

## **UNDA Seventh Tranche**

### **Project E:**

**Development and implementation of a monitoring and assessment tool for CO<sub>2</sub> emissions in inland transport to facilitate climate change mitigation**

**Project documents  
for the 7th tranche of the Development Account**

**United Nations Economic Commission for Europe  
Transport Division  
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## 1. EXECUTIVE SUMMARY

**Title** - Development and implementation of a monitoring and assessment tool for CO<sub>2</sub> emissions in inland transport to facilitate climate change mitigation.

**Duration** – 3 years (thirty-six months) (2011-2013)

**Executing agency:** UNECE

**Implementing entity** – Other UN Regional Commissions (ECA, ECLAC, ESCAP and ESCWA)

According to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, transport was responsible for 13 per cent of world energy-related greenhouse gases (GHG) emissions with about three quarters coming from road vehicles, and it produced about 23 per cent of world energy-related CO<sub>2</sub> emissions. Furthermore, the transport sector is the second largest (and second fastest growing) source of global GHG emissions. More than 1.3 billion road vehicles<sup>1</sup> in the world today produce nearly 3 billion tonnes of CO<sub>2</sub> per year, thus having a very negative impact on the climate. To facilitate the implementation of commitments made by countries under the United Nations Framework Convention on Climate Change (UNFCCC), an information and analytical tool based on a uniform methodology for the evaluation of the actual CO<sub>2</sub> emissions generated by the different modes of land transport needs to be set up. Although a number of tools for measuring CO<sub>2</sub> emissions exist, none of them capture relevant data for effective transport policy interventions. They also produce results and specific data that are not really comparable at international level. Emerging economies where the motorization level is still low, but where the fastest growth is anticipated, are expected to strengthen their political commitment for taking actions and implement transport policies geared towards sustainable development.

The project, *Development and implementation of a monitoring and assessment tool for CO<sub>2</sub> emissions in inland transport to facilitate to facilitate climate change mitigation*, is aimed at assisting countries in the implementation of the recommendations contained in the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) and in General Assembly resolution A/63/32 on *Protection of global climate for present and future generations*.

Building upon the results achieved in this area, this project proposes to develop a uniform monitoring and analytical tool based on a standard and transparent methodology to evaluate the CO<sub>2</sub> footprint of land transport, taking into account climate-relevant indicators, and based on the monitoring results to offer a set of potential actions, i.e. a package of transport policy interventions (a transport policy converter). This tool is meant to pave the way for the future inland transport systems, thus we have named it ForFITS. It would be freely available to all UN member States and organizations that wish to analyze a wide range of issues linked to CO<sub>2</sub> emissions and the policy implications of using different mitigation techniques and measures in the land transport sector. It would take into consideration not only the continued growth of road vehicle fleets (including the different types of propulsion), future extensions of transport infrastructure, the development and use of Intelligent Transport Systems and the availability of

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<sup>1</sup> Global status report on road safety, Time for Action, World Health Organization, 2009.

sustainable energy sources, but also railway and inland waterway transport, with particular attention paid to intermodal transport.

The ForFITS would provide a robust and transparent framework capable of analyzing alternative strategies for the development of sustainable transport and would establish links with transport policy-making decisions. The review and analysis of existing assessment models for the evaluation of transport activities, energy consumption and CO<sub>2</sub> emissions will be the starting point for the establishment of a standard methodology for monitoring and assessment of inland transport CO<sub>2</sub> emissions, as well as for raising awareness about the issues. This phase is expected to be launched in January 2011. The testing, validation and implementation of the web-based application tool is expected to be completed in 2012. The tool is intended to be publicly accessible and free of charge via the website by the end of 2012.

The capacity building workshops and training activities on how to use the ForFITS as a standard CO<sub>2</sub> assessment tool for inland transport CO<sub>2</sub> emissions including the transport policy converter will take place in all the five regions of the Regional Commissions during 2013. These workshops are aimed at raising awareness of the importance of climate change and transport, and building up the necessary capacity at regional and national levels to facilitate climate change mitigation in the inland transport sector using the tool ForFITS developed under this project.

## **2. BACKGROUND**

### **2.1. Introduction**

Global warming represents a global challenge and calls for global action. There is a clear consensus among scientists, policy makers, experts and business leaders in the transport sector, including transport operators and vehicle manufacturers (the automotive and rail industries, as well as inland shipbuilders) that concerted action is needed to address climate change through the reduction of greenhouse gas emissions, especially of carbon dioxide (CO<sub>2</sub>). The Kyoto Protocol and the United Nations Framework Convention on Climate Change (UNFCCC) envisage a lead role for the United Nations in these concerted efforts and the Secretary-General has put climate change firmly at the top of the United Nations agenda.

The globalization and liberalization of national economies is resulting in a permanent increase in trade and consequently in cross-border transport activities. Economic growth also leads to fast growth in the level of motorization all over the world. The growing vehicle fleet and increasing fuel consumption contribute to the climate change effect through greenhouse gas emissions. The most important component of this negative effect is the emission of carbon dioxide. The CO<sub>2</sub> emissions of a country are linked not only to the total energy consumption of different modes of transport, but also to the shares of the different energy sources used and their different contributions to climate change.

The UNECE is well-equipped to be a driving force addressing this challenge. It has a strong mandate and recognized expertise in areas which are crucial for climate change mitigation, namely through environmental conventions, regulations on vehicle construction, policies towards sustainable transport development and its work in the field of energy efficiency, housing, forestry and statistics. Other Regional Commissions as well have done some relevant work in this area which may be used as input for the project.

The UNECE's extensive experience spans more than six decades in the development of legal instruments in the field of transport, and as a result by now it has become the global Centre for multilateral agreements relating to inland transport, road vehicle regulations and transport and the packaging of dangerous goods and chemicals. Today the Inland Transport Committee manages 57 international conventions and agreements in the area of transport infrastructure, border crossing, construction of vehicles, transport of dangerous goods and other specialized cargoes and road safety. These legal instruments are available to all UN member States. The World Forum for Harmonization of Vehicle Regulations (WP.29) administers three Agreements – the 1958 and the 1998 Agreements on vehicle construction and the 1997 Agreement on periodical technical inspections of vehicles in use. Contracting parties to these agreements from five continents (almost all the European countries, United States of America, Canada, Japan, China, India, Korea, Thailand, Malaysia, Australia, New Zealand, South Africa, etc.), represent more than 80 per cent of worldwide vehicle production.

