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Introduction

The United Nations Economic Commission for Europe (UNECE) is one of the five regional commissions of the United Nations. It is the forum where the countries of western, central and eastern Europe, central Asia and North America – 56 countries in all – come together to forge the tools of their economic cooperation. That cooperation concerns economics, statistics, environment, transport, trade, sustainable energy, timber and habitat. The Commission offers a regional framework for the elaboration and harmonization of conventions, norms and standards. The Commission's experts provide technical assistance to the countries of south-east Europe and the Commonwealth of Independent States. This assistance takes the form of advisory services, training seminars and workshops where countries can share their experiences and best practices.

The objective of sustainable development is to maximise welfare, and provide a sound economic, social and environmental base for both present and future generations.

Each UNECE country recognizes that transportation is an important tool to help meet overall sustainability objectives. Attributes of sustainable transport follow from the expanded definition of sustainable development - sustainable transport is safe, high quality, and accessible to all; ecologically sound; economical; and a positive contributor to regional development. Specific goals for sustainable transport may include improved service quality and quality of access to goods and services, safety, improved air quality, noise reduction, improved water quality, protection of habitat and open space, historic preservation, reduced carbon emissions, increased social equity, economic development, and a satisfying quality of life, as well as local goals consistent with the overall objective.

There is clear evidence that a comprehensive and high-performing transport system is an important enabler of sustained economic prosperity: a 5 per cent reduction in travel time for all business and freight travel on the roads could generate around £2.5 billion of cost savings – some 0.2 per cent of GDP¹. In UNECE member countries transport sector contributes up to 10% of gross domestic product (GDP) and provides mobility, prosperity and jobs.

Traditionally, new connections have played a pivotal role in periods of rapid economic growth in many economies, but in mature economies with well-developed transport networks it is transport constraints that are most likely to impact upon a nation's productivity and competitiveness. Transport corridors are the arteries of domestic and international trade, boosting the competitiveness of imports and exports. Transport networks support the productivity and success of urban areas by getting people to work, providing access to other services, supporting labour markets and allowing businesses within the area to reap the benefits of agglomeration.

Mobility is critical to development. Increasing mobility is associated with economic growth and development: - it connects people to jobs, markets and essential services. It enables businesses to contribute to development, by serving new markets and unlocking new resources. It reduces the trade barrier effect of costly and unreliable transport, enabling poor regions and nations to become more competitive. Transport and mobility are now high on many agendas as countries and regions across the world seek to increase mobility and to lessen the negative impacts of transport. Urban areas, in particular, face today the challenge of making transport sustainable in environmental (CO₂, air pollution, noise) and competitiveness (congestion, other efficiency shortcomings) terms while at the same time addressing social concerns. Urban mobility is also a central component of long-distance transport. Most transport, both passengers and freight, starts and ends in urban areas and passes through several urban areas on its way. Urban areas need to provide efficient interconnection points for transport network and offer efficient 'last mile' transport for both freight

¹ The Eddington Transport Study, The case for action: Sir Rod Eddington's advice to Government, December 2006, Crown copyright 2006

and passengers. They are thus vital to the competitiveness and sustainability of future transport system.

This paper outlines key UNECE contributions and reviews progress towards the development of more sustainable transport system and policies in the UNECE region. From sustainability point of view, inland transport in the UNECE region continues to face numerous challenges:

Infrastructure: Road and rail networks are not adequate, coherent, interoperable and integrated. Inland waterways represent a market opportunity yet to be fully explored, while intermodal transport has not been exploited to its full potential.

Border crossing: Crossing borders has always been a challenge, but current crossing times in many parts of the UNECE region – by truck or train – are too frequently too long. The main barriers are unnecessarily complex control procedures, inadequate infrastructure and lack of skilled personnel. The difficulties at borders translate into lost time, inefficient use of capital, enhanced security risks, unnecessary inventory costs and higher social costs of transport workers and residents of border regions.

Transport and trade facilitation: Transport and trade facilitation reduces the transaction costs and complexity of international trade by making the processes more transparent, efficient and cost-effective. However, it is an area of bipolar world of costs and benefits: measures introduced by one country may serve the interest of other countries; it can truly be beneficial for all only in multi-lateral frameworks.

The environment: Transport is a source of air pollution, particularly in urban areas. Noise caused by road and rail transport generates nuisance and health hazards. Introduction of cleaner vehicles and fuels as well as less noisy engines has reduced air pollution and noise in some UNECE countries. Emissions from the transport sector are significant and growing contributor to the overall greenhouse gas emissions in Europe. Emissions impact on long-term economic growth by contributing to global climate change. Transport will therefore need to play an important role in an economy-wide response to that challenge. The results are promising, but much more remains to be done.

Intelligent transport systems: Intelligent transport systems (ITS) integrate information and communication technology with transport infrastructure, vehicles and users. A growing number of UNECE members are intensively developing and implementing intelligent transport systems in various transport areas. At the same time, low income countries of UNECE may be handicapped not just by the poor infrastructure network, but they will have to face the consequences of a new digital divide unless they manage to accelerate their development in this field as well.

Road safety: There are still too many road traffic deaths and injuries in the UNECE region. Governments have a primary role in creating safe road traffic conditions. Quantifying the road safety problem through reliable national statistics and research is essential.

In addition to challenges mentioned above, the negative effects of transport include congestion, landscape degradation and other harmful health effects, particularly in urban areas.

This calls for internationally harmonized regulatory and technical measures and policies as well as for the change in behaviour to ensure that transport system provides for personal mobility today and serves also future generations. At the same time, transport must ensure the efficient and secure functioning of economies and international trade which are the foundations of prosperity, without becoming a burden on humans and the environment.

The UNECE intergovernmental machinery in transport (Inland Transport Committee) and the international legal instruments administered by it in the fields of vehicle construction, transport of dangerous goods, road, rail, inland water and intermodal transport and logistics and road traffic safety work towards this goal by setting international standards and targets for more efficient, clean, safe and affordable inland transport in the region.

The UNECE transport work has been based on the mandate to facilitate the international movement of persons and goods by inland transport modes and improve competitiveness, safety, energy efficiency and security in the transport sector taking into account environmental protection to levels that reduce adverse environmental impact of transport activities and contribute effectively to sustainable development.

Supporting sustainable development aims at addressing economic, social and environmental sustainability of transport development. In this regard UNECE offers the multilateral regulatory framework as well as the forum for exchange of know-how and best practices on transport infrastructure and services that:

- provide **access** to individuals (access to work, access to basic services, like health, education) and to societies (access to markets)
- are **affordable** (subsidies, public service obligations, socio-economic analysis of investment decisions),
- are **safe** (special attention to road safety), and
- are **environmentally** friendly (promoting modal split improvements, limiting local pollutions, CO2 emissions, noise).

The following table gives a snapshot review of the main activities of UNECE²:

	Legal Instruments and standards	Analytical work and Capacity building	Governance structure: working parties
Access	Infrastructure agreements: AGC, AGTC, AGR, AGN Border Crossing Facilitation: TIR Convention, Harmonisation of Border Crossing Procedures Convention Trade facilitation : UN Centre for Trade Facilitation and Electronic Business (UN/CEFACT) UN Electronic Data Interchange (UN EDIFACT) Trade standards	Support to investment planning at regional level: - Euro-Asian Transport Linkages Project - Trans-European Railways project - Trans-European Road project Support to Land-locked developing countries Ports and their hinterland connection	ITC ³ / Transport Economics working party (WP.5) ITC/ Customs and transport (WP.30) CEFACT Committee Trade Committee

² This table includes only those programs that are most relevant with regard to sustainable development of transport

³ ITC: Inland Transport Committee of the UN Economic Commission for Europe

	Legal Instruments and standards	Analytical work and Capacity building	Governance structure: working parties
Affordability		<p>Methodological bases/ analytical work:</p> <ul style="list-style-type: none"> - socio-economic analysis of transport investments - common criteria on identification of bottlenecks, missing links, quality of service <p>Capacity building in PPPs in infrastructure development</p>	<p>ITC/ Transport Trends and Economics WP.5</p> <p>Committee on Economic Competition and Innovation (CECI)</p>
Safe transport	<p>Conventions on road traffic and road signs and signals (Vienna Conventions)</p> <p>The European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR),</p> <p>European Agreement Concerning the International Carriage of Dangerous Goods by Inland Waterway (ADN),</p> <p>International Carriage of Dangerous Goods by Rail (RID)</p> <p>European Code for Inland Waterways (CEVNI)</p> <p>Recommendations on tunnel safety</p>	Road safety target setting project	<p>ITC/ Road Safety Forum (WP.1)</p> <p>ITC/Working parties on dangerous goods transport</p> <p>ITC/ Inland Waterway transport (SC.3 and WP.3)</p>
Environmentally friendly transport	Vehicle regulations	<p>UNDA Project: Facilitating climate change adaptation in transport through addressing the energy-environment linkage</p> <p>THE PEP conferences and workshops addressing environmental and health aspects of transport</p>	<p>ITC / World Harmonization Forum on Vehicle Construction (WP.29)</p> <p>ITC / Intermodal transport and logistics (WP.24)</p> <p>THE PEP</p>

Trends in the UNECE region

In the last two decades, the UNECE region has passed through remarkable and profound changes. In Western Europe, further integration of new countries in the EU has brought together 27 European nations in a common economic area with direct impact on their economies with consequences for

developments in the transport sector. Transport policies have been more closely governed and developments more coordinated. There are still notable variations in trends from country to country, primarily due to historical reasons as well as to a different length of membership in the EU. During this period most EU countries have experienced an economic growth which has led to higher levels of prosperity and welfare but also to environmental and health problems. Transport has substantially contributed to both effects. These countries are now generally endowed with a very developed road infrastructure in which road sector has predominance over rail and other inland transport modes. Railways are regaining some market share, albeit very slowly.

