2015	0	0	0	0	0
2016	0	0	0	0	0
2017	49,817	965	191	-170	50,803
2018	102,180	1,980	392	-345	104,208
2019	157,188	3,046	604	-524	160,314
2020	214,941	4,166	826	-709	219,224
2021	275,974	5,349	1,060	-899	281,483
2022	340,163	6,593	1,306	-1,096	346,966
2023	407,635	7,900	1,566	-1,300	415,802
2024	478,522	9,274	1,838	-1,511	488,123
2025	552,959	10,717	2,124	-1,731	564,068
2026	631,085	12,231	2,424	-1,960	643,780
2027	648,226	12,563	2,490	-2,000	661,279
2028	665,832	12,904	2,557	-2,042	679,251
2029	683,916	13,255	2,627	-2,087	697,710
2030	702,491	13,615	2,698	-2,135	716,668
2031	721,570	13,984	2,771	-2,187	736,139
2032	741,168	14,364	2,847	-2,243	756,136
2033	761,298	14,754	2,924	-2,268	776,708
2034	781,975	15,155	3,003	-2,268	797,865
2035	803,214	15,567	3,085	-2,268	819,597

*Values are in thousands of euro. Source: elaboration by Steer Davies Gleave*

**TABLE A.10: NET PRESENT VALUE (INCUMBENT'S MARKET SHARE = 85%)**

Time horizon	Savings on tariff	CO2 emissions	Jobs RS	Trans. costs	Total	Average annual NPV
2015-2025	863,639	21,603	3,219	-5,979	882,482	80,226
2015-2035	2,597,489	64,975	9,680	-17,219	2,654,925	126,425

*Values are in thousands of euro. Source: elaboration by Steer Davies Gleave*

**TABLE A.11: NET PRESENT VALUE (INCUMBENT'S MARKET SHARE = 75%)**

Time horizon	Savings on tariff	CO2 emissions	Jobs RS	Trans. costs	Total	Average annual NPV
2015-2025	1,857,833	36,006	7,135	-5,979	1,894,995	172,272
2015-2035	5,587,637	108,291	21,460	-17,219	5,700,169	271,437

*Values are in thousands of euro. Source: elaboration by Steer Davies Gleave*

## Gap 2: Competition for public service contracts

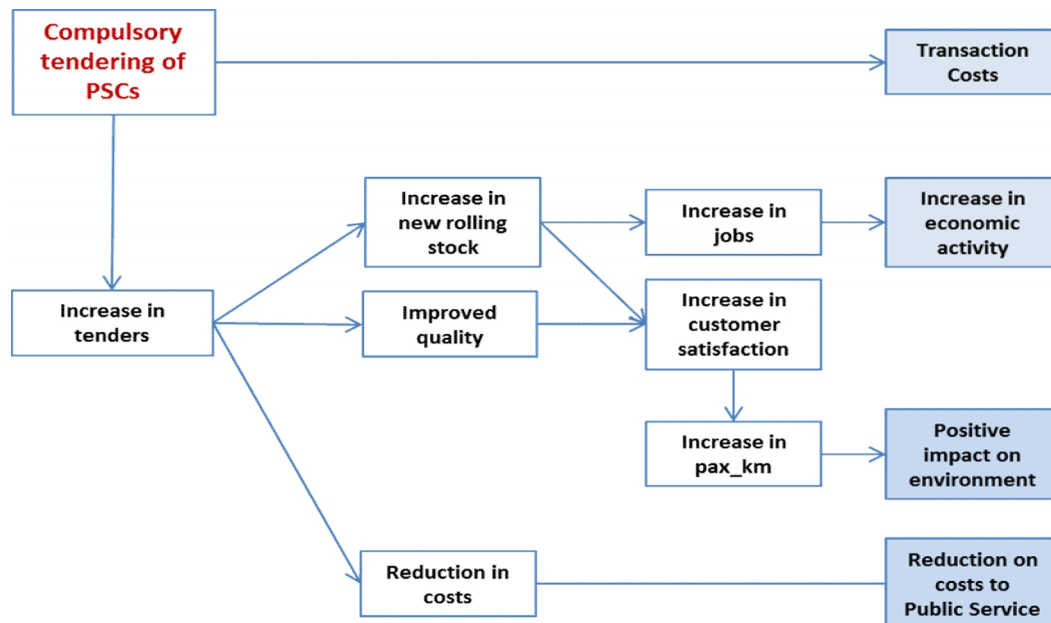
The creation of a single market also means allowing any EU operator to bid for public service contracts in the rail sector. Currently this is only possible in some Member States while others do not allow for any form of competition for the award of public service contracts.

### Methodology

The introduction of new entrants will lead to higher quality services (increased demand) and cost optimisation, resulting in cost savings to Public Authorities. It will also result in increased transaction costs as a result of the tendering process.

The additional benefits will result from: a reduction in Public Service Contract costs, a reduction in pollution (as a result of a shift of car users to rail services), and economic benefits associated to the manufacturing of additional Rolling Stock. The following diagram shows the logic behind our assessment.

**FIGURE A.18: "OPEN ACCESS TO PSC" COST SAVINGS DIAGRAM**



### **Baseline**

The passenger PSC market is only partially open and as a result, most of the Public Service contracts are still operated by the Incumbent Operator (74% of total train-km).

**TABLE A.12: PSC PARAMETER METRICS**

<b>PSC metrics (2009)</b>	<b>Incumbent</b>	<b>New Entrant</b>	<b>Total</b>	<b>% Incumbent</b>
Passenger-km	180.6	10.9	240.4	75%
Passenger train-km	1,475.3	77.5	1,997.9	74%
Capital expenditure	2.5	0.1	3.1	80%
Operating expenditure	21.3	1.0	26.0	82%
Passenger revenue	19.0	1.2	25.9	73%

*Source: "Further Action at European Level Regarding Market Opening for Domestic Passenger Transport by Rail and Ensuring Non-Discriminatory Access to Rail Infrastructure and Services" (SDG for EC- November 2012)*

### **Full Europe Scenario**

The full opening of the market will result in an important increase of Private participation in PSC. It has been assumed that the incumbent's market share will gradually decrease from the existing level of 75%. It is difficult to say to what extent new entry will replace incumbent operators so we have assumed a range of new incumbent market shares from 25-70% by 2026.

Entrance of new operators will lead to an improvement on the quality of existing services, resulting on an increase of demand – both in terms of train-km, but even higher in passenger-km (due to yield optimisation). Moreover, the new entrants are likely to be more efficient than incumbent operators, leading to substantial reductions in operating costs, which would translate into lower subsidies paid by Public Authorities. More importantly however, the threat of competition and entry means that incumbent operators will also seek to introduce efficiencies, leading to further savings.

The following table shows the main assumptions on demand, revenue and costs impacts.

**TABLE A.13: PSC DEMAND METRICS**

<b>Impact of full opening</b>	<b>Incumbent</b>	<b>New Entrant</b>
Passenger-km (new entrants)	0%	5%
Passenger train-km (new entrants)	0%	3%
Capital expenditure / train-km	0%	0%
Operating expenditure/ train-km	-3%	-10%
Passenger revenue/ pass-km	0%	0%

As a result, and following the methodology described in the diagram above, we have estimated the following costs/savings in the overall transport Market

■ ***Cost Savings to Public Service***

The increase in demand (and therefore revenue) and the reduction in operating expenditure, would lead to a substantial improvement of Net Revenue, which will result in a reduction of Public subsidies (estimated as the difference on Revenue-Capex-Opex, for the baseline and the full opening scenario). Evidence from recent tenders has shown that potential cost savings can amount to between 20 and 30% on the initial value of the contract, for the purpose of this assessment we have limited this potential benefit to 10% to allow for those PSOs that are currently under-recovering and to allow for competent authorities to accept fewer savings in exchange for increase services or high quality.

■ ***Environmental Savings***

The improvement on service quality would result in additional demand, that would be captured from road traffic, and therefore would lead to a reduction in CO<sub>2</sub> emissions. The assumptions adopted here mirror those used for Gap 1.

■ ***Increased Rolling Stock economic benefits***

As per Gap 1.