The first International Transport Forum (ITF), the global annual meeting of transport ministers, was held in Leipzig on 28-30 May 2008 and addressed the energy and climate change challenges for the transport sector. It stressed the need for CO<sub>2</sub> abatement focusing on improved fuel efficiency in road transport and noted that this could be achieved through different measures such as fuel efficient vehicles; sustainable alternative fuels such as biofuels; improved transport infrastructure and Intelligent Transport Systems (ITS); consumer information and behaviour; as

well as, and particularly, fiscal and financial instruments. In this context, the UNECE World Forum for Harmonization of Vehicle Regulations (WP.29) has been asked to accelerate the development of worldwide harmonized emission test cycles, which are necessary to improve the fuel efficiency of road vehicles and to reduce their CO<sub>2</sub> emissions. Several other high-level conferences have been organized worldwide to discuss the climate change and transport nexus. An International Symposium on a global approach to automotive fuel economy was held in Paris in 2008, organized by the International Energy Agency (IEA) in cooperation with ITF, the FIA Foundation for the Automobile and Society and the United Nations Environment Programme (UNEP). The Ministerial Conference on Global Environment and Energy in Transport (MEET) held in Tokyo in January 2009 continued the debate at political level and adopted a Declaration. With the objective of reducing GHG emissions, the Declaration calls for countries to improve fuel/energy efficiency in the transport sector by introducing regulations on fuel efficiency or GHG emissions and by improving motor vehicle components and fuel quality through UNECE/WP.29.

While “greening the vehicle” is an important component of any transport program on climate change mitigation, it is obvious that a far more comprehensive approach is warranted. Transport demand management, ITS, economic and fiscal incentives, stricter regulations and standards, as well as better transport infrastructure and policy measures could help in bringing down the total energy consumption in the transport sector. In addition, stopping and turning around the trends in modal split with a growing part for road transport and for individual transport is a shared objective among transport policy makers. However, the link between the above-mentioned broad brush reforms and the actions on the ground need to be strengthened. And to be able to do so, it is important to have the capability to appropriately evaluate the efficiency of nationally or regionally implemented measures aimed at climate change mitigation. Governments and the private sector must analyse alternative scenarios in order to be able to define their strategies. While the data and methodologies available to measure transport activities, their energy consumption and CO<sub>2</sub> emissions are sufficient to track general trends, the quality of the data and the methodologies to calculate CO<sub>2</sub> emissions need to be considerably improved and harmonized to be comparable at an international level. The UNECE also has a long tradition in collecting environmental and transport data, with the most recent addition being data on CO<sub>2</sub> emissions by inland transport.

To enable Governments to make the right policy decisions and optimize their strategy and actions for CO<sub>2</sub> reduction targets, there is a need to develop a well-defined standard monitoring and assessment tool. The UNECE Inland Transport Committee (ECE/TRANS/208, para. 95), as well as its subsidiary World Forum WP.29 (ECE/TRANS/WP.29/1068), endorsed the initiative to develop such a CO<sub>2</sub> monitoring and assessment tool. It was proposed that the tool should incorporate a transport policy converter that will be capable of offering a mix of policy measures and determining the intervention with potentially the most effective impact on the reduction of CO<sub>2</sub> emissions. In order to ensure internationally comparable data on the CO<sub>2</sub> footprint of inland transport, it is important to:

- (a) develop an analytical CO<sub>2</sub> monitoring and assessment tool for inland transport with alternative policy responses based on a uniform and harmonized methodology (i.e. assessment and policy converter), the **ForFITS**;
- (b) establish recommendations on data collection and sampling methods.

Once established and made available on the website, ForFITS could be used by all policy makers to analyze and evaluate different policy scenarios and choose the best possible option for their particular situation. ForFITS will assist policy makers and other interested stakeholders in their efforts to develop and optimize appropriate national or regional strategies to reduce CO<sub>2</sub> emissions, including shifts between different modes of transport, and to measure CO<sub>2</sub> emission reduction. ForFITS must be transparent to ensure that decisions are not biased by the specific interests of various interest groups.

The UNECE will lead the work of a team of specialists engaged in setting up a standard tool and, together with other Regional Commissions (RCs), prepare training material tailored to the specific needs of different regions. All RCs will organize awareness-raising and capacity building activities targeting the relevant audience and will disseminate relevant information and training material in their respective region. Collaboration with other interested partners (UNEP, UNFCCC, etc.) will be sought at various stages of the project.

A number of countries and international organizations have already expressed their interest in cooperating with UNECE in the follow-up activities to this UNDA project and to contributing to additional modules covering other areas of interest (other GHG emissions in the transport sector such as methane or other transport modes such as coastal shipping or domestic aviation). To this end, this project can act as a catalyst for leveraging extra-budgetary resources for supplementary and follow-up activities, similar to those of the highly fruitful UNDA project on “improving road safety: setting regional and national road traffic casualty reduction targets”, implemented in 2008–2009 by the five UN RCs under the 5<sup>th</sup> tranche.

## **2.2. Link to the Programme Budget**

The project is linked to the proposed 2010-2011 programme budget (A/64/6 (Sect.19)), Part V, Section 19 “Economic development in Europe”, particularly subprogramme 2, “Transport”.

**UNESCWA Strategic Framework 2010-2011** Subprogramme 3 Economic development and integration; Expected accomplishment (c) Enhanced capacity of member countries to implement the Integrated Transport System in the Arab Mashreq (ITSAM) and other measures promoted by ESCWA in order to improve regional and international transport linkages, with due consideration to environmental issues;

**UNESCAP Strategic Framework 2010-2011** Subprogramme 3: Transport; Expected accomplishment (a) Enhanced knowledge and increased capacity of member States to develop and implement effective and sustainable transport policies and programmes, including those targeting the Millennium Development Goals.

**UNECA Strategic Framework 2010-2011** Subprogramme 1: Trade, finance and economic development; Expected accomplishment (a) Enhanced capacity of member States to mainstream and integrate macroeconomic and sectoral policies in national development strategies to achieve faster growth for poverty reduction and sustainable development, including the Millennium Development Goals.

**UNECLAC Strategic Framework 2010-2011** Subprogramme 8: Sustainable development and human settlements; Expected accomplishment (a) Increased capacity of ECLAC member

countries to integrate policies and measures for sustainable development, particularly in relation to climate change and human settlements.

### **2.3. Link to the Internationally Agreed Development Goals (IADGs), including the Millennium Development Goals (MDGs)**

The project is consistent with the scope and priorities of the Millennium Declaration and the MDG 7 on environmental sustainability, the Kyoto Protocol, the UN Framework Convention on Climate Change (UNFCCC) and General Assembly resolution 63/32 on protecting the global climate for present and future generations of mankind.