In Central and Eastern as well as South-east Europe, Caucasus and Central Asia, historical developments and decades of economic stagnation and environmental neglect have left them in challenging situation. Transition process initiated two decades ago has led to a healthier economic situation in some and to an increased awareness of environmental problems in most of them. However, new political realities manifested by new borders and obstacles to smoother and efficient transportation, have had significant repercussions for their access to markets and competitiveness. This is a particularly worrying development as these countries developed extensive rail networks. Their existing road network leaves a lot to be desired, especially against the backdrop of the fast level of motorization and car ownership which accompanies slow but growing economic prosperity. Evolution of the transport sector and the shift towards less environmentally friendly transport modes compounded with rapid growth in other sectors has aggravated their environmental problems as well as the road safety situation.

International freight and passenger transport in particular, have increased steadily and have made considerable contribution to economic growth in Europe. There has been extensive building of new roads and motorways across Europe, with the overall length of motorways in the European Union-25 (EU-25) growing by 41 per cent between 1990 and 2003. In the 10 countries which acceded to the EU in 2004, this growth was more pronounced, at 75 per cent during the same period. Some levelling off has taken place since then, but to achieve an integrated transport system more or less on the same level continues to require more investments in the new EU Member States. In Eastern Europe, Caucasus and Central Asia (EECCA) and South-Eastern Europe (SEE), the length of newly constructed motorways was even more remarkable, at 144 per cent and 157 per cent respectively.

In the EU, the volume of passenger and freight transport has more than doubled over the past 25 years. Road transport is becoming more important also in EECCA and SEE countries. Between 1995 and 2005, passenger transport in the EU-25 grew by an annual average rate of 1.8 per cent and freight transport by 2.8 per cent, while gross domestic product (GDP) grew by an average rate of 2.3 per cent in the same period. Conversely, passenger transport in EECCA and SEE declined sharply during the 1990s. Since 2000, however, while the number of vehicles has steadily grown, passenger and freight transport have picked up and reversed the downward trends. Freight transport is also recovering and freight volume is increasing, leading to increase of traffic congestion, especially in urban areas. Road transport volumes and the number of road vehicles are expected to grow further in the next decades.

The use of public passenger transport (rail, buses and coaches) in EECCA countries experienced a substantial decline between 1990 and 2000, and subsequent recovery has been weak in most countries. A key factor behind the inability of public transport to recover from the decline of the 1990s has been the decrease in funding levels that many public transport systems in EECCA and SEE have experienced in the past years. The use of private cars for transport has increased significantly over the last decade. However, the level of private car ownership, below 180 cars per thousand population in all EECCA countries, and below 290 in SEE, is still much lower than the typical values of 400 to 600 in Western Europe.

These transport developments have significant consequences on [environmental and health situation](#)⁴ in some parts of Europe. Although authorities in many European countries are realizing severity of the situation concerning the state of environment and health of their population, more national efforts and assistance by international community is needed to ensure that future transport systems are developed on a sustainable basis. At this point in time, transport sector faces other numerous challenges.

Rapid development of global trade in recent decades has been largely made possible through advances in transport and communications infrastructures and the simplification of the process and procedures in international trade and transport. For example, advances in trade and transport techniques such as unitisation, and particularly containerization first in sea borne trade and then in related infrastructure improvements of inland connections and by now in all modes of transport, together with IT based developments in supply chain and logistics management have greatly reduced the cost of bringing goods to markets. Simplification (and elimination where possible) of international trade procedures, including trade documents and development of electronic information exchange techniques, have greatly reduced the costs of international trade.

At the same time, process of globalization has created new challenges for almost all UNECE countries. Countries which were able to offer, *inter alia*, competitive transport services and good quality transport infrastructure were able to benefit more from the growing trade and from migration of production facilities. Countries situated along major transit routes would also be able to benefit from increasing volume of trade and movements of goods and people, particularly between Europe and Asia if favourable transit conditions are introduced. Deficiencies in infrastructure, as well as problems related to complex and time consuming border crossing procedures, prevented many transit countries in the UNECE region to benefit from newly created opportunities occurring with the globalization. With a growing trade between Asia and Europe, the quality and efficiency of a national transport system became important and determining factor of the capacity to fully engage in international trade and benefit from more intensive transport flows. Provided that their national transport system was well integrated and capable to respond to new demand patterns, transit position of certain countries became strategically important for their economic development and significant source of revenues.

The economic downturn in the UNECE region has impacted all inland transport modes. Freight transport services declined more than GDP while passenger traffic decreased less. The automotive manufacturing sector was hit hard in Eastern Europe and North America by falling consumer and business demand for motor vehicles. State aid in the form of car scrapping schemes helped to preserve sales and production in Western Europe. Transport infrastructure investment has been accelerated by governments with fiscal space but fell rapidly in countries that had to pursue fiscal consolidation.

Achievements

Access – Transport Infrastructure Development

Infrastructure agreements, TEM, TER and Euro-Asian Transport Links project

Infrastructure agreements managed by the UNECE cover road, rail, inland waterways, and combined transport. These agreements are to strengthen relations between the UNECE countries through

⁴ See Transport, Health and Environment: Trends and Developments in the UNECE-WHO European Region (1997-2007)

coordinated plans for the construction and development of their transport infrastructure of international importance. They provide for the technical conditions the transport infrastructure should confirm to be part of the international network and to get a number, an “ID” in the network. Thus these agreements ensure that the international transport infrastructure in this network looks and is more or less the same on the whole continent, i.e. from the Atlantic to the Pacific. They are legally binding for the States who become Contracting Parties. There are six major international infrastructure agreements:

- The declaration on the Construction of Main International Traffic Arteries, of 16 September 1950
- The European Agreement on Main International Traffic Arteries (AGR), of 15 November 1975, which resulted in E roads network
- The European Agreement on Main International Railway Lines (AGC), of 31 May 1985 and its Annex 1;
- The European Agreement on Important International Combined Transport Lines and Related Installations (AGTC), of 1 February 1991
- The Protocol on Combined Transport on Inland Waterways to the European Agreement on Important International Combined Transport Lines and Related Installations (AGTC) of 1991, of 1997
- The European Agreement on Main Inland Waterways of International Importance (AGN), of 19 January 1996

Complementing these agreements, the UNECE has been carrying out three sub-regional infrastructure projects, together with participating countries:

- The Trans European Motorways (TEM) project,
- Trans European Railways (TER) project, and
- The Euro-Asian Transport Links project

UNECE TEM⁵ and TER⁶ Projects are sub-regional co operations established respectively in 1977 and 1990 by the Governments of the Central, Eastern and South Eastern European countries. Main objectives of the projects are facilitation of road traffic in Europe among and through participating countries as well as development of a coherent and efficient international road, railway and combined transport system in the region. Projects are developed in accordance with the UNECE Pan European infrastructure agreements. TEM and TER Projects are the backbone of Pan-European Road Corridors in Central and East Europe and represent an important instrument of institutional inter-country co-operation and coordinated actions of the countries in Central, East and South-east Europe.

⁵ 15 countries from Central, Eastern and South east Europe are members of TEM [Armenia, Austria (associate member), Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Italy, Lithuania, Poland, Romania, Slovakia, Slovenia and Turkey], 4 others have an observer status [Montenegro, Serbia, Sweden and Ukraine], while Azerbaijan membership is pending, awaiting signature for accession.

⁶ 17 countries from Central, Eastern and South-east Europe are members of TER at present: Armenia, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Greece, Hungary, Italy, Lithuania, Poland, Romania, Russian Federation, Slovak Republic, Slovenia and Turkey. In addition a number of observer countries participate at certain activities of the project: Belarus, Latvia, Moldova, Montenegro, Serbia, The Former Yugoslav Republic of Macedonia and Ukraine, while Azerbaijan membership is pending, awaiting signature for accession.