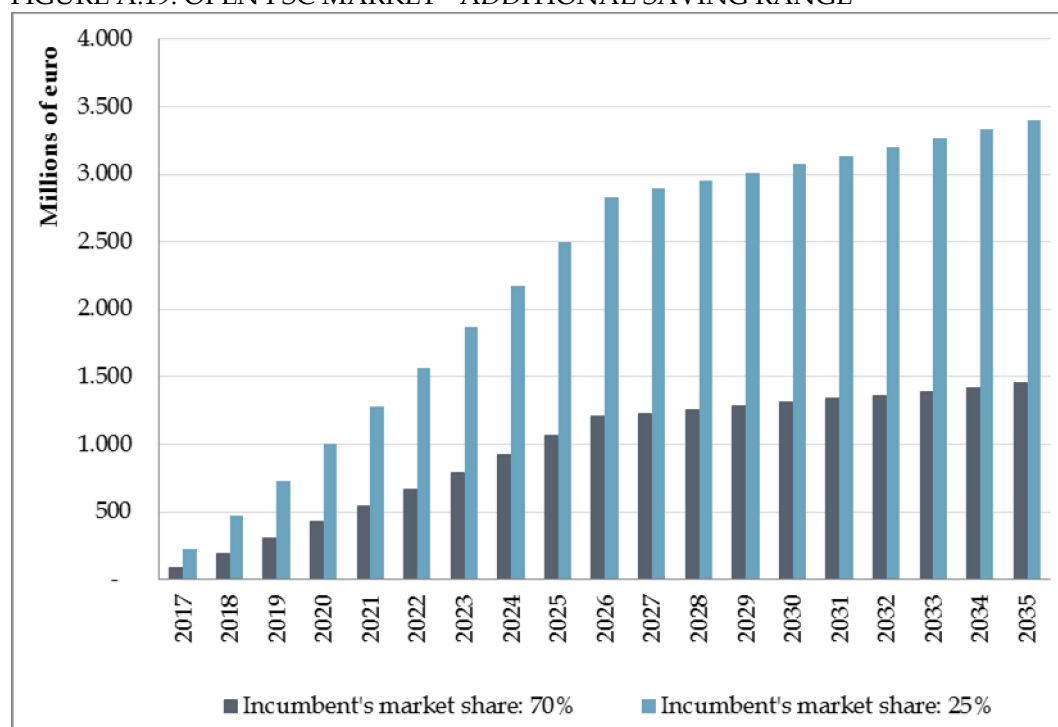
■ ***Transaction Costs***

The transaction costs associated with PSC market opening were analysed in detail (by cluster) in the study “Further Action at European Level Regarding Market Opening for Domestic Passenger Transport by Rail and Ensuring Non-Discriminatory Access to Rail Infrastructure and Services” (SDG for EC-November 2012). The main additional transaction costs were estimated as:

- The initial set up costs required at an administrative level to prepare and monitor the PSCs - €48m,
- Competitive tendering costs: estimated to be around €23-26 million per annum between 2017 and 2035

These assumptions lead to the estimated benefit of full opening of the PSC market bringing annual savings of between €1,450 million and €3,400 million by 2035, which correspond to a Net Present Value in the range of €10.5 billion to €24.8 billion over the 2015-2035 period. The following graph shows the annual savings based on the high and low values of future market shares for Incumbents (25-70%).

FIGURE A.19: OPEN PSC MARKET - ADDITIONAL SAVING RANGE



Source: elaboration by Steer Davies Gleave

TABLE A.14: ANNUAL NET BENEFIT (INCUMBENT'S MARKET SHARE = 70%)

Year	Cost reduction to public sector from PSCs/incumbents	CO2 emissions	Jobs RS	Transaction costs	Total
2015	0	0	0	-9,635	-9,635
2016	0	0	0	-9,635	-9,635
2017	101,230	1,644	82	-11,967	90,991
2018	206,494	3,354	168	-14,362	195,655
2019	315,913	5,131	257	-16,827	304,475
2020	429,610	6,978	350	-9,732	427,206
2021	547,944	8,900	446	-12,353	544,938
2022	670,918	10,898	547	-15,061	667,302
2023	798,672	12,973	651	-17,864	794,432
2024	931,350	15,128	759	-20,769	926,468
2025	1,069,098	17,365	871	-23,761	1,063,574
2026	1,212,069	19,688	988	-26,401	1,206,343
2027	1,236,743	20,088	1,008	-26,401	1,231,438
2028	1,261,920	20,497	1,028	-26,401	1,257,044
2029	1,287,609	20,915	1,049	-26,401	1,283,171
2030	1,313,821	21,340	1,070	-26,401	1,309,831
2031	1,340,566	21,775	1,092	-26,401	1,337,033
2032	1,367,856	22,218	1,114	-26,401	1,364,788
2033	1,395,702	22,670	1,137	-26,401	1,393,109
2034	1,424,115	23,132	1,160	-26,401	1,422,006
2035	1,453,106	23,603	1,184	-26,401	1,451,491

Values are in thousands of euro. Source: elaboration by Steer Davies Gleave

**TABLE A.15: ANNUAL NET BENEFIT (INCUMBENT'S MARKET SHARE = 25%)**

Year	Cost reduction to public sector from PSCs/incumbents	CO2 emissions	Jobs RS	Transaction costs	Total
2015	0	0	0	-9,635	-9,635
2016	0	0	0	-9,635	-9,635
2017	233,861	4,111	911	-11,967	226,916
2018	477,040	8,385	1,859	-14,362	472,922
2019	729,817	12,828	2,844	-16,827	728,662
2020	992,477	17,445	3,868	-9,732	1,004,058
2021	1,265,851	22,251	4,933	-12,353	1,280,682
2022	1,549,945	27,244	6,040	-15,061	1,568,168
2023	1,845,080	32,432	7,190	-17,864	1,866,838
2024	2,151,589	37,820	8,384	-20,769	2,177,024
2025	2,469,813	43,413	9,624	-23,761	2,499,090
2026	2,800,101	49,219	10,912	-26,401	2,833,831
2027	2,857,104	50,221	11,134	-26,401	2,892,057
2028	2,915,266	51,243	11,360	-26,401	2,951,469
2029	2,974,613	52,286	11,592	-26,401	3,012,090
2030	3,035,167	53,351	11,828	-26,401	3,073,945
2031	3,096,955	54,437	12,068	-26,401	3,137,059
2032	3,160,000	55,545	12,314	-26,401	3,201,458
2033	3,224,328	56,676	12,565	-26,401	3,267,168
2034	3,289,967	57,829	12,820	-26,401	3,334,216
2035	3,356,941	59,007	13,081	-26,401	3,402,628

Values are in thousands of euro. Source: elaboration by Steer Davies Gleave

**TABLE A.16: NET PRESENT VALUE (INCUMBENT'S MARKET SHARE = 70%)**

Time horizon	Cost reduction to public sector from PSCs/incumbents	CO2 emissions	Jobs RS	Transaction costs	Total	Average annual NPV
2015-2025	3,657,104	59,402	2,980	-125,017	3,594,469	326,770
2015-2035	10,615,566	172,428	8,649	-264,114	10,532,529	501,549

Values are in thousands of euro. Source: elaboration by Steer Davies Gleave

**TABLE A.17: NET PRESENT VALUE (INCUMBENT'S MARKET SHARE = 25%)**

Time horizon	Cost reduction to public sector from PSCs/incumbents	CO2 emissions	Jobs RS	Transaction costs	Total	Average annual NPV
2015-2025	8,448,583	148,505	32,923	-125,017	8,504,994	773,181
2015-2035	24,523,909	431,070	95,566	-264,114	24,786,430	1,180,306

Values are in thousands of euro. Source: elaboration by Steer Davies Gleave

### Gap 3: National specific vehicle authorization and safety certification

#### Methodology

For this analysis we have used the results and data gathered in the Steer Davies Gleave study undertaken for the Commission on the Future Role of the European Railway Agency. We have based our analysis on the results of this study but have extended the timescales to reach 2035.

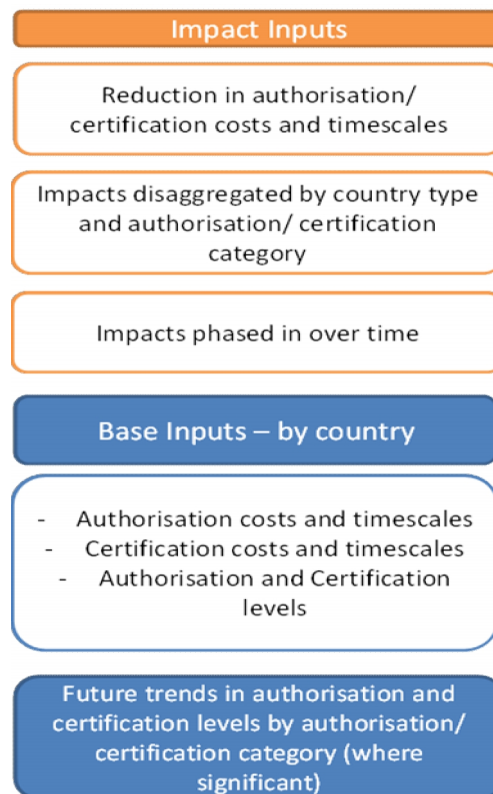
The cost savings calculator has three key input data sets:



- Current costs, timescales and levels of authorisation by country
- Future trends in levels of authorisation by category
- Impact of Option 4 in the study (the preferred option of ERA & NSAs to share competencies) on costs and timescales of certification

The following figure summarises the key inputs of the impact assessment calculator.