### **2.4. Lessons learned and good practices**

The UNECE has set up a large number of international legal instruments in the transport, energy and environment sectors, which provide the basis for international cooperation (see <http://www.unece.org/welcome.htm>). The UNECE also has longstanding intergovernmental structures relevant for the formulation of transport policies (see <http://www.unece.org/trans/welcome.html>). UNECE Transport Division has also launched an activity on "Climate change and transport" (see [http://www.unece.org/trans/theme\\_global\\_warm.html](http://www.unece.org/trans/theme_global_warm.html)) with already available analytical results that support this UNDA project: an awareness raising study, a literature review, a "who is doing what" review, Round Tables for policy debates and CO<sub>2</sub> statistics in inland transport.

The UNECE has been the lead agency / coordination in the implementation of previous UNDA projects with recognised results. The main lessons from these projects are that (a) sound planning is the foundation of end results; (b) regular consultations among the implementing partners, i.e. Regional Commissions, as well as with the key stakeholders and, in particular, with governments is essential for high quality and sustainable results; (c) project management requires considerable investment and attention and that needs to be appropriately funded.

## **3. ANALYSIS**

### **3.1. Stakeholder analysis**

- (a) Potential users of the ForFITS are mainly the following stakeholders: ministries of transport, environment, energy, and education; sub-national administrations (e.g. city councils); intergovernmental organizations and civil society; non-governmental organizations (NGOs) active in the inland transport sector (e.g. International Road Transport Union (IRU), Union Internationale des Chemins de fer (UIC), International Road Federation, river commissions etc.); energy supply and environmental protection organizations; as well as academia and research institutions interested in climate change mitigation through the reduction of GHG emissions (specifically CO<sub>2</sub> emissions) including all users of inland transport infrastructures (i.e. roads, railways and waterways).
- (b) Stakeholder characteristics: Governments have a responsibility for the national implementation of international agreements and resolutions on the reduction of GHG emissions by establishing and enforcing national or regional legislation. They are also involved in the monitoring process and the collection of relevant data (i.e. fuel

consumption, CO<sub>2</sub> emissions, energy efficiency), in education, as well as in developing and implementing their national transport policies that are in support of sustainable development. In each country, different Government ministries have responsibilities for climate change mitigation with various settings and targets. For this reason, coordination among Government experts is necessary. Civil society and NGOs tend to be concerned with new legislation (e.g. CO<sub>2</sub> taxation for vehicles or tax incentives for environmentally friendly vehicles) in the interests of specific segments of society (i.e. users of transport infrastructures, vehicle manufacturers, transport operators, energy suppliers, etc.) and have an important role in lobbying Governments to improve such legislation. However, it must be in a fair and transparent manner. Non-governmental organizations and academia are in this way expected to help Governments reach their GHG emission targets.

- (c) Needs of stakeholders: Under the Kyoto Protocol, Governments have to reduce their GHG emissions through legislation, enforcement, information campaigns, education, etc. They need to optimize these conditions according to national, regional and local needs. In order to evaluate the implementation of such new national or regional legislation, Governments and the private sector have to analyze alternative scenarios and develop strategies, taking into account the composition of total energy consumption in different sectors. While the data and methodologies available to measure transport activity, energy consumption and CO<sub>2</sub> emissions are sufficient for tracking general trends, the quality of collected data need to be considerably improved and a common methodology for the assessment of CO<sub>2</sub> emissions has to be established. To enable Governments to make the right policy decisions and to optimize their strategy on CO<sub>2</sub> reduction targets, there is a need to develop a well-defined standard monitoring and assessment tool that takes into account the latest technological and policy developments in inland transport (i.e. environmentally friendly vehicles). Knowing the problems and their causes, characteristics, identifying the pockets of concern within the country is only the first step. This knowledge must be translated into actions, like transport policy decisions that create the right environment and incentives – if necessary – to reduce inland transport related CO<sub>2</sub> emissions. Thus the project aims to provide such a CO<sub>2</sub> monitoring and assessment tool with the transport policy converter, i.e. the ForFITS.
- (d) Expected changes: More governments will establish national programs and even targets to reduce inland transport CO<sub>2</sub> emissions. They will be more aware of the close relationship between transport, energy and environmental protection and the benefits that ForFITS could bring also in support of information campaigns and education. The national programs accomplished and the targets achieved will lead to the development of more sustainable living conditions for all citizens, energy savings, as well as better health and environmental conditions.
- (e) Beneficial outcomes: Some countries are already in the process of mapping their national CO<sub>2</sub> emissions. Their experience will be useful for the other countries that have not yet done much in this field. The project will serve also as a gateway for information sharing among all these countries. Furthermore, it is expected that the benefits derived from the project will extend well beyond this project by a number of possibilities on how to use ForFITS (e.g. municipalities can calculate the extent of their CO<sub>2</sub> emissions and identify ways to reduce them or Governments can use it to evaluate vehicle emissions on a uniform basis). In this respect, all countries of all regions can benefit from the project.

- (f) Conclusions for project design: It will be important to communicate the benefits of ForFITS and the various possibilities for analyzing alternative strategies for new policy measures on climate change mitigation. Such information would be provided by complementing the ForFITS with a user-manual and detailed training materials.
- (e) Furthermore, RCs will choose one pilot site in each region and organize a capacity building workshop at policy makers' level to raise awareness and a training session at technical level to enhance skills for the use of the standard inland transport CO<sub>2</sub> monitoring and assessment tool with the transport policy converter, the ForFITS.