The TEM and TER Master Plan, reflecting the priority transport infrastructure needs of 21 Central, Eastern, and South-Eastern European countries, was published in 2006. It identified the backbone road and rail networks in those countries and presented a realistic investment strategy to gradually develop these networks. As many as 491 projects with an aggregate estimated cost of EUR 102 billion have been evaluated and prioritized. The implementation of such an investment plan would contribute to the economic growth of the countries concerned and to the well being of their populations, as well as assisting the integration and harmonization of transport within Europe and beyond (http://www.unece.org/trans/main/tem_ter.html?expandable=99)

The Master Plan provides a useful tool and framework for intergovernmental cooperation towards coordinated development of a coherent international transport infrastructure networks in Central, Eastern and South Eastern European countries and their integration into the pan-European networks. With this Plan, TEM and TER Projects contributed to the extension of the European Union's TEN-T (Trans-European Transport Network); the practical implementation of Pan-European Transport Corridors; the promotion of intermodal operations and complementarities of transport modes. The revision of the Master Plan has already been initiated with an expected completion date in 2011.

The Euro-Asian Transport Links (EATL) project was a joint undertaking between the United Nations Economic Commission for Europe (UNECE) and the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) with designated national focal points from 18 participating countries⁷, whose objective was to identify main Euro-Asian road and rail routes for priority development and cooperation in the Euro-Asian region. Countries have also evaluated and prioritized a large number of projects along these routes. From among them 230 project in the value of \$43.4 billion. Further on, they developed a Geographical Information System (GIS) database, and made a preliminary analysis of transit transport obstacles and recommendations for reducing them. A number of national capacity-building workshops on transport facilitation were organised in the framework of the project

Recognizing the importance of further development of Euro-Asian transport links, participating countries stressed the need to continue with the project and to set up a permanent monitoring mechanism. In the same vein and in order to ensure a continuation of activities, UNECE elaborated proposal for a Phase II of the project to be implemented between 2008 and 2012. The Phase II was launched at the end of 2008.

Access – Trade and transport facilitation (TTF) – special attention to land-locked countries

The UNECE member governments include nine “landlocked developing countries” as classified by the Office of High Representative for the Least Developed, Landlocked Developing Countries and Small Island Developing States (OHRLLS). They are: Armenia, Azerbaijan, Kazakhstan, Kyrgyzstan, Republic of Moldova, Tajikistan, the Former Yugoslav Republic of Macedonia, Turkmenistan and Uzbekistan.

In general, UNECE contribution to the implementation of the Almaty Programme of Action is of two types: promotion of relevant UNECE legal instruments, norms and standards and undertaking specific APA initiatives.

⁷ Eighteen countries from the Euro-Asian region were: Afghanistan, Armenia, Azerbaijan, Belarus, Bulgaria, China, Georgia, Iran, Kazakhstan, Kyrgyzstan, Moldova, Romania, Russian Federation, Tajikistan, Turkey, Turkmenistan, Ukraine and Uzbekistan. At a later stage, Greece also joined the work.

With regard to transport and border crossing facilitation the multilateral agreements enabling international mobility of cargo, vehicles and their drivers are at the disposal of the countries. The so-called TIR Convention and Harmonization Convention are good examples of the UNECE's work in this area. The International Convention on the Harmonization of Frontier Controls of Goods (Harmonization Convention) aims to reduce the number and duration of all types of controls, be it for health reasons (medico-sanitary, veterinary, phytosanitary), for reasons of compliance with technical standards or for quality inspections in general, and is applicable to all goods in import, export or in transit. Fifty-three States and the European Community are Contracting Parties to this Convention. The Harmonization Convention also establishes commonly agreed requirements for coordinated border management. In May 2008, a new Annex 8 to the Convention came into force. This is the first time that an annex to the Harmonization Convention deals with a particular mode of transport, i.e. road transport, in recognition of the fact that the road transport industry should be considered as the main beneficiary of the facilitation measures set out in the Convention. New Annex 8 covers, inter alia, facilitation of visa procedures for professional drivers, standardized weighing operations and vehicle weight certificate, minimum infrastructure requirements for efficient border crossing points and provisions to monitor the border crossing performance. A similar annex for rail border crossing is being finalized.

The TIR Convention has proved to be one of the most effective international instruments prepared under the auspices of UNECE. While it was drawn up originally for European transport only, this system has gradually been extended to other areas in the world, including Central Asia, the Middle East, North Africa and Latin America. The TIR system applies to goods carried in road vehicles or containers, provided that at least a portion of the journey is undertaken by road. Sixty-seven States and the European Community are Contracting Parties to the TIR Convention. More than 40,000 operators are authorized to use the TIR system and around 2.5 millions TIR transports are carried out per year. In substance, the tremendous increase in the use of the TIR Customs transit system can be explained by the special features of the TIR regime which offer transport operators and Customs authorities a simple, flexible, cost-effective and secure Customs regime for the international transport of goods across frontiers. To make it even more attractive, work is continuing on the computerization of the TIR procedure, in particular the so-called e-TIR project which will provide for Customs-to-Customs information exchange as well as a system for the management of guarantee information. The TIR computerization is expected not only to facilitate goods transit operations, but also to contribute significantly to the security of the international supply chain.

In addition to transport, the UNECE has also been active in the area of trade facilitation. Trade tools created by the UNECE and its bodies such as the UN Centre for Trade Facilitation and Electronic Business (UN/CEFACT) offer many possibilities to improve the efficiency of trade. The UNECE trade standards, recommendations and tools such as: the UN Layout Key for trade documents, codes and data element directories, the only global standard for Electronic Data Interchange UN/EDIFACT, recommendations and standards on the Single Window and data harmonization, greatly enhance trade information flow and documentary controls and help cope with inefficient trade procedures and other factors impeding trade.

In order to assist its member countries to develop more efficient and integrated trade and transport practices able to address the current economic downturn, and at the same time to invest in long-term economic development, in February 2009, the UNECE Inland Transport Committee and the Committee on Trade f held a joint conference, entitled [“The Impact of Globalization on Transport, Logistics and Trade: the UNECE Work”](#). The objective of the Conference was to underline the importance of trade and transport facilitation for landlocked countries. The Conference provided an overview of the changes in global trade and transport trends affecting UNECE countries, particularly in a time of economic crisis. Among the key solutions presented were how supply chain competitiveness can help countries tap into global markets and how employing trade and transport facilitation tools can remove bottlenecks in these supply chains and, particularly, at borders.

With a more specific attention to overcoming border crossing obstacles⁸, a joint seminar was organized by the International Transport Forum, the World Bank and UNECE. Another workshop, exclusively on road transport border crossing issues and the implementation of Annex 8 to the International Convention on Harmonization of Frontier Controls⁹, was jointly organized with the Black-sea Economic Cooperation Organization in June 2009.

Access – ports and their hinterland connection

The liberalization of international trade and increasing geographical dispersion of manufacturing over the last two decades generated some unforeseen problems. Considerable pressure has been placed on port - hinterland connections, with consequent economic, environmental and social problems. In particular, inefficient hinterland links lead to increased supply chain costs and greater adverse environmental impacts.

A recent UNECE report¹⁰ examines the ways in which seaports and their hinterland connections can help to enhance supply chain performance, through the removal of bottlenecks and the improvement in the efficiency and sustainability of port hinterland links.

Despite the recent policy focus on sustainable mobility in most advanced UNECE member states, there is still tension between the efforts to promote economic growth and improve accessibility and the need to reduce the consumption of fossil fuels and the associated greenhouse gas emissions. The European Union has called for public policy to align itself with the concept of 'co-modality', defined as the optimal and sustainable use and combination of the various modes of transport, in combination with measures to fully internalise the costs of the different modes. International flows by sea and hinterland modes are a major contributor to the problem, and measures to improve hinterland flows could play an important role in reducing the environmental impacts of transport activity.

The UNECE report shows that to ensure the best use of transport infrastructure and appropriate investment targets, it is important to consider all transport activity demands, especially across strategic transport networks which link ports with their hinterlands. In considering port hinterland connections, it is imperative to consider more than just physical infrastructure.

Border crossing performance has a major influence on the functioning of hinterland flows that cross international frontiers en route to/from ports. Obstacles at border crossings have a disproportionate effect on landlocked developing countries since they do not have direct access to one or more seaports without crossing a land frontier, whereas countries with a coastline have the opportunity to develop direct shipping services.

- Examples of good practice in enhancing the efficiency and sustainability of hinterland freight movement are highlighted in the report. These good practice examples could be used as part of a toolkit of measures to be adopted in different situations and locations, as appropriate.