**FIGURE A.20: FRAMEWORK FOR THE IMPACT ASSESSMENT CALCULATOR**



### ***Baseline***

The following table shows the current authorisation categories, and the associated average costs and timescales.

**TABLE A.18: AUTHORISATION CATEGORIES (COSTS AND TIMESCALES)**

Authorisation Category	Average cost (000€s)	Average timescale (months/type)
New locomotive type authorisation (1st country)	6,000	24
New wagon type authorisation (1st country)	100	2
New Multiple Unit type authorisation (1st country)	600	24
New Coach type authorisation (1st country)	100	24
New locomotive type authorisation (additional country)	916	11
New wagon type authorisation (additional country)	0	0
New Multiple Unit type authorisation (additional country)	120	7
New Coach type authorisation (additional country)	0	0
Locomotive type re-authorisation without ERTMS (1st country)	750	12
Locomotive type re-authorisation with ERTMS (1st country)	1,500	12
Number of wagon type re-authorisations (1st country)	100	1
Multiple Unit type re-authorisation without ERTMS (1st country)	600	24
Multiple Unit type re-authorisation with ERTMS (1st country)	6,000	27
Coach type re-authorisation (1st country)	100	24
Locomotive type re-authorisation without ERTMS (additional country)	0	0
Locomotive type re-authorisation with ERTMS (additional country)	750	8
Number of wagon type re-authorisations (additional country)	0	0
Multiple Unit type re-authorisation without signalling (additional country)	0	0
Multiple Unit type re-authorisation with ERTMS (additional country)	2,000	6
Coach type re-authorisation (additional country)	0	0

Note: zero values relate to where there no reauthorisation is necessary.

Source: *Impact assessment study – The Future Role of the European Railway Agency (SDG)*

In the baseline, a key issue is the trend of number of vehicles per type. It is likely that market consolidation and market changes induced by the TSIs will reduce the number of vehicle types on the market and hence the type size should increase. The assumed Type size changes are shown in the following tables.

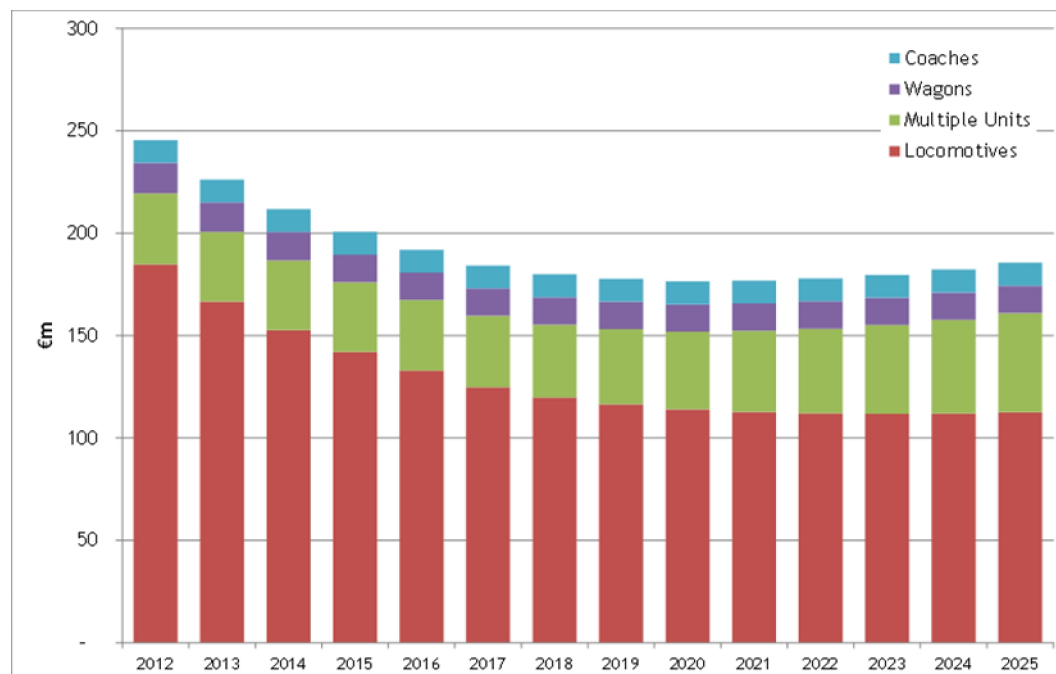
**TABLE A.19: TYPE SIZE CHANGES ASSUMED IN THE IMPACT ASSESSMENT CALCULATOR**

Vehicle Category	Type Size	
	2007/2008	2025
New Wagons	105	148
Existing Wagons	148	148
New Locomotives	5	32
Existing Locomotives	13	13
New Coaches	22	22
Existing Coaches	22	22
New Multiple Units	16	87
Existing Multiple Units	35	35

*Source: Impact assessment study- The Future Role of the European Railway Agency (SDG)*

In the baseline, even without major extensions of the Agency's role, total authorisation costs are anticipated to fall by over a third by 2020 as Cross-Acceptance, reduction of National Rules, TSI scope extension and other measures impact authorisation costs. The increase in authorisation costs post 2020 is caused by growth in ERTMS deployment creating a higher volume of (expensive) ERTMS related vehicle authorisations.

**FIGURE A.21: AUTHORISATION COSTS - BASELINE SCENARIO**



*Source: Impact assessment study- The Future Role of the European Railway Agency (SDG)*

### **Full Europe Scenario**

The impacts of different policy options will differ according to the current industry context in any given country. For example, in countries which already authorise efficiently there will be a lower benefit from measures reducing authorisation costs.

To account for these complexities, impacts were disaggregated to allow for different impacts in some countries where specific issues in relation to authorisation are known to exist. Inputs have then been expressed as percentage reductions in costs and timescales compared to the value that is likely to occur with no intervention.

For the optimistic case, it was assumed that the costs of authorisation and the timescales would be as follows

**TABLE A.20: MINIMUM POSSIBLE COSTS OF AUTHORISATION IN IMPACT ASSESSMENT CALCULATOR (€000)**

Vehicle Category	New (1st Country)	New (additional country)	Re-authorisation (1st country)	Re-authorisation (additional country)
Wagons	100	n/a <sup>1</sup>	100	n/a
Locomotives	5,000	500	375 (without ERTMS) 750 (with ERTMS)	n/a (without ERTMS) 500 (with ERTMS)
Coaches	100	100	100	n/a
Multiple Units	480	200	480 (without ERTMS) 6,0004,800 (with ERTMS)	n/a (without ERTMS) 2,000 (with ERTMS)

Source: *Impact assessment study- The Future Role of the European Railway Agency (SDG)*

**TABLE A.21: MINIMUM POSSIBLE TIMESCALES OF AUTHORISATION IN IMPACT ASSESSMENT CALCULATOR (MONTHS/TYPE)**

Vehicle Category	New (1st Country)	New (additional country)	Re-authorisation (1st country)	Re-authorisation (additional country)
Wagons	1	n/a <sup>1</sup>	1	n/a
Locomotives	18	6	6 (without ERTMS) 8 (with ERTMS)	n/a (without ERTMS) 8 (with ERTMS)
Coaches	18	n/a	18	n/a
Multiple Units	18	12	18 (without ERTMS) 20 (with ERTMS)	n/a (without ERTMS) 6 (with ERTMS)

Source: *Impact assessment study- The Future Role of the European Railway Agency (SDG)*

Option 4 assumed that ERA & NSAs share competencies, this would have a significant impact (Medium/high) on costs and it has been assumed that the full impact will be introduced gradually between 2017 and 2023.

As part of the “Impact assessment study - The Future Role of the European Railway Agency” Steer Davies Gleave also identified a number of horizontal measures that directly affect rolling stock authorisation. These measures (known as Option 6) were merged with the desired Option 4 discussed above to provide the total benefits from the initiative. These requirements could be mandated within a timeframe of 2 years and

therefore its benefits could be expected from 2015. As a result, the following savings have been estimated:

■ ***Operator Cost Savings associated to Authorisation Costs (option 4- ERA & NSAs share competencies)***

The reduction on authorisation costs to operators would be significant. This would lead to cost savings of around €33-47 million per annum in the period 2023- 2035.