### 3.2. Problem analysis

- (a) Current situation: According to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, transport was responsible for 23 per cent of world energy-related greenhouse gases (GHG) emissions with about three quarters coming from road vehicles, and it produced about 23 per cent of world energy-related CO<sub>2</sub> emissions. Furthermore, the transport sector is the second largest (and second fastest growing) source of global GHG emissions. More than 1.3 billion road vehicles<sup>2</sup> in the world today produce nearly 3 billion tonnes of CO<sub>2</sub> per year, thus having a very negative impact on the climate. With regard to the total external costs of transport, climate change share is the most important category with 30 per cent, followed by air pollution with 27 per cent and accidents with 24 per cent. Furthermore, the transport sector is the second largest and second fastest growing source of global GHG emissions, especially in countries and regions with economies in transition. In the field of aviation the International Civil Aviation Organisation (ICAO) has taken the lead to reduce GHG emissions. In case of maritime transport the International Maritime Organisation (IMO) has been engaged in analytical work and galvanised actions among the shippers to this end. With regard to land transport, initiatives so far has been sporadic, isolated and without major impact at a global level though land transport with its road mobility is the key concern for climate change within the whole transportation sector.
- (b) Major problem conditions: Governments are responsible for monitoring their CO<sub>2</sub> emissions in different sectors. For monitoring the overall emissions per sector, many countries use methodologies based on the *IPCC Guidelines for National Greenhouse Gas Inventories*, mainly on the basis of the consumption of fossil fuels. However, for a more detailed consideration and comparison of CO<sub>2</sub> emissions by sub-sectors, authorities use different methodologies based on definitions and data available at the national level (at least where there is a land transport CO<sub>2</sub> monitoring and assessment system in place). Transport and, in particular, road transport is a complex system with implications for road safety and security, energy consumption and the environment. Countries do not use harmonized definitions for different vehicle categories (mopeds and motorcycles, passenger cars, busses and coaches, light and heavy duty vehicles, tractors, non-road mobile machineries etc.) and also use different methodologies and/or assumptions to calculate the CO<sub>2</sub> emissions for monitoring purposes. This fact results in emission data sets with different quality which could not be easily compared at international level. With regard to energy consumption and CO<sub>2</sub> emissions, the international ranking of some countries does not reflect the real situations (e.g. in countries with low fuel taxes, most

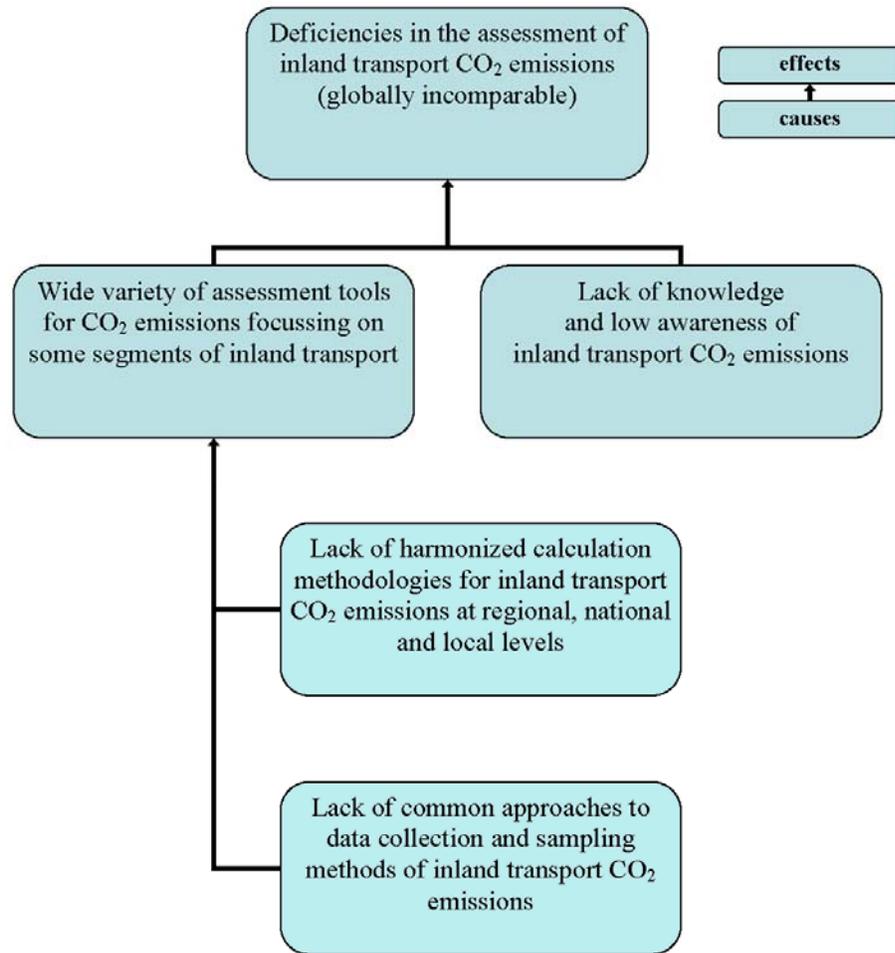
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<sup>2</sup> Global status report on road safety, Time for Action, World Health Organization, 2009.

transit vehicles benefit from filling up their fuel tanks, which increase national transport CO<sub>2</sub> emissions). In order to consider CO<sub>2</sub> emissions in detail, some countries have started to develop models for calculating and mapping their national CO<sub>2</sub> emissions in order to identify ways and measures to effectively reduce them. Inland transport CO<sub>2</sub> emissions are mainly caused by evaporative emissions from the use and combustion of fossil fuels in vehicles, not only for propulsion but also for the purpose of heating and air conditioning of the passenger compartment of a vehicle or the freight compartment in case of a refrigerated vehicle. The CO<sub>2</sub> emissions caused by road vehicles, trains and inland water vessels are mostly calculated on the basis of sales of the fuel products for different transport modes, either at service stations or directly to the operators, i.e. the total of petrol, diesel, biodiesel, compressed natural gas (CNG), liquid petroleum gas (LPG) and compressed or liquid hydrogen (H<sub>2</sub>). This approach cannot capture the impact of the type of use of the vehicle, and thus the sources of actual CO<sub>2</sub> emissions are not qualified (neither geographically nor with regard to the nature of traffic). Specific calculation methodologies are needed to estimate CO<sub>2</sub> emissions for the different transport modes. High income countries are already making efforts to measure the CO<sub>2</sub> emissions created by inland transport modes. However, the results are usually not comparable at international levels. On the other hand, developing countries do not have easy or affordable access to such solutions. Furthermore, knowledge about CO<sub>2</sub> emissions in transport is rarely translated into transport policy actions.

- (c) Cause-effect relationship: The use of different calculation methodologies and different approaches to data collection and sampling methods for inland transport CO<sub>2</sub> emissions at regional, national and local levels result in a variety of assessment tools, in many cases focusing on some specific segments of inland transport only. Due to the complexity of inland transport systems and their intermodal links, there is in general low awareness and lack of knowledge about the assessment of inland transport CO<sub>2</sub> emissions. Both the variety of assessment tools and the lack of knowledge result again in deficiencies in the assessment of inland transport CO<sub>2</sub> emissions. These data and statistics can vary considerably and, therefore, cannot be compared on a worldwide level for the purpose of global analysis. Consequently, the national, regional, urban or sub-regional transport policies and investment strategies are not focused on CO<sub>2</sub> reduction (see figure 1).