⁸ <http://www.internationaltransportforum.org/Proceedings/Border2009/index.html>

⁹ http://www.unece.org/trans/seminars/WP30_HarmonizationConvention_Jun09.htm

¹⁰ http://www.unece.org/trans/publications/other_hinterland.html

Affordability – Analytical work and capacity building

Identification of bottlenecks, missing links and quality of service in infrastructure networks

Inland transport infrastructure in the pan-European region continues to be provided mainly by governments at prices set well below the long-run marginal cost. Therefore, an administrative process is needed to identify bottlenecks and potential investment. A recent UNECE report ^{11/} aims to provide a methodology for the identification of bottlenecks for further analysis that would consider a range of options to remove such bottlenecks, including investment, infrastructure pricing, regulation of access, and so on.

Eminent experts have argued that international bottlenecks are likely to have causes and solutions that are different from national ones. If the bottleneck is between countries or if an internal bottleneck is mostly a problem because it reduces international traffic flows, the root cause may well be related to rivalry between states that pursue narrow national interests or the lack of an adequate international funding mechanism.

All experts agree that bottlenecks depend on prices. In other words, there will always be a price high enough for the bottleneck to disappear. For instance, fixed rail rates in Canada that do not allow for seasonal variations result in seasonal traffic congestion. In contrast, flexible rail rates in the United States remove seasonal traffic congestion.

UNECE developed a robust methodology for the identification of bottlenecks and missing links in the early 1990s, while using a pragmatic performance indicators/links profile approach. This approach leaves the task of identification to national authorities on the basis of shared and technically explicit guidelines. The methods used to identify bottlenecks are mode specific. The focus should be primarily on bottleneck identification because methodology for recognizing missing links is less well developed and because their identification is better done from an overall (pan-European) network perspective rather than link-by-link or country-by-country.

Consequently, it would be desirable to identify and rank bottlenecks by means of shadow prices, if they could be estimated with a reasonable degree of accuracy. This approach may well be feasible for highways but its viability is less obvious in the case of railways or inland waterways. In addition, the causes and remedies pertaining to international capacity bottlenecks are likely to differ from those relevant to internal bottlenecks. Last but not least, economic regulators of network industries developed pragmatic approaches to the definition of bottlenecks that might be of further interest to transport planners.

Socio-economic analysis of transport investment projects

In the pan-European region, the international transport infrastructure planning has been carried out on the basis of four major UN infrastructure agreements (AGC, AGN, AGR, AGTC) and a common UNECE methodology for the identification of bottlenecks. Data collection and the prioritization of the infrastructure investments needed to improve pan-European traffic flows and links to peripheral countries are additionally used to support the planning process. Whereas detailed planning processes take place at the national level, the UNECE process entails intergovernmental coordination within the Inland Transport Committee and its subsidiary bodies dealing with

^{11/} UNECE (2009), *A Methodological Basis for the Definition of Common Criteria regarding the Identification of Bottlenecks, Missing Links and Quality of Service in Infrastructure Networks*, United Nations, New York and Geneva (<http://unece.org/trans/doc/2009/wp5/ECE-TRANS-205e.pdf>).

infrastructure agreements, transport statistics and economics, sub-regional and interregional projects.

UNECE Governments have agreed on common methodologies for transport planning and statistics. In the 1990s cost-benefit analysis became an increasingly important planning tool for the assessment of transport infrastructure projects in North America and Western Europe. UNECE (2003) provides a set of guidelines¹² for applying cost-benefit analysis in the specific institutional context of the CIS. This contribution, based on the so-called “TINA Guidelines” developed earlier for the EU-candidate countries, is important in the sense that it presents a planning tool that can facilitate considerably the appraisal and selection of transport infrastructure projects in countries with transition economies.

The UNECE work on international networks has been based on a multi-criteria approach that complements the quantitative analysis of the available data with the qualitative evaluation of strategic and political concerns.¹³ This planning tool has been applied in three international infrastructure development projects: Trans-European Motorway (TEM) and Trans-European Railway (TER) projects of the UNECE as well as the joint UNECE-UNESCAP project on the development of Euro-Asian Transport Linkages (EATL).¹⁴ TEM and TER networks as well as Euro-Asian linkages within the ECE region coincide to a large extent with the pan-European transport corridors and axes identified by the European Commission.

The UNECE infrastructure planning tool prioritizes transport investment projects in a well defined series of steps, including the evaluation of each project according to socio-economic criteria. The underlying idea is that policy makers should have a good understanding of the social and political consequences of transport infrastructure projects in order to make informed investment decisions.

In conclusion, UNECE has contributed to the pan-European infrastructure planning process by administering major UN transport infrastructure agreements and regional projects as well as by developing operational planning tools to identify key international transport linkages and prioritize investments. The UNECE planning process includes a systematic evaluation of planned transport investment on the basis of socio-economic and sustainability criteria.

Public Private Partnerships in infrastructure development

For several years the UNECE has been active in promoting a better understanding of Public Private Partnerships (PPPs) in all fields of infrastructure development. through facilitation of networking (800 experts) information-sharing and exchange of practical experience in public-private partnerships among UNECE member States, to elaborate guides on best practices and contribute to the implementation of a capacity-building programmes for public and private sector officials from catching-up economies on this topic.

UNECE Guidebook on promoting Good Governance in PPPs: To strengthen the governance of PPPs, the UNECE has elaborated a Guidebook on Promoting Good Governance in PPPs, setting out seven principles of good governance, where environmental concerns are included. It shows how PPPs can give incentives to deliver public services in a more environmentally friendly way. It also suggests a number of action points to ensure that governments and private sector reflect on green case for

¹² Both versions are available at the website of the Working Party on Transport Trends and Economics <<http://www.unece.org/trans/main/wp5/wp5.html>>.

¹³ For a detailed description of the multi-criteria model used in UNECE infrastructure planning projects, see Tsamboulas, D. (2007), A tool for prioritizing multinational transport infrastructure investments, Transport Policy, vol. 14, pp. 11-26.

¹⁴ For details see ECE-ESCAP (2008), part V.

PPPs, such as wider dissemination best practices case studies where public service was delivered applying a PPP model and in a more environmental sensitive way and improving policy coordination between the economic and finance ministries that have usually responsibility for relevant PPP projects or programme, and environmental ministries.

Training module on PPP and sustainable development: Based on the principles set out in the Guidebook, UNECE has also developed a Toolkit on “How to do PPPs” consisting of approximately 20 training modules and covering all the issues around implementing PPP projects. Elaboration of the training module and sustainable development and including it into the UNECE PPP training and capacity-building activities for various PPP actors will help to timely address environmental sustainability.

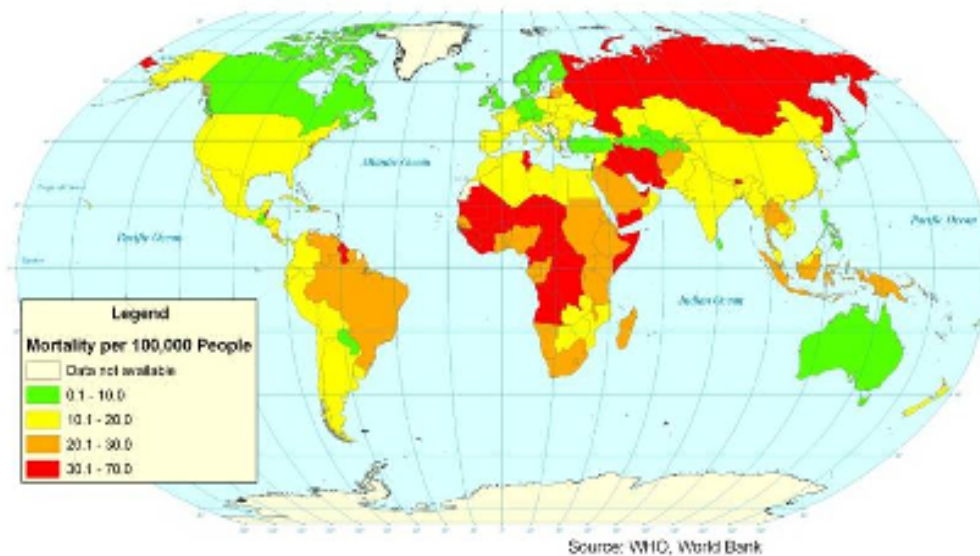
Consultations with the Governments on elaboration of pathfinder PPP projects: Within the framework of its capacity-building programme UNECE provides support to emerging PPP countries on developing pioneering projects that can generate evidence based success and further replicated.

Safe transport

Road traffic safety¹⁵

In many UNECE developed countries, the number of road crashes with fatalities and injuries reached an all-time peak level around 1970. During subsequent years, the seriousness of the situation was acknowledged and progress was made in bringing down the number of fatalities and casualties even with a further growth of mobility. While developed UNECE countries have considerably improved road safety and while there are effective programs in place, particularly in the EU countries to achieve the zero fatalities target, East European and Central Asian countries face a double-lined degradation. Their motorization level has been increasing at a fast rate, as well as local and international traffic on their territories. However, neither their transport infrastructure nor their institutions have been able to clear the development gap and to cope with the relevant safety requirements. Road safety situation in some EECCA is comparable to the worst performers globally (see the map below).