■ ***Operator Costs Savings associated with Horizontal Measures<sup>29</sup> (option 4 merged with option 6)***

In order to merge the options effectively Steer Davies Gleave provided weights to reflect the impact that each of the Option 6 measures would have when considered in conjunction with Option 4. Following the merging of these two options, the annual savings on Authorisation Costs to the operator increased to between €43 million and €60 million between 2023-2035.

■ ***Cost Savings associated to “trains in sidings”***

There will be a number of savings arising directly from shorter rolling stock authorisation timescales. These include:

- Reduction in operating costs accrued as a result of needing to cover delayed stock with alternative stock
- Reduction in loss of revenue where the introduction of new services is delayed/existing services are cut back where rolling stock is not available to cover for delayed stock
- Reduced storage costs

This would lead to estimated cost savings of around €42 million per annum from 2023.

■ ***Transaction Costs***

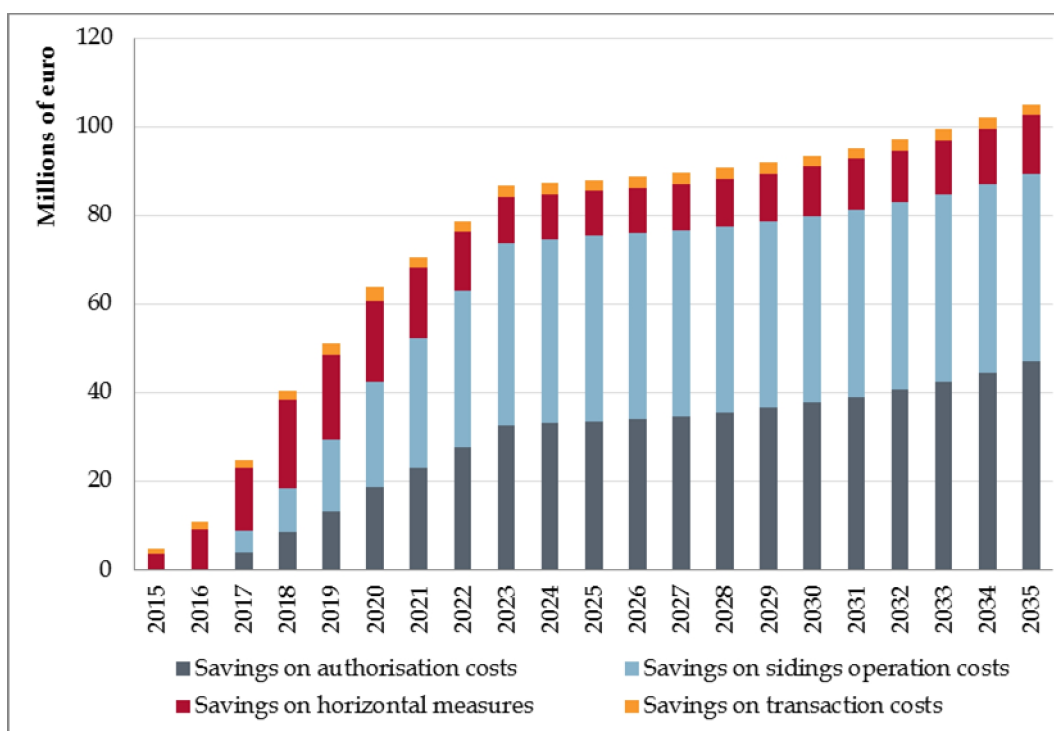
Due to the reduction in authorisations, the transaction costs associated to it will also be reduced. The associated savings were analysed in detail in the aforementioned study, which estimated annual savings of around €2.5 million from 2023.

As a result, it is estimated that a common approach to harmonisation will lead to annual savings of between €87 million and €105 million between 2023-2035, which correspond to a Net Present Value of €950.3 million over the 2015-2035 period.

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<sup>29</sup> These include other legislative changes and ERA tasks that could be implemented to improve the competitiveness of the rail sector, such as: enhanced role of ERA in monitoring and control of implementation of national safety and interoperability legislation; enhanced role of ERA in dissemination of railway-related information and training; enhanced role of ERA in providing advice & support for Member States & other stakeholders in implementing legislation on safety & interoperability. See pag. 107 of the “Impact assessment study - The Future Role of the European Railway Agency” for a full list.

FIGURE A.22: AUTHORISATION ADDITIONAL SAVINGS - TOTAL



Source: elaboration by Steer Davies Gleave

TABLE A.22: ANNUAL COSTS/BENEFITS

Year	Savings on authorisation costs	Savings on sidings operation costs	Savings on horizontal measures	Savings on transaction costs	Total
2015	0	0	3,445	1,164	4,609
2016	0	0	9,043	1,636	10,679
2017	3,987	4,734	14,185	1,873	24,778
2018	8,338	10,097	19,770	2,266	40,471
2019	13,170	16,180	19,141	2,660	51,150
2020	18,736	23,779	17,982	3,448	63,945
2021	22,915	29,209	15,894	2,463	70,480
2022	27,606	35,218	13,360	2,463	78,647
2023	32,645	41,066	10,385	2,463	86,559
2024	32,967	41,448	10,296	2,463	87,173
2025	33,433	41,886	10,216	2,463	87,996
2026	33,957	41,949	10,320	2,463	88,689
2027	34,626	42,012	10,457	2,463	89,558
2028	35,451	42,076	10,628	2,463	90,616
2029	36,442	42,139	10,836	2,463	91,880
2030	37,616	42,202	11,086	2,463	93,367
2031	38,989	42,266	11,382	2,463	95,099
2032	40,579	42,329	11,728	2,463	97,098
2033	42,408	42,392	12,129	2,463	99,392
2034	44,502	42,456	12,591	2,463	102,011
2035	46,886	42,519	13,121	2,463	104,989

Values are in thousands of euro. Source: elaboration by Steer Davies Gleave

**TABLE A.23: NET PRESENT VALUE**

Year	Savings on authorisation costs	Savings on sidings operation costs	Savings on horizontal measures	Savings on transaction costs	Total	Average annual NPV
2015-2025	140,813	176,922	113,855	19,808	451,398	41,036
2015-2035	344,669	399,331	173,548	32,783	950,332	45,254

*Values are in thousands of euro. Source: elaboration by Steer Davies Gleave*

Safety certification is currently carried out within national borders increasing the cost to operators. Hereinafter the methodology for the assessment of this side of Gap 3 is presented.

### **Baseline**

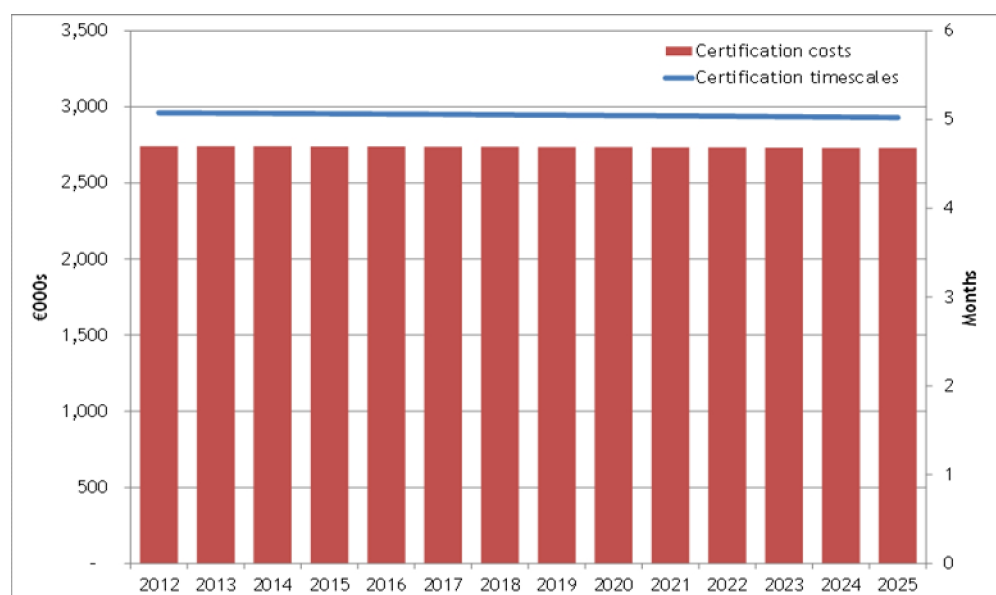
The following table shows the current certification categories included in the impact assessment and the associated average costs and timescales:

**TABLE A.24: CERTIFICATION CATEGORIES**

Certification Category	Average cost (€000s)	Average timescale (months)
Safety Certification (1st Country) – Freight	21	5
Safety Certification (additional Country) – Freight	20	5
Safety Certification (1st Country) – Passenger	20	5
Safety Certification (additional Country) – Passenger	24	6

*Source: Impact assessment study- The Future Role of the European Railway Agency (SDG)*

In the baseline, certification costs and timescales are forecast to remain virtually constant over time.