Figure 1  
Problem tree



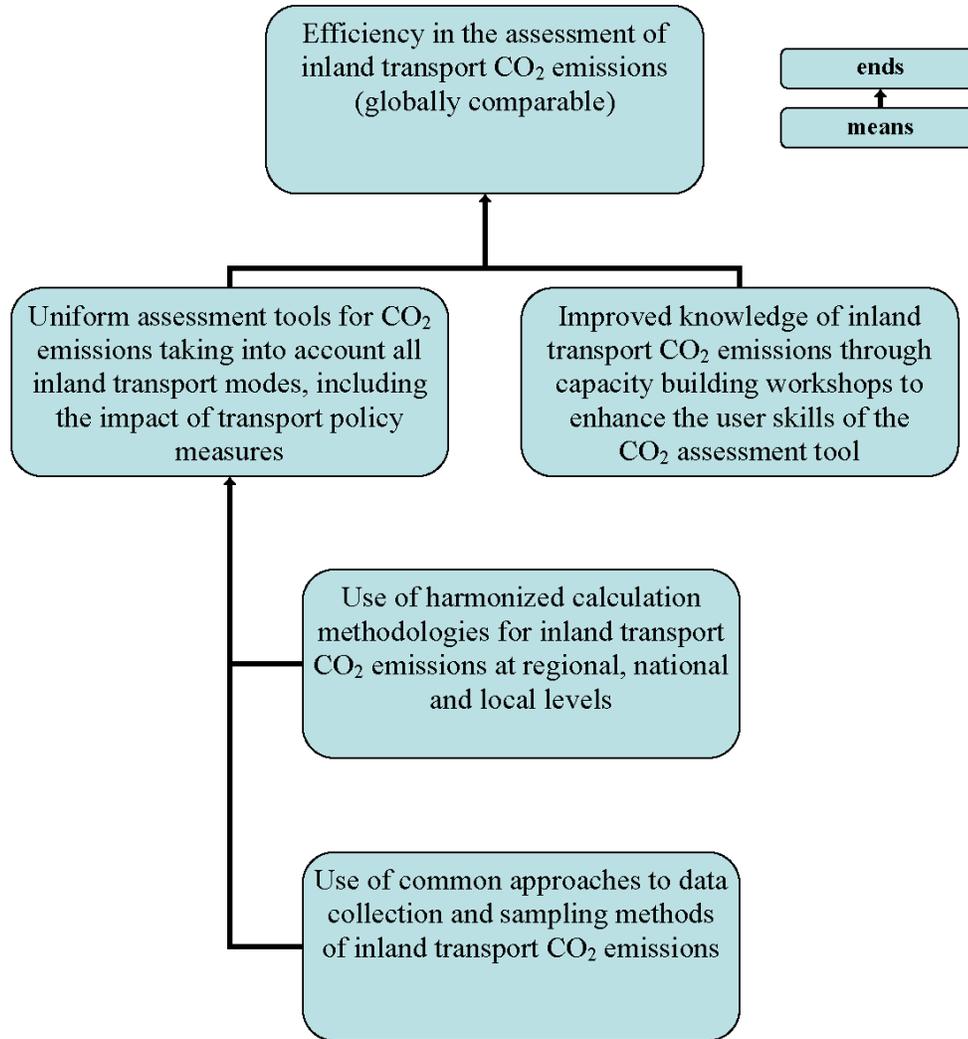
### 3.3. Analysis of objectives

- (a) Governments have agreed to implement UN resolutions on climate change mitigation and adaptation. They are required to report on established measures (policy strategy, legislation, education, etc.), expectations and achievements made in the reduction of GHG for each sector. They need to evaluate, analyze and compare different CO<sub>2</sub> emissions reduction scenarios that would be in compliance with the Kyoto Protocol. Instead of developing national models for calculating detailed transport CO<sub>2</sub> emissions in each country, a single and uniform methodology should be developed on the basis of existing assessment models, but streamlined according to UN requirements, terminology, definitions and classification of vehicles, transport modes, etc. The CO<sub>2</sub> monitoring methodology should be harmonized and, at the same time, flexible for application by different user groups. In this context, a common test procedure for the determination of engine fuel consumption as well as common data collection and sampling methods needs to be used as far as possible, to obtain comparable assessment results for transport CO<sub>2</sub> emissions for rail, road and inland navigation (see figure 2 below). In a situation where such data is not available, a set of recommendations should be established for the collection of statistical data.
- (b) Another important element is the collection and compilation of transport statistics, including data on road traffic, transport by road and rail, inland water traffic, oil pipelines and transport infrastructures. These UNECE transport statistics are available not only through publications but also through an online transport statistics database, which provides good quality, relevant, user friendly and timely transport statistics. Such updated statistical data on transport is essential to complement the CO<sub>2</sub> monitoring and assessment tool.
- (c) Furthermore, the potential of intermodal transport and logistics to shift freight transport from road to other transport modes is under-utilized. Efficient transshipment operations between road, rail and inland waterways are essential to achieve a considerable shift of freight transport from road to rail and waterways. CO<sub>2</sub> emissions by rail are in some countries much lower than in others as their railways have reached a higher level of electrification.
- (d) The electrification of transport modes will shift, in the long term, an important part of transport CO<sub>2</sub> emissions to the electric energy sector, which does not contribute *per se* to the reduction of global CO<sub>2</sub> emissions, if the electricity is mainly generated by power plants operating on fossil fuels like coal, gas and petroleum. However, it makes sense for countries with an important share of electricity generation on the basis of nuclear energy or renewable and regenerative energies like hydraulic power, wind, solar and photovoltaic, etc. Furthermore, some regions have a liberal market for electricity and consumers in one country are free to buy their electricity in another country with a different CO<sub>2</sub> emission relationship.
- (e) As there is no possibility to considerably reduce transport CO<sub>2</sub> emissions in the short run, Governments mainly have to concentrate on emission avoidance (such as eco-driving campaigns and education, especially for professional drivers, fostering public transport and intermodal transport for freight, etc.) and the setting up of appropriate policies for the reduction of future CO<sub>2</sub> emissions. The impact of information campaigns for consumers

has therefore to be highlighted in the proposed methodology to reflect, for example, the use of public transport versus the individual use of cars, recommendations for eco-driving and the promotion of non-motorized transport modes (cycling and walking, etc.). Furthermore, fiscal and financial measures could also have an important effect on the attitude of consumers, such as carbon taxation, road pricing and tax incentives for low carbon transportation. In this respect, the CO<sub>2</sub> monitoring and assessment tool with the transport policy converter, the ForFITS, should take into account the impact of such policy measures to reduce inland transport CO<sub>2</sub> emissions. It may help to raise awareness of the complexity of transport systems and contribute to improving the knowledge of inland transport CO<sub>2</sub> emissions in general.