¹⁵ <http://www.unece.org/trans/doc/2008/UNECE-Transport-Review-1-2008.pdf>



Road Traffic Mortality per 100,000 People

Critical situation related to simultaneous motorization and a growing number of road fatalities, called for actions to be developed in the field of road safety. This work has become one of the key elements of the UNECE Transport division's work.

The UN Road Safety Forum (Working Party on Road Traffic Safety (WP.1)): is the only permanent intergovernmental body in the United Nations system dealing with road safety. In addition to its regulatory work, WP.1 is involved in development and promotion of best road safety practices.

The main achievements of WP.1:

- Unique set of road safety best practices contained in the Consolidated Resolutions on Road Traffic (R.E.1) and on Road Signs and Signals (R.E.2) in order to bring them in line with the dramatic developments in road safety;
- Contribution to the Road Safety Weeks including the First United Nations Global Road Safety Week, jointly organized by the World Health Organization (WHO) and the UN Regional Commissions, which took place from 23-29 April 2007. It focused on young drivers, the World Youth Assembly for Road Safety was the key global event during that week¹⁶;
- A database was set up that contains road traffic safety requirements in a number of UNECE countries, based on data transmitted by Governments. The database contains information on the legislation governing speed limits, permissible levels of alcohol in the blood and methods of control, seat belts and child restraints, wearing of helmets, use of lamps, periodic technical inspections and driving permits.

The project on "improving global road safety: setting regional and national road traffic casualty reduction targets (http://www.unece.org/trans/roadsafe/unda_conclusions.html) - has received funding of about 660,000 USD from the United Nations Development Account (UNDA) and was

¹⁶ Based on the resolution A/60/5 of the General Assembly

implemented through 2008 and 2009, by the five United Nations Regional Commissions, in cooperation with other international organizations and NGOs active in the field of road safety.

The objective of the project was to help countries with economies in transition to develop regional and national road traffic casualty reduction targets and to provide them with examples of good road safety practice that could help them to achieve the targets selected by 2015. It included organization of seminars under the auspices of each regional commission.

The most recent road safety related GA resolution 64/L.44/Rev.1* keeps the spotlight on the need for international cooperation to improve global road safety. The General Assembly resolution proclaiming a Decade of Action for Road Safety 2011-2020 (A/64/L.44/Rev.1) was tabled by the Government of the Russian Federation and cosponsored by more than 90 countries. The UNECE as a member of the UN Road Safety Collaboration welcomes this proclamation which seeks to save lives by halting the increasing trends in road traffic deaths and injuries world-wide.

Vehicle safety

Safety work of The World Forum for Harmonization of Vehicle Regulations: Among the essential improvements of vehicle safety, the World Forum (WP.29) has adopted new provisions for the mandatory installation of Brake Assist Systems (BAS) and Electronic Stability Control (ESC) systems which are major achievements in the field of active vehicle safety. Their regulatory implementation, make these technologies applicable on a worldwide scale. Furthermore, Daytime Running Lights (DRL), Adaptive Front-Lighting Systems (AFS) and contour markings for commercial vehicles are efficient technologies to also improve the active safety of vehicles (crash-avoidance). New requirements to increase passive safety of buses, like the mandatory installation of safety-belts and safety-belt anchorages as well as fire detection systems in coaches have contributed to reduce the consequences of traffic accidents.

In 2009, the World Forum finalized and adopted new provisions for Tyre Pressure Monitoring Systems (TPMS) to ensure correct inflation of tyres on the vehicle. These systems will not only improve the vehicle safety, but will also have an environmental impact through better vehicle fuel efficiency by reducing the tyre rolling resistance.

A significant percentage of the 1.3 million fatalities per year due to road crashes occur because many motorcyclists do not wear helmets while driving. While wearing a helmet correctly can cut the risk of death by almost 40%, and the risk of severe injury by 72%, The most recent amendments agreed by the World Forum regarding UNECE Regulation No. 22 (protective helmets), have resulted in one the most relevant sets of requirements for the construction of motorcycle helmets at the world level (New York Times, 6 May 2010). Since motorcycle usage is growing fast, particularly in the developing countries, adherence to the World Forum (WP.29) requirements on helmets could massively contribute to road safety improvement.

Periodic technical inspection of vehicles is required both to ensure that vehicles in operation are safe and meet the environmental standards (more on this under the environmental section).

Road safety statistics

Road traffic accidents statistics: For many years the UNECE is undertaking the regular compilation and dissemination of road traffic accident statistics in Europe and North America (<http://www.unece.org/trans/main/wp6/transstatpub.html>), a rich collection of detailed data (including on-line) relating to road traffic accidents and casualties by country, year, location, time of occurrence, road condition, nature of accident, age group and accidents under influence of alcohol

Tunnel Safety

Improvements in road infrastructure can greatly help to reduce the frequency and gravity of traffic accidents. By configuring roads so that they are user-friendly, designers can influence user behaviour.

Tunnel safety became a particularly urgent issue after the tragic accidents that took place between 1999 and 2001 in three long tunnels under the Alps. These accidents put this issue in the media spotlight, bringing political leaders and all the stakeholders into the debate.

To ensure road safety in tunnels, a number of structural, technical and organizational measures must be implemented, taking account of technical progress. Furthermore, consideration must be given to all the elements involved: road users, traffic control and emergency services, infrastructure and vehicles. A set of recommendations along these considerations was adopted in 2007 to be included in the latest Consolidated Resolution on Road Safety.

Road-Rail Level Crossings

There are still tens of thousands road-rail level-crossings all over the world. Despite all the measures taken to appropriately signal level-crossings and make them safe, many road users are killed or injured at such crossings every year. Many victims fail to observe mandatory stop lights or audible alarms or venture onto a level-crossing without first making sure that no rail traffic is approaching, or else they drive through or around the barriers or half-barriers. Contrary to what is generally thought, most accidents involve “regulars”, in particular those living near a level-crossing, as habit makes them less careful or more reckless, which may prove fatal.

UNECE member countries are already making efforts to remove level-crossings, starting with the ones where the risk is highest. This is, however, a long-term undertaking because of the cost involved and the relatively long study and implementation times.

In order to help countries in their efforts to improve safety at level-crossings, UNECE’s Road Safety Forum (the Working Party on Road Traffic Safety (WP.1)) approved in 2009 a revised set of best practices, the Consolidated Resolution on Road Traffic Safety (R.E.1), which contains a specific sub-chapter on level-crossings

Inland Water Transport Safety

In the area of inland water transport, the UNECE has been dealing with a wide range of issues, including safety. This work is accomplished in close cooperation with European Commission, River Commissions, like the Central Commission for the Navigation on the Rhine (CCNR), the Danube Commission, Sava Commission, Mosel Commission and other competent international bodies.

The Working Party on the Standardization of Technical Safety Requirements in Inland Navigation (SC.3/WP.3) assists the Working Party on Inland Water Transport in preparing amendments to pan-Europeans technical and safety requirements for inland navigation, such as European Code for Inland Waterways (CEVNI) that provides model rules for national and international legislation on rules of the road, signalling and marking of inland waterways and vessels. Similarly, UNECE Resolution No. 61 on Harmonized Europe-Wide Technical Requirements for Inland Navigation Vessels, that are compatible with those applicable in the EU, provide harmonized provisions on the recognition of ship’s certificates, on the limitation of air, water and noise pollution as well as on minimum manning requirements and on working and rest hours of crew..

Safety conditions for transport of dangerous goods.

UNECE provides the secretariat for the ECOSOC Committee of Experts on the Transport of Dangerous Goods (TDG) and on the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). It provides recommendations on classification, listing, use of packagings and tanks, their construction and approval, their marking and labelling, as well as consignment and operational procedures for international transport. These recommendations are implemented not only at country level but also through international instruments by other international organizations such as the International Maritime Organization and the International Civil Aviation Organization. UNECE ensures that these Model Regulations are reflected in inland transport legislation: ADR for road transport; ADN for inland waterways, and RID for rail. Furthermore, the European Union has aligned its legislation on classification, labelling and packaging of substances and mixtures to the GHS.

The major achievements in recent years were the adoption by UNECE, ICAO and IMO of the provisions contained in the 15th revised edition of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations, for integration into their respective legal instruments and application as from 1 January 2009; the entry into force of ADN; and the adoption of amendments to the above mentioned 15th revised edition that led to the publication of the 16th revised edition.

Environmentally friendly transport

Role of intermodal transport

At the pan-European level, UNECE is the only inter-governmental organization that contributes to internationally harmonized solutions in the field of intermodal transport infrastructures, technical minimum standards and service benchmarks. UNECE has negotiated a pan-European network of important road-rail-inland water transport lines (AGTC Agreement) and provides a forum for Government and industry experts to review the latest policy, legal and technical developments, to exchange best practices in intermodal transport and to prepare guidance on specific issues.