**FIGURE A.23: CERTIFICATION COSTS – BASELINE SCENARIO**

*Source: elaboration by Steer Davies Gleave*

### ***Full Europe Scenario***

For the Full Europe Scenario, it was assumed that the costs of certification would be limited to the 1<sup>st</sup> country (valid for the whole EU) and would be harmonised to €18,000. Certification timescales have also been assumed to fall to just 3 months.

Option 4 assumed that ERA & NSAs sharing competencies would have a significant impact (Medium/high) on costs and it has been assumed that the full impact will be introduced gradually between 2017 and 2023. Similar to the previous gap, Steer Davies Gleave also merged this option with a number of horizontal measures that directly affect rolling stock certification, although in this case the impact was not significant.

As a result, the following savings have been estimated:

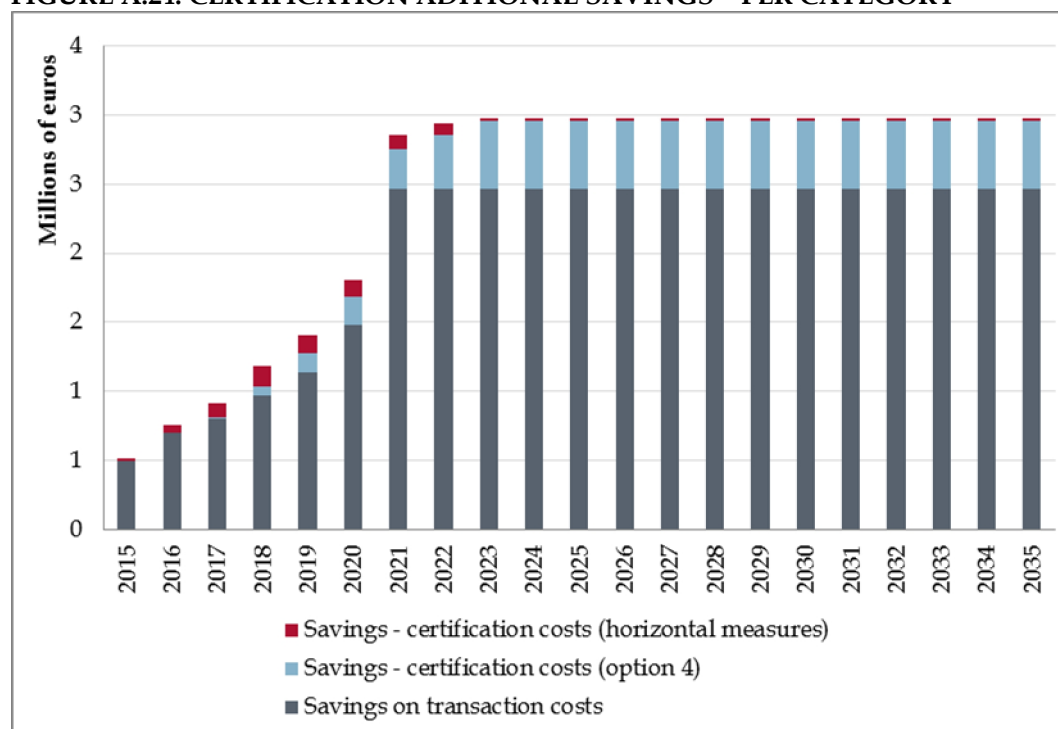
- ***Operator Cost Savings associated with Certification Costs (option 4)***  
The reduction in certification costs to operators would be significant, especially due to the elimination of certifications for 2<sup>nd</sup> and other countries. This would lead to cost savings of around €0.498 million per annum from 2023.
- ***Operator Costs Savings associated to Horizontal Measures (option 4 merged with option 6)***  
In order to merge the options effectively Steer Davies Gleave provided weights to reflect the impact that each of the Option 6 measures would have when considered in conjunction with Option 4. Following the merging of these two options, the annual savings on Certifications Costs to the operator increased slightly to €0.516 million
- ***Transaction Costs***  
Due to the reduction in certification (especially 2<sup>nd</sup> and other countries), the transaction costs associated with the certification of trains will also be reduced. The associated savings were analysed in detail in the aforementioned study which estimated annual savings of around €2.5 million.

As a result, it has been estimated that actions in relation to certification costs will lead to annual savings of €3 million from 2023, which correspond to a NPV of €31.7 million over the 2015-2035 period.

The figure and tables below show the expected level of saving per category.



**FIGURE A.24: CERTIFICATION ADDITIONAL SAVINGS - PER CATEGORY**



Source: elaboration by Steer Davies Gleave

**TABLE A.25: ANNUAL COSTS/BENEFITS**

Year	Savings - certification costs (option 4)	Savings - certification costs (horizontal measures)	Savings - transaction costs	Total
2015	0	15	499	514
2016	0	51	701	752
2017	7	102	803	912
2018	68	145	971	1,184
2019	135	133	1,140	1,408
2020	211	118	1,478	1,807
2021	296	102	2,463	2,860
2022	391	86	2,463	2,940
2023	498	21	2,463	2,981
2024	498	20	2,463	2,980
2025	498	19	2,463	2,979
2026	498	19	2,463	2,979
2027	498	19	2,463	2,979
2028	498	19	2,463	2,979
2029	498	19	2,463	2,979
2030	498	19	2,463	2,979
2031	498	19	2,463	2,979
2032	498	19	2,463	2,979
2033	498	19	2,463	2,979
2034	498	19	2,463	2,979
2035	498	19	2,463	2,979

Values are in thousands of euro. Source: elaboration by Steer Davies Gleave

**TABLE A.26: NET PRESENT VALUE**

Year	Savings - certification costs (option 4)	Savings - certification costs (horizontal measures)	Savings - transaction costs	Total	Average annual NPV
2015-2025	1,863	659	13,440	15,961	1,451
2015-2035	4,484	756	26,414	31,655	1,507

*Values are in thousands of euro. Source: elaboration by Steer Davies Gleave*

#### **Gap 4: Ensuring non-discriminatory access to infrastructure**

Additional benefits are likely to be achieved by tackling a number of obstacles which hamper the enhancement of a non-discriminatory access to the railway infrastructure. In particular, two feasible actions have been identified and analysed with respect to their potential effects: the creation of a European Rail Regulator and the implementation of regulatory actions capable of enhancing the level of separation between incumbent operators and national infrastructure managers.

The quantification of the benefits has been carried out as follows.

#### ***Independent regulation at European level***

We estimate that the creation of a European Regulator could increase the benefits set out in Gap 1 by up to 2%. The following tables report each annual benefit set out in Gap 1 weighted by this 2% rate.

As a result, European Regulation could bring - over the 2015-2025 period - additional benefits in the range of €17.7 million (in the case of 85% of incumbent's market share) to €37.9 million (in the case of 75% of incumbent's market share). Over the 2015-2035 period, these estimates rise to a range of €53.1 million (in the case of 85% of incumbent's market share) to €114.0 million (in the case of 75% of incumbent's market share).