- (f) Existing models should be analyzed regarding their CO<sub>2</sub> assessment performances and their possible adaptation with respect to the goal of this project. The advantages and disadvantages of each model should be highlighted and an expert group should come to an agreement about the most appropriate models on which the development of the standard CO<sub>2</sub> monitoring and assessment tool will be based. This expert meeting will be organized by UNECE in cooperation with all other RCs.
- (g) Adapted calculation models have to be incorporated into ForFITS as the user-friendly and web-based application tool. Selected calculation models, as well as their applications, should be described in detail and elaborated in a transparent manner in a user manual, which would be the basis for the preparation of capacity building and training material. The application and effective use of ForFITS will be presented and shared with the other UN RCs during capacity building workshops organized in the five regions.
- (h) In a further step, the ForFITS should be complemented with a catalogue of recommendations on a number of measures on how users can reduce their CO<sub>2</sub> emissions within road, rail and inland waterways transport.
- (i) Finally, the development of the ForFITS will be followed by a number of capacity building workshops and training sessions in all RCs aimed at raising the awareness of policy makers and enhancing the skills for the use of the ForFITS.

Figure 2  
Objectives tree



#### 4. PROJECT STRATEGY: OBJECTIVE, EXPECTED ACCOMPLISHMENTS, INDICATORS, MAIN ACTIVITIES

**Objective:** The main objective of the project is to **enhance international cooperation and planning towards sustainable transport policies through the** development and use of a standard monitoring and assessment tool for CO<sub>2</sub> emissions in inland transport including a transport policy converter.

The ForFITS will be a web-based tool for a uniform and transparent evaluation of the CO<sub>2</sub> footprint of land transport, for monitoring the changes and for making actions to minimise CO<sub>2</sub> emissions, with a view to raising awareness among Governments and other stakeholders, providing a rational basis for sustainable transport policies and effective measures. The ForFITS would help Governments and other organizations in their objectives to map the CO<sub>2</sub> sources in inland transport and to identify areas with the highest potential for reduction. Internationally comparable inland transport CO<sub>2</sub> emissions data are necessary and the first step will be to apply a common approach to data collection and sampling. The identification and definition of the emission reduction potentials for each inland transport mode directly or indirectly producing CO<sub>2</sub> is essential for establishing powerful measures to effectively mitigate climate change. As an implicit result of this project, the future use of the ForFITS (implemented calculation models, transport policy intervention packages, as well as the related documentation) will increase the awareness of the causality and interrelationship between transport, energy and CO<sub>2</sub> emissions and will lead to enhanced inter-sectoral and international cooperation and planning towards sustainable transport policies. It is expected that the project will sensitize Governments and sub-national bodies, as well as businesses and international organisations, to share concerns about climate change, and will make them aware of the methods and project recommendations enabling them to develop the capacity to reduce CO<sub>2</sub> emissions in inland transport.

##### (b) Expected accomplishments and their indicators of achievement

###### *Expected Accomplishment EAI:*

Increased awareness of the cause-effect relationship between the different transport modes, energy and CO<sub>2</sub> emissions based on internationally comparable information on inland transport CO<sub>2</sub> emissions.

###### *Indicators of achievement for EAI:*

Number of Governments and international organizations consulted about the existing models and methodologies.

ForFITS developed and made available publicly.

Number of pilot projects where the ForFITS has been used.

Recommendations on common approaches to data collection and sampling of inland transport CO<sub>2</sub> published in the project report.

Number of countries publishing Inland Transport CO<sub>2</sub> statistics.

Number of countries that established national targets to reduce transport CO<sub>2</sub> emissions.

*Expected Accomplishment EA2:*

Enhanced capacity to assess and monitor and to take actions to reduce inland transport CO<sub>2</sub> emissions. Enhanced national capacity to monitor and assess current and future energy consumption patterns of the land transport modes and their respective CO<sub>2</sub> emissions by using the ForFITS, available free of charge via the Internet.

*Indicators of achievement for EA2:*

Increased number of national and sub-national policy makers in Governments and industry stakeholders able to monitor and assess CO<sub>2</sub> emissions in inland transport and to design the most effective intervention measures and transport policies - number of participants at the awareness raising and capacity building workshops on the Inland Transport CO<sub>2</sub> Assessment, the Monitoring framework tool and its transport policy converter (ForFITS).

Number of countries that express intention to follow up on the lessons learned during the regional capacity building and training workshops (participation survey).

Number of visits to the ForFITS website (web hits).

(c) Main activities

The main activities for Expected Accomplishment EA1 are:

- (i) Surveys to be carried out by the Regional Commissions - in a harmonised way - to identify which countries publish inland transport CO<sub>2</sub> statistics, and which countries established national targets to reduce transport CO<sub>2</sub> emissions.
- (ii) Development of the recommendations on common approaches to data collection and sampling of inland transport CO<sub>2</sub>.
- (iii) Review study of existing assessment models, and those that are under research, methodologies for evaluation of transport CO<sub>2</sub> emissions. Collecting and reviewing existing assessment models for the evaluation of transport CO<sub>2</sub> emissions from different transport modes and their energy consumption. Analysis and evaluation of advantages and disadvantages of existing models in view of a development of a future CO<sub>2</sub> monitoring and assessment tool with a transport policy converter as defined by this project. Clarify if the existing models have to be supplemented by specific features. Contact the different owners in order to clarify the copyrights and any possible further development by the UN RCs of the methodology or, if necessary, an updated version of it. Make a SWOT analysis of the existing tools and models and make recommendations for a uniform monitoring and assessment tool for CO<sub>2</sub> emissions in inland transport with a transport policy converter (ForFITS).
- (iv) Organization of international experts' meetings, in support of the main activities of this project, to assess the findings of the review study, and to develop the experts' recommendations.

- (v) Development of the inland transport CO<sub>2</sub> monitoring and assessment tool with transport policy converter, the ForFITS. Development of standard methodology, taking into account international terminology, definitions and classification of vehicles and transport modes. The structure of the ForFITS should allow for an extension, at a later stage, to other GHG or to other modules. It should also be possible to insert time-dependent functions to reflect any variations in the future vehicle fleet or in the development of the different transport modes.
- (vi) Development and testing of a user-friendly, web-based application tool, including an online user-manual (in English only) with detailed instructions and explanations. Setting up of a new website for the ForFITS and an application tool which could be linked to or supplemented by relevant statistics. As an indicator of the project's expected accomplishment, the application should also be able to record the use of the ForFITS. Furthermore, it should be possible to safely store locally specific data supplied by users in order to avoid the re-capture of data during further sessions or consultations.
- (vii) In consultation with other RCs one pilot country in each region will be selected for piloting out the ForFITS. Selection will be based on the willingness and the capacity of the country to undertake the required testing of the tool.