Work on intermodal transport also includes measures to shift freight traffic, wherever possible, from roads to railways and inland waterways to free up road capacity, to tackle congestion and to arrive at a better carbon foot-print of land transport in general. However, for most transport operations, lorries are indispensable to ensure terminal hauls and the final distribution of goods, particularly in case of consumer products. Therefore, very often rail and inland waterway transport entails trans-shipment operations using containers and other intermodal transport units that can be shifted swiftly and safely from one mode to the other.

In order to ensure that intermodal transport solutions are applicable within total logistics and transport chains, Governments have the responsibility to establish the necessary framework conditions that set a level playing field among all actors and modes of transport involved. This would then allow the industry to establish and operate seamless intermodal transport operations that are economically viable and ecologically sustainable.

In Europe, efficient intermodal transport operations are often only feasible beyond distances of 300-500 km. Thus, international cooperation and harmonized transport policies are required as the total transport chain is only as good as its weakest link.

Vehicle construction regulations and technical inspection of vehicles

The UNECE World Forum for Harmonization of Vehicle Regulations (WP.29): is the unique global forum where vehicle regulations are developed. As a regulatory body, its responsibility for "greening the transport sector" is therefore huge. 53 Countries (including the European Union) are Contracting Parties to at least one of the two United Nations (UN) Agreements on vehicle regulations (1958 and 1998 Agreements)¹⁷ and apply the vehicle regulations adopted by the World Forum (WP.29). These countries, representing the 5 Continents (almost all the European countries, USA, Canada, Japan, China, India, Korea, Thailand, Malaysia, Australia, New Zealand, South Africa, etc.), manufacture more than 80% of vehicles worldwide. Other countries (Vietnam, Philippines, Cambodia, Argentina, Brazil, Mexico, the Community of the Arab Gulf Countries, the Southern African Developing Community (SADC), the South East Asian Nations (ASEAN), etc.) are either in the process of acceding to the UN 1958 and 1998 Agreements or have shown interest in acceding to them.

Expectations towards the World Forum (WP.29)

On 28-30 May 2008, transport ministers have met in the International Transport Forum (ITF)¹⁸ held in Leipzig (Germany) to discuss the energy and climate change challenges for the transport sector, especially global warming and the emissions of Greenhouse gases. The Transport ministers addressed the need of CO₂ abatement and improved fuel efficiency in the transport sector, mainly through:

- (a) Innovative engine technologies, advanced engine management systems and efficient vehicle powertrains;
- (b) The use of sustainable bio fuels not only of the first generation (vegetable oil, biodiesel, bio-alcohols and biogas from sugar plants, crops or animal fats etc.), but of the second generation (bio fuels from biomass, non-food crops including wood) and third generation (biodegradable fuels from algae);
- (c) An improved transport infrastructure together with Intelligent Transport Systems (ITS) in order to avoid traffic congestion and to foster the use of intermodal transport (road, rail and waterways);
- (d) Consumer information (campaigns for eco-driving¹⁹, use of public transport and modal transport etc.);
- (e) Legal instruments (such as tax incentives for low carbon products and processes, taxation of CO₂ intensive products and processes, etc.).

¹⁷ The World Forum WP.29 administers the following 3 Agreements:

The 1958 Agreement concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be fitted and / or be used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, 1958

The 1997 Agreement Concerning the Adoption of Uniform Conditions for Periodical Technical Inspections (PTI) of Wheeled Vehicles and the Reciprocal Recognition of Such Inspections, 1997

The 1998 Agreement concerning the Establishing of Global Technical Regulations (gtr) for Wheeled Vehicles, Equipment and Parts which can be fitted and / or be used on Wheeled Vehicles, 1998

¹⁸ The Messages of the Ministers at the International Transport Forum can be found at:

¹⁹ An example of golden rules for eco-driving as well as additional information on this subject can be found at the website: <http://www.ecodrive.org/>

In their key messages of the International Transport Forum in 2008, transport ministers urged the World Forum WP.29 to accelerate the work to develop common methodologies, test cycles and measurement methods for light vehicles, including CO₂ emissions.

During its session in June 2008, the World Forum (WP.29) noted the results of the International Symposium on a global approach to automotive fuel economy, and at its November 2008 session, it agreed that, with regard to the abatement of global warming and the reduction of CO₂ emissions, a possible strategy for the transport sector could be:

- (a) a short term objective through an improved energy efficiency and the use of sustainable bio fuels (2015);
- (b) a mid term objective with the development and introduction into the market of plug-in hybrid vehicles (2020-2025), and;
- (c) a long term objective with development and introduction into the market of electric vehicles (2030-2040). This strategy would shift the transport sector from the use of fossil energy to the use of hydrogen and electric energy.

In this respect, the sustainable production of electricity and hydrogen would become the crucial policy issue in future discussions on global warming and on the reduction of CO₂ emissions.

With regard to the inland transport modes, the Ministerial Conference on Global Environment and Energy in Transport (MEET)²⁰ in Tokyo in January 2009 adopted a declaration according to which, for the purpose of reducing greenhouse gas emissions, countries should be encouraged to:

- (f) Improve fuel/energy efficiency of motor vehicles, railways, and domestic aircraft and ships, through approaches such as: introducing fuel efficiency or GHG emission standards and improving vehicle components, noting IEA's energy efficiency policy recommendations and its development of energy efficiency indicators; strengthening international cooperation to develop and harmonize procedures for testing fuel efficiency or measuring GHG emissions through the UNECE/WP.29 and other regional or international fora; and facilitating, as appropriate, the introduction of energy-saving equipment and advanced technologies into ports and other transport facilities;
- (g) Use strategic transport policies to reduce emissions, such as coordination of transport planning with urban spatial planning to realize, where applicable, more compact urban forms, transport demand management, enhanced modal integration, improvement of road and railway networks, and promotion of non-motorized means of travel; and
- (h) Facilitate behavioural changes, including eco-driving, the use of public transport, and, where applicable, modal shifts, taking the environmental impacts of each mode into consideration.

Furthermore, MEET agreed on the need to limit or reduce air pollutant emissions from inland transport, recognizing the fact that some countries have significantly reduced air pollutants such as carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NO_x), sulfur oxide (SO_x) and particulate matters (PM), and encouraged, in addition to the aforementioned measures, countries to:

²⁰ Ministers and relevant Representatives from: Australia; Brunei Darussalam; Cambodia; Canada; France; Germany; India; Indonesia; Italy; Japan; Republic of Korea; Lao People's Democratic Republic; Myanmar; Philippines; Russian Federation; Singapore; Thailand; United Kingdom; United States; Vietnam, and the European Commission

- (a) Review and strengthen, as necessary, their regulations on exhaust emissions from motor vehicles, railway locomotives and ships, both for new and in-use vehicles; and promote both low sulfur diesel and gasoline accordingly;
- (b) Strengthen international cooperation to develop and harmonize procedures for testing exhaust emissions through the UNECE/WP.29 and other regional or international fora; and
- (c) Work to promote the production and use of environmentally friendly vehicles (EFV) and clean fuels, and promote public transport.

At its sixty-third session of UNECE, held in Geneva on 31 March 2009, and during its a high level segment on climate change mitigation and adaptation, the member countries welcomed the World Forum consideration of specific market fuel quality requirements that could be a step forward towards further reduction of vehicle emission levels in a comprehensive global framework, based on harmonized and technologically neutral regulations.

The World Forum's strategy to reduce greenhouse gas emissions in the transport sector

With regard to the *reduction of the greenhouse gas emissions* (especially CO₂) in the transport sector, the World Forum and its subsidiary Working Parties consider or have already considered a large number of measures to improve the energy efficiency of the vehicle fleet, especially:

- (a) innovative engine technologies, i.e. the development of Environmentally Friendly Vehicles (EFV) such as Plug-in Hybrid Electric Vehicles (PHEV), Hydrogen and Fuel Cell Vehicles (HFCV), Electric Vehicles (EV), etc.
- (b) advanced engine management systems (e.g. stop and go function, gearshift and eco-drive indicators),
- (c) efficient vehicle powertrains (e.g. low friction components, tyres with low rolling resistance, tyre pressure monitoring systems,
- (d) the use of other alternative energy sources such as liquefied petroleum gas (LPG), compressed natural gas (CNG) and sustainable biofuels (liquid and gaseous),
- (e) development of quality specifications for market fuels in relation with the vehicle emission levels and engine technology type,
- (f) installation on vehicles of electric devices with a low energy consumption (e.g. headlamps with Light Emitting Diode (LED) technologies),
- (g) development of Intelligent Transport Systems (ITS) in order to avoid traffic congestion and driver assisting features.