**TABLE A.27: ANNUAL NET BENEFIT (INCUMBENT'S MARKET SHARE = 85%)**

Year	Savings on tariff	CO2 emissions	Jobs RS	Trans. Costs	Total
2015	0	0	0	0	0
2016	0	0	0	0	0
2017	463	12	2	-3	473
2018	950	24	4	-7	970
2019	1,461	37	5	-10	1,493
2020	1,998	50	7	-14	2,042
2021	2,566	64	10	-18	2,622
2022	3,163	79	12	-22	3,232
2023	3,790	95	14	-26	3,873
2024	4,449	111	17	-30	4,547
2025	5,141	129	19	-35	5,254
2026	5,867	147	22	-39	5,997
2027	6,027	151	22	-40	6,160
2028	6,190	155	23	-41	6,327

Year	Savings on tariff	CO2 emissions	Jobs RS	Trans. Costs	Total
2029	6,359	159	24	-42	6,500
2030	6,531	163	24	-43	6,676
2031	6,709	168	25	-44	6,858
2032	6,891	172	26	-45	7,044
2033	7,078	177	26	-45	7,236
2034	7,270	182	27	-45	7,434
2035	7,468	187	28	-45	7,637

Values are in thousands of euro. Source: elaboration by Steer Davies Gleave

**TABLE A.28: ANNUAL NET BENEFIT (INCUMBENT'S MARKET SHARE = 75%)**

Year	Savings on tariff	CO2 emissions	Jobs RS	Trans. costs	Total
2015	0	0	0	0	0
2016	0	0	0	0	0
2017	996	19	4	-3	1,016
2018	2,044	40	8	-7	2,084
2019	3,144	61	12	-10	3,206
2020	4,299	83	17	-14	4,384
2021	5,519	107	21	-18	5,630
2022	6,803	132	26	-22	6,939
2023	8,153	158	31	-26	8,316
2024	9,570	185	37	-30	9,762
2025	11,059	214	42	-35	11,281
2026	12,622	245	48	-39	12,876
2027	12,965	251	50	-40	13,226
2028	13,317	258	51	-41	13,585
2029	13,678	265	53	-42	13,954
2030	14,050	272	54	-43	14,333
2031	14,431	280	55	-44	14,723
2032	14,823	287	57	-45	15,123
2033	15,226	295	58	-45	15,534
2034	15,640	303	60	-45	15,957
2035	16,064	311	62	-45	16,392

Values are in thousands of euro. Source: elaboration by Steer Davies Gleave

**TABLE A.29: NET PRESENT VALUE (INCUMBENT'S MARKET SHARE = 85%)**

Year	Savings on tariff	CO2 emissions	Jobs RS	Trans costs	Total	Average annual NPV
2015-2025	17,273	432	64	-120	17,650	1,605
2015-2035	51,950	1,299	194	-344	53,098	2,529

Values are in thousands of euro. Source: elaboration by Steer Davies Gleave

**TABLE A.30: NET PRESENT VALUE (INCUMBENT'S MARKET SHARE = 75%)**

Year	Savings on tariff	CO2 emissions	Jobs RS	Trans. costs	Total	Average annual NPV
2015-2025	37,157	720	143	-120	37,900	3,456
2015-2035	111,753	2,166	429	-344	114,003	5,429

Values are in thousands of euro. Source: elaboration by Steer Davies Gleave

### *Lack of full unbundling*

In the Impact Assessment Support Study undertaken for the Commission in relation to the 4<sup>th</sup> Railway Package, we reviewed the main advantages and disadvantages of separation identified in the Briefing Paper which we prepared for the TRAN Committee in 2011, and estimated the potential benefit to society from compulsory full unbundling.

In that study we noted that full unbundling could potentially lead to benefits of between €2.5 billion and €6.5 billion between 2015 and 2035 on its own, but that tying this with Gaps 1 and 2 mentioned above could increase such benefits by between 10 and 50%. As shown in the following table, this could lead to additional benefits in a range of €2.75 billion to €9.75 billion.

**TABLE A.31: NET PRESENT VALUE (INCUMBENT'S MARKET SHARE = 75%)**

			Additional benefit if combined with Gaps 1 and 2	
			10%	50%
Benefit from unbundling	Min	2,500	2,750	3,750
	Max	6,500	7,150	9,750

*Values are in millions of euro. Source: elaboration by Steer Davies Gleave*

### **Gap 6: Passenger rights**

We have identified a number of actions which could be implemented in order to address the current lack of appropriate passenger rights and thus result in additional benefits:

- Extending the requirements of Regulation 1371/2007 to all rail services and all Member States;
- Ensuring the harmonisation of common information provision across borders;
- Requiring that all information is provided in a second language;
- Enforcing integrated ticketing across Europe;

In order to estimate the potential benefits related to these actions, we have set a number of methodological assumptions:

- The current (2012) passenger figure is equal to 7,688 million;
- We assume that these actions would, at most, lead to an increase in demand of 1% across Europe;
- We carry out our estimates adopting two different hypotheses on the average ticket price level, respectively €1 and €5;
- As regard the potential cost of providing increased information to passengers, reference is made to the Steer Davies Gleave study on the implementation of Rail Passenger Rights Regulation. Increases in cost from passenger rights' projects can be estimated in €431.6 million.

As shown in the following tables, we estimate that these actions would lead to benefits – in terms of NPV – of between €0.2 billion and €4.5 billion over the 2015-2035 period.

**TABLE A.32: HYPOTHESES FOR GAP 6**

	Scenario A	Scenario B
Number of passengers	7,688	7,688
Average ticket price	€ 1	€ 5
Current revenue	7,688	38,440
Increase in revenue	76.88	384.40

*Source: elaboration by Steer Davies Gleave*

**TABLE A.33: ANNUAL NET BENEFITS AND NPV FOR GAP 6**

Year	Scenario A			Scenario B		
	Increase in costs	Increase in benefits	Net benefits	Increase in costs	Increase in benefits	Net benefits
2015	431.60	76.88	-354.72	431.60	384.40	-47.20
2016		76.88	76.88		384.40	384.40
2017		76.88	76.88		384.40	384.40
2018		76.88	76.88		384.40	384.40
2019		76.88	76.88		384.40	384.40
2020		76.88	76.88		384.40	384.40
2021		76.88	76.88		384.40	384.40
2022		76.88	76.88		384.40	384.40
2023		76.88	76.88		384.40	384.40
2024		76.88	76.88		384.40	384.40
2025	431.60	76.88	-354.72	431.60	384.40	-47.20
2026		76.88	76.88		384.40	384.40
2027		76.88	76.88		384.40	384.40
2028		76.88	76.88		384.40	384.40
2029		76.88	76.88		384.40	384.40
2030		76.88	76.88		384.40	384.40
2031		76.88	76.88		384.40	384.40
2032		76.88	76.88		384.40	384.40
2033		76.88	76.88		384.40	384.40
2034		76.88	76.88		384.40	384.40
2035	431.60	76.88	-354.72	431.60	384.40	-47.20
NPV	193.80			4,508.05		
Average annual NPV	9.2			214.70		

*Values are in millions of euro. Source: elaboration by Steer Davies Gleave*

### Gap 7: Varied access charges

Additional benefits from addressing Gap 7 have not been quantified, in that we expect minor economic impacts from actions in this area.

## Gap 5 and 8 to 12: the harmonisation of technical aspects

The full benefits deriving from the complete renewal of the entire European railway network would only eventuate once the system as a whole is harmonized, as intermediate changes create much smaller benefits given that legacy systems would continue to be needed on the ground and on rolling stock to guarantee continued operation of the railway.

However, actions can only reasonably be taken through intermediate steps. These actions create obligations that need to be met in the short term (through changes in rules or regulations) but are only implemented fully in the long term. Below we identify which benefits can be achieved in the short term (2015 to 2035); a longer term view (from 2035 onwards) would probably provide greater benefits.

### *Installation of ERTMS on rolling stocks*

The removal of wider technical barriers will reduce costs for operators. Benefits could arise from the installation of only one signalling system on those vehicles operating cross-border services. In order to estimate the potential benefits related to these actions, we have set a number of methodological assumptions:

- Based on UIC data (2012), the Europe-wide fleet that need signalling systems can be approximated to 60.000 vehicles;
- The percentage of such fleet that requires ERTMS installation for cross-border services can be estimated in the range of 5% to 15%;
- The cost of installation of ERTMS equipment varies between €200,000 and €400,000;
- On-board signalling costs could fall by as much as 75% for cross border installation and 50% in terms of authorisation.

The total benefit of cross border installation of ERTMS has to be divided over twenty years to obtain the value of each annual benefit. As shown in the following table, the resulting NPV of installing only one system on vehicles operating cross-border services can be estimated in the range of €200 million to €1.3 billion over the 2015-2035 period for the EU as a whole. Note that this is a very high level estimate and requires verification through a detailed impact assessment.

Given that some ERTMS deployment plans go well beyond 2035, full, network wide, installation could increase this value further. In the longer term period (where the full benefits could be better extracted) the benefits could be between 50% and 100% higher than the figure above, potentially giving an NPV of between about €300 million and €2.5 billion after 2036.