The main activities for Expected Accomplishment EA2 are:

- (viii) Development of capacity building and training materials and a user-manual with additional region-specific guidelines (consultancy) (see item (vi) above).
- (ix) Organisation by each RC of capacity building workshops for Government officials at policy making level and key industry stakeholders to raise awareness about the need for climate change mitigation and about the use of ForFITS to underpin their climate mitigation policies in the transport sector - one or more workshops in each region. In consultations with other RCs, participants will be selected from the relevant Ministries, governments' agencies and other national institutions dealing with environment and transport policies.
- (x) Organization of training sessions at a more technical level on how to use ForFITS – one or more training sessions in each region. In consultations with other RCs, participants will be selected from the relevant governments' ministries, agencies and other national institutions dealing with technical and technological aspects of inland transport and emissions.

Activities under (ix) and (x) might be organised either in combination, back-to-back or separately depending on the preferences or arrangements with other RCs.

- (d) Assumptions and hypotheses

There are certain external factors that can negatively impact the effort to achieve the project objectives. These external factors are beyond the control of project management and include, but are not limited to, the following circumstances. Countries have set

different levels of priorities as regards the monitoring of their national CO<sub>2</sub> emissions in the transport sector. Not all countries treat climate change mitigation as an important issue and may not yet accept that this subject is an urgent problem with a high priority. Countries can have different economic and political constraints. For example, some have strategies to shift road vehicles from the use of fossil fuels to electricity whereas others, where electricity generation is based on coal, could find it difficult to justify this shifting.

Yet another external factor that may affect the implementation of the project is the fact that different Government ministries have been assigned responsibilities for climate change mitigation in each country (generally ministries of environment, housing, energy and/or transport). Different ministries adopt different approaches and priorities to address the problem and the implementation of the project will have to take this into account. One of the challenges for the project will be to get all relevant ministries involved in climate change mitigation and adaptation to work together.

## **5. MONITORING AND EVALUATION**

The progress with implementation of the detailed project implementation plan with milestones will be monitored by the transport chiefs of the Regional Commissions. In addition, as mentioned above, the indicators of achievement are mainly based on the ultimate practical use of the established standard CO<sub>2</sub> assessment and monitoring tool with a transport policy converter, the ForFITS. The data collection will be automatic and self-evaluating. In addition, the main transport forums will be informed of the availability of the ForFITS, once established on the website. Distribution of an evaluation questionnaire to participants in the project meetings/workshops/training sessions will be used for a more detailed evaluation of the project. These questionnaires will be returned to project staff in the UNECE Secretariat for the purpose of a final evaluation, which would be done by an external consultant. The evaluation report will be made available on the website.

## **6. GENDER CONCERNS**

According to the United Nations Development Programme (UNDP), women are particularly vulnerable to climate change because they are more prone to the adverse impacts of climate change. Their limited adaptive capacities arise from prevailing social inequalities and ascribed social and economic roles that manifest itself in differences in property rights, access to information, lack of employment and unequal access to resources. Furthermore, changes in the climate usually impact on sectors that are traditionally associated with women, such as paddy cultivation, cotton and tea plantations, and fishing. This means increased hardship for women as women bear a disproportionate burden of climate change consequences, not only through decreased food security, but also through the impact on livelihoods, water resources and increased burden of care giving.

By providing the countries with a uniform CO<sub>2</sub> monitoring and assessment tool for inland transport with the transport policy converter (the ForFITS) the project contributes to the worldwide implementation of measures to mitigate climate change, which has a negative impact on people, particularly vulnerable groups such as women, the elderly and children.

## 7. IMPLEMENTATION ARRANGEMENTS

The UN RCs have already established close working relations in the field of transport, both through earlier UNDA projects (on road safety, Euro-Asian Transport Links project, etc.) and through direct and regular consultations between transport chiefs. The project will build on that cooperation.

The project will produce the following outputs, which will be available for electronic publication:

- Review study (in English).
- International Experts' Meeting – presentations, summary of discussion, recommendations (in English).
- Transport CO<sub>2</sub> monitoring and assessment tool with transport policy converter (ForFITS).
- Reports of the pilots (in English) (minimum one per region is planned).
- Capacity building and training materials and a user-manual with additional region-specific guidelines (in English).
- Regional Workshop reports (in English).
- Global status report about countries that established national targets to reduce transport CO<sub>2</sub> emissions based on the regional surveys (in English).
- Recommendations on common approaches to data collection and sampling of inland transport CO<sub>2</sub> (in English).

The UNECE, as the lead agency in coordinating the implementation of the project, will act as project manager. In this capacity, and in close cooperation with the Regional Commissions, it will:

- Prepare Terms of Reference and carry out the selection and supervision of consultants.
- Organize the International Experts' Meeting.
- Coordinate with relevant international organizations active in inland transport and other stakeholders to make this project a world-wide catalyst for inland transport CO<sub>2</sub> mitigation activities.
- Prepare the first draft questionnaire for the regional surveys.
- Prepare templates for the awareness raising and capacity building workshops and training sessions for use of the Regional Commissions.
- Make efforts to raise additional funding for the replication of the project results.
- Draft the consolidated Project Report with inputs from other Regional Commissions.
- Carry out the project related administrative work.
- Set up the project website that will become the host of the tool.
- Select the external consultant to evaluate the project.

The Regional Commissions – including lead-agency UNECE – will:

- Carry out consultations with member States on the review study.
- Participate in the International Experts' meetings.
- Comment on the draft of the inland transport CO<sub>2</sub> monitoring and assessment tool with transport policy converter (ForFITS).
- Select a city in the region and secure the commitment of the municipality for piloting out the tool.
- Organize the awareness raising and capacity building workshops in the region.
- Prepare the documentation for the participants in the workshops and training sessions.
- Assist the participants in the workshops and training sessions.

- Make efforts to raise additional funding for the replication of the project's results.
- Coordinate with the relevant regional organizations active in inland transport and other stakeholders to make this project a catalyst for inland transport CO<sub>2</sub> mitigation activities world-wide.
- Carry out the survey in the region.
- Publish project information on the RC website.
- Prepare the regional contribution to the project report.
- Cooperate with the consultant evaluating the project.