Furthermore, in June 2010, the World Forum will organize a "Round Table on Climate Change and Transport". In this respect, the World Forum expects to move forward its strategy to reduce GHG emissions in the transport sector, to bridge the policy dialogue and technological innovations, as well as to build trust between the UN organizations, the automotive industry, the oil industry and other Non-Governmental Organizations (NGOs).

Past achievements of the World Forum (WP.29) to build on

In the framework of the 1958 Agreement the World Forum has developed several UNECE

Regulations limiting the maximum admissible level of vehicle emissions for various gaseous pollutants (CO, HC, NO_x) and particulate matters.²¹ The successive amendments of these UNECE Regulations have resulted in substantial abatements, of 95-97 per cent, of the emission limits of CO, HC and NO_x for new private passenger cars as compared with the limits established in the 1970's (see Figure below). This means that the latest emission limits established by UNECE Regulations for these pollutants are today more than 20 times lower than those established thirty years ago. Similarly, the amendments to the relevant UNECE Regulations have reduced emission limits of particulates by over 90 per cent as compared with those established in 1990, which means that the latest limits approved are over 10 times lower than those in 1990.

²¹ Vehicle emissions fall into five main categories:

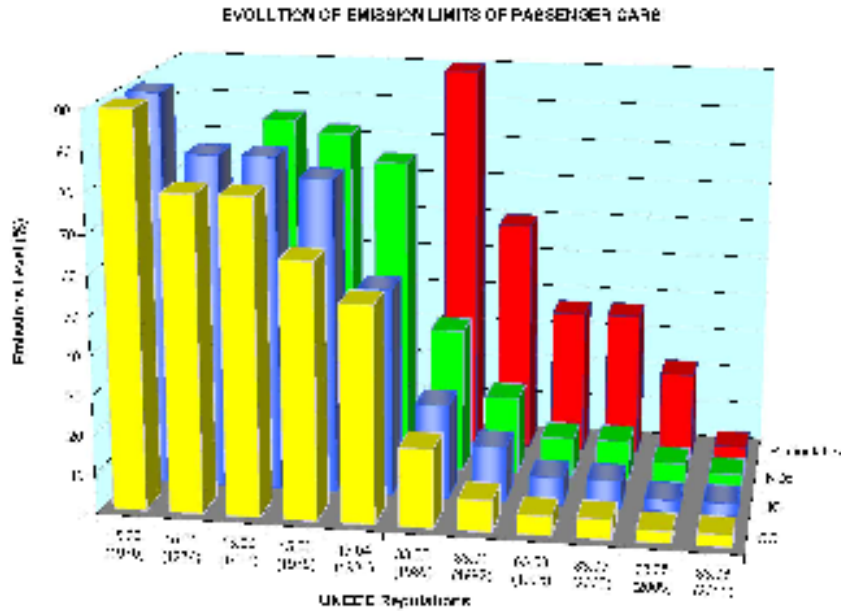
Carbon Dioxide (CO₂), which is an inevitable product of burning a fuel which contains carbon (as all petroleum products do). CO₂ does not an air pollutant *per se*, but a greenhouse gas and, therefore, contribute to global warming. The reduction of CO₂ emissions in the transport sector can only be achieved by reducing the combustion of fossil fuels, either by improving the energy efficiency of vehicles and their engines or by using low-carbon fuels (i.e. alternative fuels including sustainable biofuels) or other energies (e.g. use of hydrogen and fuel cell vehicles or electric vehicles) in their propulsion system, or a combination of all.

Carbon Monoxide (CO), which is product of incomplete combustion. CO reduces the blood's ability to carry oxygen. It's dangerous to people with heart disease and in high concentrations, it is poisonous. Thus, CO is a gaseous pollutant which can be reduced by a more efficient combustion in vehicle engines (so that CO₂ is produced instead of CO) and further reduced after its combustion by an oxidizing process in a catalytic converter. $[2xCO + O_2 = 2xCO_2]$

Hydrocarbons (HC), also known as "Volatile Organic Compounds (VOC)", are made up of unburned or partially burned fuel. As being toxic, they can harm people by causing liver damage and even cancer. HC are a major contributor to "photochemical smog" in certain climatic conditions. They can also be reduced by a more efficient combustion in the engine and further reduced after its combustion by an oxidizing process in a catalytic converter. $[4H_xC_y + (x+4y)O_2 = 2xH_2O + 4yCO_2]$

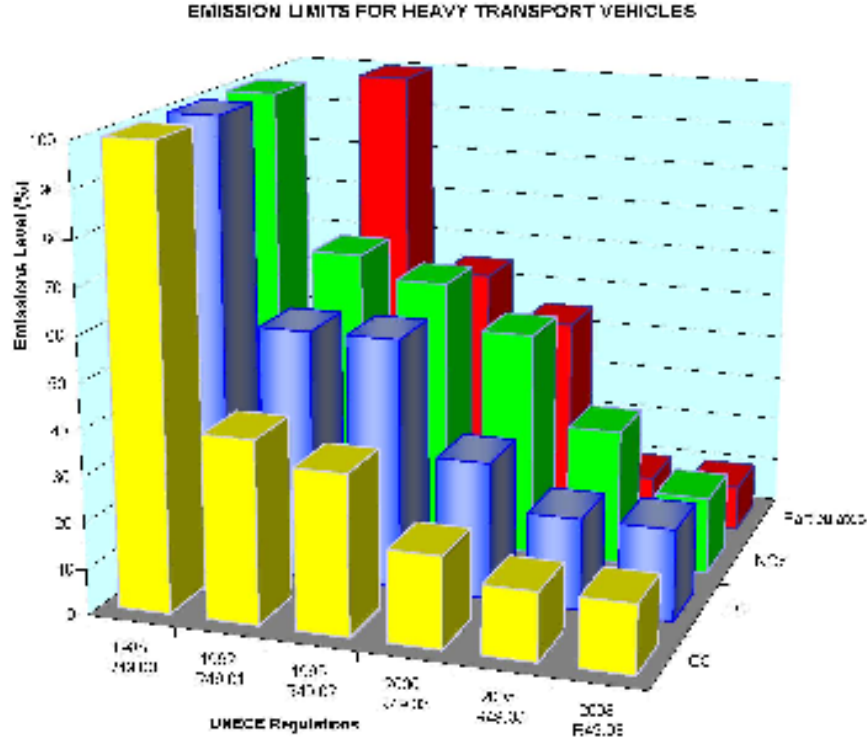
Nitrogen Oxides (NO_x) are generated when nitrogen N₂ in the air (78% N₂, 21% O₂) reacts with oxygen O₂ at high temperature and pressure in engine combustion chamber. NO_x can be an irritant to the lungs and is a precursor to "photochemical smog" and acid rain. It cannot be removed by oxidation (like CO and HC), but the opposite process, i.e. the removal of oxygen. This "reduction" process is necessary to convert NO_x back to nitrogen and oxygen. The exhaust gas recirculation and selective catalytic reduction have significantly reduced NO_x emissions by vehicle engines.

Particulate Matter (PM) is very small particles (micrometer size range), mostly of un-burnt carbon. PM causes respiratory health effects in humans and animals. Vehicle particle filters have significantly reduced the PM emissions.



At present, the World Forum considers a proposal by the European Commission to further reduce, by September 2011, the limit values of the above mentioned pollutants, especially the emissions of particles by more than 80 per cent. These new limit values will not only have to be fulfilled, as it is still the case today, by diesel engines but also by petrol engines.

The emission limits for heavy-duty vehicles have also been abated although with lower percentages and work is under way to abate them further (see Figure below).



With regard to noise reduction, recently, the World Forum adopted a new noise measurement method, which better reflects the noise emissions of real traffic conditions. These new provisions will soon be supplemented with new performance requirements (i.e. limit values for maximum noise level).

The Transport, Health and Environment Pan-European Programme (THE PEP)

The Transport, Health and Environment Pan-European Programme (THE PEP) addresses key challenges to achieve sustainable transport patterns and to encourage governments, at national and local levels, to pursue an integrated approach to policymaking and to put sustainable mobility at the top of the international agenda.

At the Third High-level Meeting on Transport, Health and Environment in January 2009, Governments adopted the Amsterdam Declaration -- Making THE Link, Transport choices for our Health, Environment and Prosperity, giving renewed political impetus to THE PEP and agreed 4 priority goals:

- To contribute to sustainable economic development and stimulate job creation through investment in environment- and health-friendly transport.
- To manage sustainable mobility and promote a more efficient transport system.
- To reduce emissions of transport-related greenhouse gases, air pollutants and noise.
- To promote policies and actions conducive to healthy and safe modes of transport

THE PEP comprise, inter alia, activities related to [sustainable urban transport](#), [health impacts of transport](#), [cycling and walking](#) as feasible non-motorised transport modes for urban areas, the [Clearing House project](#), and [consideration of institutional arrangements](#) for policy integration.