**TABLE A.34: ANNUAL NET BENEFITS AND NPV, ERTMS**

Scenario		Low	High
Europe-wide fleet		60,000	60,000
% of vehicles needing ERTMS' installation		5%	15%
Cost of ERTMS' installation		€ 200,000	€ 400,000
Cost saving		50%	50%
2015-2035	Total benefit (€ million)	300	1,800
	Annual benefit (€ million)	15	90
	NPV (€ million)	200	1,300
	Average annual NPV (€ million)	10	62
2036-2056	Annual benefit (50% – 100% more than before)	22.5	180
	NPV (50%-100% more than before) (€ million)	300	2,500
	Average annual NPV (€ million)	7	60

Source: Steer Davies Gleave elaboration

#### *Replacement of rolling stocks*

Other additional benefits could come from the standardization of rolling stocks. As in the previous case, a series of assumptions is needed in order to obtain an estimate of such benefits' size:

- We assume that between 20% and 30% of all rolling stocks operating in Europe will need to be replaced between 2015 and 2035;
- Cost range for the replacement of a single rolling stock can be assumed between €5 and €7 million;
- Cost reduction resulting from reduced design costs – as part of the standardization process – is assumed to be equal to 10%.

As shown in the following table, over the 2015-2035 time horizon, the NPV benefit resulting from standardization of rolling stocks at European level can be estimated to be between €4.0 billion and €8.9 billion. Note that this is a very high level estimate and requires verification through a detailed impact assessment.

As per the ERTMS point above, in the longer term, the benefits of standardisation increase further as more rolling stock is replaced. As such, the benefits post 2036 could also be between 50% and 100% higher leading to potential savings in NPV terms of between €6 billion and €17.5 billion.

**TABLE A.35: ANNUAL NET BENEFITS AND NPV, ROLLING STOCKS**

Scenario		Low	High
Europe-wide fleet		60,000	60,000
% of rolling stock for which replacement is needed		20%	30%
Cost of a single rolling stock (€ million)		5	7
Cost savings from reduced design costs		10%	10%
2015-2035	Total benefit (€ million)	6,000	12,600
	Annual benefit (€ million)	300	630
	NPV (€ million)	4,200	8,900
	Average annual NPV (€ million)	200	424
2036-2056	Annual benefit (50% to 100% more than before)	450	1,300
	NPV (50% to 100% more than before) (€ million).	6,300	17,700
	Average annual NPV (€ million)	150	421

Source: elaboration by Steer Davies Gleave

### Infrastructure

We identified the main identifiable benefit relating to infrastructure as being the benefit from the deployment of ERTMS across the network. This analysis was based on the following high level assumptions:

- Europewide revenue per annum of infrastructure managers ranges from €13 billion to €17 billion<sup>30</sup>.
- ERTMS (level 2) can provide capacity benefits of up to 20%
- The capacity benefits can be achieved only in 50% of the upgrades
- Only 50% of the additional capacity is then sold per annum

Annual benefits amount to between €0.65 billion and €0.85 billion from 2035.

### Operations

In relation to operations, the main calculated benefit is likely to come through reduced training costs as identified in the main report. Our calculations in this area are based on the following assumptions:

- Total staff employed in the rail sector across the EU: €1.1 million
- Driving staff is likely to between 5% and 15% of the above number
- Between 5% and 15% of driving staff travel on international services
- Training costs range between €20,000 and €40,000 per person
- The language elements of these training courses are about 20%

Bringing these assumptions together leads to potential one-off savings of between €11 million and €194 million.

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<sup>30</sup> Estimate based on the access charge revenue of the major infrastructure managers and considering the total length of the European rail network.



## Road

This section includes a quantitative review of the main costs of not having a single European market in the road sector based on the understanding of the gaps identified.

For Gaps 1 to Gap 3, this quantitative analysis has been developed in two separate steps:

- Definition of a baseline for each case study gap.
- Definition of a “Full Europe” scenario where the desired benefits from the completion of the single market can be achieved.

For the remaining gaps, the analysis has been based on the review of existing literature, whose reference are reported below.

### **Gap 1-2 and 3: Completing market opening in road, harmonisation of social standard and enforcement of rules**

The evaluation of the measurable benefits that could be generated by further liberalisation in the road freight sector has been computed by taking into account the improved efficiency that could be achieved by the reduction of empty runs expected from a more integrated market against a baseline scenario reflecting current trends.

In order to do this we have computed the amount of vehicle-kms of freight transport that we estimate could be saved thanks to the presence of open competition across the EU over the 2015-2035 period and computed the potential savings by multiplying the figures obtained by the unit cost of freight vehicle-km.

As shown below two scenarios – Scenario A and Scenario B - have been developed: they differ only for different hypothesis on the expected level of reduction of empty runs (high reduction for Scenario A and low reduction for Scenario B) that could be achieved by a more efficient market.

Overall we estimate that the full liberalisation of the road freight transport market could lead to a NPV benefit in the range of €50-€90 billion over the 2015-2035 period, corresponding on average to a 2% improvement with respect to the baseline scenario.

Two points have to be made on these figures. Firstly, to avoid double counting with the figures presented in other sections of the report, the estimates calculated here focus only on the economic gain expected from the reduced operating costs of the road sector and do not account for external costs such as environmental benefits or safety improvements that could result as a consequence of reduced kilometres travelled by freight lorries on EU roads.

Secondly, although the increased competition could lead to labour cost reductions in the short term – driven by an increased amount of transport operations undertaken by operators based in the EU12 Member States – as we expect that the wage levels of drivers based in the EU12 MS will level out with those of drivers based in the EU15, we have assumed that no variation in labour costs, and consequently in transport costs, would occur over the 2015-2035 period. We believe this assumption to be conservative but realistic as we consider that a full liberalisation of the road freight transport could occur

only after further harmonisation of social standards, social security systems and wage levels: we expect these actions to accompany the liberalisation process and be followed in the short term along with deeper and more standardized enforcement of existing rules across the EU.

Finally, we have taken into account the potential costs related to the implementation of the measures that would need to accompany the liberalisation process by reducing the expected potential benefits by 7% in each of the two scenarios estimated, as shown in the table below.

**TABLE A.36: POTENTIAL ANNUAL NET BENEFIT FROM FURTHER MARKET OPENING, HIGHER HARMONISATION OF SOCIAL STANDARDS AND DEEPER ENFORCEMENT OF EXISTING RULES**

Year	Scenario A expected reduction empty runs (bil veh-km)	Scenario B expected reduction empty runs (bil veh-km)	Scenario A expected annual savings (€ bil.)	Scenario B expected annual savings (€ bil.)
2015	0.97	0.54	1.70	0.94
2016	1.30	0.72	2.30	1.28
2017	1.65	0.92	2.91	1.61
2018	2.01	1.11	3.53	1.96
2019	2.37	1.32	4.18	2.32
2020	2.75	1.53	4.84	2.69
2021	3.12	1.73	5.49	3.05
2022	3.50	1.94	6.16	3.42
2023	3.86	2.14	6.79	3.77
2024	4.22	2.35	7.44	4.13
2025	4.60	2.55	8.09	4.49
2026	5.02	2.79	8.83	4.91
2027	5.45	3.03	9.58	5.32
2028	5.88	3.26	10.34	5.75
2029	6.31	3.51	11.11	6.17
2030	6.75	3.75	11.88	6.60
2031	7.19	4.00	12.66	7.03
2032	7.64	4.24	13.44	7.47
2033	8.09	4.49	14.24	7.91
2034	8.55	4.75	15.04	8.36
2035	9.02	5.01	15.87	8.82
NPV 2015-2035			96.86	53.81
Average annual NPV 2015-2035			4.61	2.56
NPV 2015-2035 (net of costs to implement the measures)			90	50
Average annual NPV 2015-2035 (net of costs to implement the measures)			4.29	2.38

Source: elaboration by Steer Davies Gleave.

## **Gaps 4 & 5: Vehicle standards: maximum weights and dimensions of road vehicles, & cleaner, safer and more intelligent vehicles**

### *Improved design of Heavy Good Vehicles*

The evaluation of the benefits that could be obtained from an improved design of Heavy Good Vehicles is based on the results set out in the European Commission in the Impact Assessment<sup>31</sup> accompanying the Proposal for a Directive of the European Parliament and of the Council amending Council Directive 96/53/EC laying down for certain road vehicles circulating within the Community the maximum authorized dimensions in national and international traffic and the maximum authorized weights in international traffic.

The Commission estimates that the preferred policy option could lead to an improvement of the carbon footprint of 27 million tonnes per year for trailers – corresponding to about € 540 million per year - and might also have a high positive effect on road safety (between 300 to 500 less fatalities per annum) with a better designed tractor unit – which would correspond to a gain in the order of €470 – €670 million per year to the EU as a whole.