In addition, concrete projects are developed by THE PEP Steering Committee, composed of UNECE and WHO/Europe Member State representatives from the transport, environment and health sectors, in cooperation with international and non-governmental organizations.

The forthcoming THE PEP [Workshop](#) on Sustainable and healthy urban transport policies - "Working together to make things happen" to be held on 7-8 June in Skopje, The former Yugoslav Republic of Macedonia, aims at encouraging transport, health and environment policymakers to develop strategies and measures to support implementation of sustainable and healthy urban transport policies in South-East Europe (SEE). Participants will work together to identify challenges and needs to promote innovative policies in cities of the region which would further support environmentally friendly and healthy transport policies and enhance urban mobility. The focus of the workshop will be on policy integration among three sectors (environment, health and transport) in developing and implementing urban transport policies, together with local authorities, industry and civil society. It will offer an opportunity for exchange of good practices and to build capacity for sustainable urban transport in the countries of South-East Europe.

Challenges, lessons learned and way forward

For UNECE countries the biggest transport related challenge will likely be to make good use of the opportunities the current economic crisis offers in terms of infrastructure development. For transition economies in the region this could be the time to narrow the gap in they have in infrastructure availability and quality compared to their developed country neighbours. In this process following sustainability criteria, particularly in terms of safety and environmental conditions should get the political priority.

Financing constraints further strengthen the need to revisit the national transport development plans through applying the scrutiny of socio-economic appraisal.

In addition, governments may take a rewarding path by giving growing attention to low cost – high return interventions, like improved legal and regulatory framework for their transport systems.

The implications of expected government policies and actions for UNECE are as follows.

Growing use of the UNECE managed transport conventions and other legal instruments:

As explained earlier, UNECE has de facto become the centre of multilateral agreements on land transport, dangerous goods and vehicle construction. The value and efficiency of UNECE transport conventions, agreements, and resolutions increases by each new contracting party. Consequently, some of these legal instruments have reached a close to global coverage and the trend is obvious for the rest of the active instruments.

This poses two types of challenges:

- (i) How can we accelerate the process towards universal coverage of those legal instruments that are the key to ensure sustainable development? A list of those legal instruments where the universal coverage is warranted at a relatively rapid speed is in Annex. 1;
- (ii) How can we effectively improve the implementation monitoring mechanisms and how much could we rely on cooperation with our key partners, including the other four Regional Commissions? A review of the implementation monitoring has already started, and the Inland Transport Committee of the UNECE welcomed the initiative with the understanding that the benefit cost ratio will justify the changes.

Access and infrastructure development:

Basic tools for improved planning capacity for transport infrastructure development are available. However, are they adequately known, are they adequately used?

Standards and best practices for land transport infrastructure are similarly available. However, the latest knowledge about sustainable development criteria needs to be incorporated.

Safety:

In the area of road traffic safety the critical path is the enhanced cooperation among the Regional Commissions so that they would be able to:

- (i) ensure the sustainability of the results and the appropriate follow up to the road safety target setting project recently completed;
- (ii) meaningfully participate in the implementation of the Decade of Action for Road Safety 2011-2020;
- (iii) contribute to tangible results in and visible improvement of the road safety situation in the World.

UNECE Executive Secretary, in his capacity as the coordinator of the Regional Commissions in 2009-2010 will promote the GA Resolution and the action program for a closer RS cooperation.

Environmental sustainability:

Global warming and sustainable development of transport

In the heat of increased attention to climate change and within this global warming mitigation it will not be easy to strike the right balance among the different components of sustainable development, including local pollution, safety etc.

A further challenge is that interventions with real impact on the ground may take a longer time to be prepared and acted on. At the same time the political impatience - that is so much valuable to drive the agenda forward - may either oversee or even neglect the importance of painstaking technical work. In other words, popular, flashy one-time events and projects may get support and funding, while the inevitably needed, "Cinderella" - activities could stay under-funded.

Global warming and transport - UN Development Account (UNDA) project

In order to evaluate the implementation of new national or regional measures aimed at mitigation of climate change, Governments and the private sector have to analyse alternative strategies, including for the composition of total energy consumption and GHG emissions in the transport sector. Whilst the data and methodologies available to measure transport activity, fuel consumption and CO₂ emissions are sufficient to track general trends, the quality and coverage of such data and methodologies will need to be considerably improved if specific greenhouse gas and CO₂ emission reduction targets and transport policy decisions were to be achieved.

To enable Governments to make the right policy decisions and to optimize their strategy on CO₂ reduction targets, there is a need to develop well defined standard monitoring and assessment tools taking into account the latest developments in transportation. Such a tool kit, which should be freely available to Governments, Regional Commissions and other interested stakeholders, must be absolutely transparent to ensure that decisions are not biased by the specific interests of different pressure groups.

At the end of 2009, the UNECE, together with other four Regional Commissions, submitted a joint project to UNDA. The project aims to develop a standard and transparent evaluation of the CO₂ footprint of land transport (aviation and maritime transport not included), to raise awareness among Governments and other stakeholders and provide a rational basis for sustainable transport policies. The project was approved at the end of 2009 and the UNECE will work on it from 2010-2012 and, together with other Regional Commissions, will prepare adequate training material tailored to the specific needs of different regions and sub-regions.

Periodic technical inspection of vehicles and other vehicle regulations

In order to ensure that road vehicles comply with the environmental performance and safety regulations in all potential operating conditions during their whole lifetime, some regions and several countries have established their national and/or regional legislation regarding periodical technical inspections of vehicles in use.

For the purpose of harmonization of such provisions, the World Forum (WP.29) set up, in 1997, an Agreement which provides the legal framework and procedures for the adoption of uniform Rules for carrying out technical inspections of vehicles in use and for reciprocal recognition of the certificates of such inspections. So far one Rule has been set up to cover the prescriptions for the environmental protection. At present, WP.29 considers further draft Rules on the technical inspection with regard to vehicle safety issues. Furthermore, it would be important to achieve the mutual recognition of the international technical inspection certificates. This would save

considerable time and financial resources. The 1997 Agreement already offers the legal framework for this, just all countries of the world should adhere to it.

ITS benefits for sustainable development

Looking at transport systems, the current challenge is to improve the quality and safety of the infrastructure, road vehicles, and in fixed transport installations such as trains, undergrounds and automated people movers or transport systems for public transport. Furthermore, the concept of efficiency, which includes energy consumption and use of the land, leads to considerations about the impact of required mobility of vehicles and people as well as of the transport of goods.

Information and communication technologies, and therefore road related telecommunication and information technologies, which are often internationally referred to as ITS – Intelligent Transport Systems - represent a wide range of organizational and technology based systems that are designed to facilitate process of migration to seamless transport systems through a better use of both the existing transport networks and energy, to prevent primary accidents, to inform the users, to provide better access to transport services, to prevent injuries to people and damage to vehicles and the environment.

The use and application of new intelligent systems is nowadays the vital part of the constant technological upgrading of vehicle performances (Advanced Driver Assistance, Advanced Protection System, Alco-lock, Intelligent Speed Adaptation, etc.) and is closely linked to enhancing the active and passive safety standards.

In near future, on-board devices will collect traffic-related data from vehicles, including driving speed, location, and also several weather-related data. This could bring the journey planning or the real time information to very high performances standards, promoting a "new era of mobility". The same is expected to happen with infrastructure, where the upgrade of existing networks and development of new structures allow higher standards of safety and a more efficient traffic management to maximize fluidity and to minimize congestion.

UNECE has initiated work on information and communication technologies for transport and logistics, identifying a possible roadmap with the aim of pursuing the efficiency, quality, safety and security of road transport in particular, in order to analyze to which extent the intelligent transport systems and information based mobility may improve transport performance and contribute to more sustainable transport and.

The Transport, Health and Environment Pan-European Programme (THE PEP)

The main challenges under THE PEP in the coming years involve the capacity of Member States to tackle the problem of sustainable urban transport, including emissions of air pollutants and noise, congestion, accidents and to develop mobility management schemes, including clean and efficient public transport, that support clean, healthy and prosperous livelihoods.

THE PEP offers primarily the tools and methods to encourage policymakers and planners to adopt an integrated policy approach. This requires each of the three sectors, transport, health and environment, to work together by putting into place institutional arrangements for cross-sectoral collaboration. This should include both horizontal collaboration (among the three ministries) as well as vertical collaboration (translating national level policy into local action, e.g. on building cycling paths in cities). It also means that the transport sector in particular needs to consider the impacts of all transport policies and planning on health and environment.

For this reason, the global economic crisis provides an opportunity to Member States to make good use of THE PEP, particularly in light of the world-wide restructuring of the automotive industry, oil price volatility, the increasing importance of clean fuels and vehicles and the recognition that economic stimulus packages (especially for transport infrastructure) should be low-carbon and support the green economy.