### *Cleaner vehicles*

The potential impact generated by the introduction of cleaner road vehicles has been estimated by reporting the findings of a study<sup>32</sup> recently carried out by the Institute for Technology Assessment and Systems Analysis (ITAS) and the Karlsruhe Institute of Technology (KIT) for the Science and Technology Options Assessment unit of DG Internal Policies of the EU Parliament. The study shows that the introduction of cleaner vehicles across all transport modes has, by 2050, the potential to lead to a consumption of 117 million toe/year and a production of 265 million tonnes of CO<sub>2</sub> per year (112 of which attributable to car fleets), which corresponds to a reduction of 45% and 75% (35% for cars) of energy consumption and CO<sub>2</sub> production, respectively, compared to the “business as usual” scenario identified in the study.

It is important to note that the feasibility of this scenario is challenged by the number of technological improvements that are foreseen in the recourse to cleaner fuels and propulsion technologies, lightweight construction, efficient design of vehicles etc. We estimate that the reduction in emissions foreseen in this study would lead to an overall abatement of 5,052 million tonnes of CO<sub>2</sub> over the 2015-2035 period; a figure that, considering an average external cost of € 20 per tonne of CO<sub>2</sub> emission, would result in a NPV gain of up to €60 billion over the same time horizon. However, it must be pointed out that these figures do not take into account the costs associated to the implementation of the actions needed to achieve this scenario, nor other economic and social impacts related to it.

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<sup>31</sup> SWD(2013) 108 final, Brussels 15, April 2013.

<sup>32</sup> European Parliament (2013). Eco-efficient transport.

**TABLE A.37: POTENTIAL ANNUAL NET BENEFIT FROM CLEANER VEHICLES**

Year	CO <sub>2</sub> emissions baseline scenario (mil ton)	CO <sub>2</sub> emissions “clean vehicles” scenario (mil ton)	CO <sub>2</sub> emissions difference (mil ton)	Economic value (€ mil)
2015	911	870	41	820
2016	916	857	59	1,179
2017	920	843	77	1,535
2018	925	830	94	1,887
2019	929	818	112	2,235
2020	934	805	129	2,580
2021	937	788	149	2,978
2022	939	771	168	3,369
2023	942	754	188	3,753
2024	944	738	207	4,130
2025	947	722	225	4,500
2026	949	697	252	5,032
2027	951	674	277	5,548
2028	953	651	302	6,047
2029	955	628	327	6,531
2030	957	607	350	7,000
2031	960	586	374	7,479
2032	963	566	397	7,944
2033	967	547	420	8,396
2034	970	528	442	8,834
2035	973	510	463	9,260
NPV 2015-2035				60,519
Average annual NPV				2,882

Source: elaboration by Steer Davies Gleave on European Parliament (2013). *Eco-efficient transport*.

Further details on the methodology adopted and the scenarios elaborated by this study can be found in the report “Eco-Efficient Transport - Interim report on Scenarios for eco-efficient transport futures” published in September 2013.

### **Gap 8 & 9: Road safety: technology and vulnerable users**

To estimate the potential gains that could be achieved by a substantial improvement of road safety performance across the EU we have computed additional lives that would be saved following the long term goal of achieving zero road deaths in the EU indicated in the EU Transport White Paper was met by 2040. If actions were taken to achieve that challenging target, we estimate that about 164,000 additional lives could be saved compared to a situation where current road deaths diminish at the pace registred in recent years. Taking into account a value of statistical life in the order of €1,350 mil.<sup>33</sup>, this

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<sup>33</sup> This estimate values human costs in road crashes on the basis of the values recommended by Bickel, P. et al (2006) ‘HEATCO deliverable 5. Proposal for harmonised guidelines.’ EU-project

would result in a NPV benefit of about €150 billion over the 2015-2035 period. It must be pointed out though that these figures are merely indicative of the size of potential benefits that could be achieved; they do not take into account the costs of the measures needed to be implemented to achieve such a target nor other positive impacts that could be expected by the reduction of serious and other injuries or from accident damage.

**TABLE A.38: POTENTIAL ANNUAL NET BENEFIT FROM ZERO VISION ROAD SAFETY TARGET**

Year	Estimated road deaths baseline scenario	Estimated zero road deaths vision by 2040	Difference	Economic value (€ mil)
2015	22,531	22,531		
2016	20,974	16,545	- 4,429	5,979
2017	19,524	12,149	- 7,375	9,956
2018	18,175	8,922	- 9,254	12,492
2019	16,919	6,551	- 10,368	13,997
2020	15,750	4,811	- 10,939	14,768
2021	14,695	3,533	- 11,163	15,069
2022	13,711	2,594	- 11,117	15,008
2023	12,793	1,905	- 10,888	14,699
2024	11,936	1,399	- 10,537	14,225
2025	11,137	1,027	- 10,110	13,648
2026	10,391	754	- 9,637	13,010
2027	9,695	554	- 9,141	12,341
2028	9,046	407	- 8,639	11,663
2029	8,440	299	- 8,142	10,991
2030	7,875	219	- 7,656	10,335
2031	5,968	161	- 5,807	7,840
2032	4,523	118	- 4,405	5,946
2033	3,428	87	- 3,341	4,510
2034	2,598	64	- 2,534	3,421
2035	1,969	47	- 1,922	2,595
NPV 2015-2035				150,953
Average annual NPV				7,188

Source: elaboration by Steer Davies Gleave.

### **Gap 10 & 11 & 12: Environmental sustainability: subsidiarity, policy coordination and promoting shift towards more sustainable modes of transport**

#### *Modal shift towards more sustainable modes of transport*

The study undertaken for the Institute for Technology Assessment and Systems Analysis (ITAS) and the Karlsruhe Institute of Technology (KIT) mentioned above estimated that if EU and national policies focused on modal shift towards more sustainable modes of transport, the car modal share could be reduced from 70% in 2010 to 58% in 2050 and the share of trucks be equal to 50% in the 2050s, against a 57% share in the reference scenario.

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developing harmonised European approaches for transport costing and project.

This would lead to a reduction of energy consumption of 53% with respect to the reference scenarios, equalling a total production of 152 million tonnes/year, an outcome that would be accompanied by a reduction of 69% in CO<sub>2</sub> emissions. We estimate that the reduction in emissions driven by the radical change in modal shift foreseen in this scenario would lead to an overall abatement of 6,957 million ton of CO<sub>2</sub> over the 2015-2035 period; a figure that, considering an average external cost of €20 per tonne of CO<sub>2</sub> emission, would result in a NPV gain of up to €85 billion over the same time horizon. However, it must be pointed out that these figures do not take into account the costs associated to the implementation of the actions needed to achieve this scenario, nor other economic and social impacts related to it.

**TABLE A.39: POTENTIAL ANNUAL NET BENEFIT FROM MODAL SHIFT**

Year	CO <sub>2</sub> emissions baseline scenario (mil. tonnes)	CO <sub>2</sub> emissions “clean vehicles” scenario (mil. tonnes)	CO <sub>2</sub> emissions difference (mil. tonnes)	Economic value (€ mil.)
2015	911	827	84	1,680
2016	916	802	114	2,277
2017	920	777	143	2,859
2018	925	753	171	3,427
2019	929	730	199	3,980
2020	934	708	226	4,520
2021	937	684	253	5,056
2022	939	660	279	5,575
2023	942	638	304	6,078
2024	944	616	328	6,567
2025	947	595	352	7,040
2026	949	577	372	7,441
2027	951	559	392	7,831
2028	953	542	411	8,211
2029	955	526	429	8,580
2030	957	510	447	8,940
2031	960	498	462	9,238
2032	963	487	477	9,531
2033	967	476	491	9,819
2034	970	465	505	10,102
2035	973	454	519	10,380
NPV 2015-2035				85,820
Average annual NPV				4,807

Source: elaboration by Steer Davies Gleave on European Parliament (2013). *Eco-efficient transport*.

Further details on the methodology adopted and the scenarios elaborated can be found in the report “Eco-Efficient Transport - Interim report on Scenarios for eco-efficient transport futures” published in September 2013.



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Cost of Non-Europe Reports identify the possibilities for economic or other gains and/or the realisation of a 'public good' through common action at EU level in specific policy areas and sectors. This Cost of Non-Europe Report seeks to analyse the costs for citizens, businesses and relevant stake-holders of remaining gaps and barriers in the Single Market in transports, as well as to examine the benefits from further action in the tourism sector.

This particular study - the first in a series - focuses on the potential benefits of completing the single market in the rail and road sectors. First, it highlights what the progress has been to date in terms of legislative actions. Secondly it seeks to evaluate in a qualitative and (where possible) quantitative manner the impact of filling the remaining gaps in legislation. The study focuses, in particular, on those areas where liberalisation has started but has not been completed, and those where markets are not functioning effectively – that is, where legislation is not currently being envisaged, but where it is likely that intervention will be needed in future.

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