The ForFITS will be developed by an expert team of international consultants. The development will be supervised by the UNECE in close cooperation with experts from other RCs. After the development of the ForFITS, each RC will have the responsibility for the organization of and assistance (including the preparation of the documentation) to the capacity building workshops for Government policy makers and industry stakeholders. Within the allocated budget, each RC organizes one or more workshops within its region in order to allow a broad participation in the events.

These workshops are aimed at disseminating the results of this project as well as raising awareness and providing skills for the use of the ForFITS. In terms of responsibility for the implementation of the project, the UNECE will play a coordinating role by preparing and providing region-specific capacity building and training materials on the basis of the user-manual provided with the ForFITS. It will be done in close cooperation with the other RCs.

Each RC will have the responsibility for organizing/preparing of and assisting to the training sessions in its region at a more technical level (at least one training session at technical level per region) and for adapting, if necessary, and disseminating the training materials to the needs of its region and to teach potential users how to use the ForFITS. Within the allocated budget, each RC will be also responsible for (a) hiring regional consultants if there is such a need. and (b) organizing additional training sessions if needed.

All RCs will prepare a written report on the results of regional workshops and training sessions, and provide evidence for the expenses and indicators of achievement related to this project. This information will be compiled by UNECE in the progress report and the terminal report, which will be circulated by UNECE via email to UNDA, DESA and all RCs. Likewise, all RCs will contribute to the evaluation of the project.

## 8. ANNEXES

The annexes below contain a simplified logical framework and additional information regarding the work plan.

### Annex 1: Simplified logical framework

Intervention logic	Indicators	Means of verification	Risks/Assumptions
Objective: Enhanced international cooperation and planning towards sustainable transport policies through the development and use of a uniform assessment tool for CO <sub>2</sub> emissions in inland transport including a transport policy converter (ForFITS).	Number of participants at the awareness raising and capacity building workshops and training sessions for the use of ForFITS.	Attendance list and workshop survey.	Risk – Workshop participants may change job and not stay in charge. Assumption – careful selection of participants can ensure the critical mass of contacts staying in place at least on a medium term; the awareness raised, capacity created will not be lost for society even if staff and managers' mobility is a loss for the transport sector.
Expected Accomplishment EA1: Increased awareness of the cause-effect relationship between the different transport modes, energy and CO <sub>2</sub> emissions based on internationally comparable information on inland transport CO <sub>2</sub> emissions	<p>Recommendations on common approaches to data collection and sampling of inland transport CO<sub>2</sub> emissions published in the project report.</p> <p>Number of countries publishing Inland Transport CO<sub>2</sub> emissions statistics.</p> <p>Number of countries that established national targets to reduce transport CO<sub>2</sub> emissions.</p> <p>Number of Governments and international organizations consulted about the critical review of existing models and methodologies.</p> <p>Development of ForFITS.</p> <p>Number of pilots of ForFITS.</p>	<p>Surveys by the Regional Commissions.</p> <p>Information on targets or progress reported by governmental delegates at national, regional and international meetings or by media.</p>	<p>Risks – Low capacity of certain countries to collect and produce CO<sub>2</sub> emission data. National priorities do not include addressing transport CO<sub>2</sub> due to different understanding by countries of the economic and social benefits that can be achieved through climate change mitigation.</p> <p>Assumption – Increased political will can be converted to improved capacity on CO<sub>2</sub> statistics in transport if recommendations are clear and simple. Furthermore, the awareness and willingness to act than capacity to take the right decisions has already raised.</p>
Main activity 1.1: <b>Preparation of a global status report</b> based on the regional surveys on inland transport CO <sub>2</sub> emissions - surveys to be carried out by the Regional Commissions.			
Main activity 1.2: <b>Development of recommendations on common approaches to data collection and sampling of inland transport CO<sub>2</sub> emissions.</b>			
Main activity 1.3: <b>Review study of existing and under-research assessment models, methodologies for evaluation of transport CO<sub>2</sub> emissions.</b> Collecting and reviewing existing national and regional assessment models for the evaluation of inland transport CO <sub>2</sub> emissions from different transport modes and their energy consumption. Analysis and evaluation of the advantages and disadvantages of the different models in view of a future application tool for CO <sub>2</sub> monitoring and assessment as defined by this project. Clarify if the existing models have to be supplemented by specific features.			

<p>Contact the different owners in order to clarify the copyrights and any possible use by the UN of the methodology, or, if necessary, an updated version of it. Preparation of background documentation for an international expert meeting in Geneva, in support of main activities 1.1, 1.2, 1.3, 1.4 and 1.5.</p>			
<p><b>Main activity 1.4: Organisation of an International Experts' Meeting on the uniform inland transport CO<sub>2</sub> Assessment and Monitoring framework tool (ForFITS) with a transport policy converter</b> Meeting report with conclusions.</p>			
<p><b>Main activity 1.5: Development of the Inland Transport CO<sub>2</sub> Assessment and Monitoring framework tool with transport policy converter (ForFITS)</b> Development of the ForFITS, which include its verification and validation. Development of the standard methodology taking into account the international terminology, definitions and classification of vehicles and transport modes, etc. The structure should allow for an easy extension of the tool to other GHGs at a later stage. It should also be possible to insert time-dependent functions to reflect any variations in the future vehicle fleet, freight capacity, shifting to other transport modes, eventual policy measures, etc. This activity should include the preparation of a detailed user manual for the ForFITS.</p>			
<p><b>Main activity 1.6: Development and setting up of the web-based application of the framework tool and the policy converter (ForFITS)</b> Development and testing of a user-friendly, web-based application tool, including an online accessible user manual (in English only) with detailed instructions and explanations. Setting up a new website with the application tool, which could be, whenever necessary, linked to or supplemented by statistical data on climate change and transport. As an indicator of the project's expected accomplishments, the application should also be able to record the use of the ForFITS. Furthermore, it should be possible to safely store locally specific data supplied by users in order to avoid the re-capture of data during further sessions or consultations.</p>			
<p><b>Main activity 1.7: Piloting out (at least one per region) the inland transport CO<sub>2</sub> monitoring and assessment tool with transport policy converter (ForFITS)</b></p>			
<p>Expected Accomplishment EA2 Enhanced capacity to assess and monitor and to take actions to mitigate inland transport CO<sub>2</sub> emissions based on the ForFITS.</p>	<p>Number of countries that express intention to follow up on the lessons learned during the regional capacity building and training workshops (participation survey).</p> <p>Number of visits to the website of the CO<sub>2</sub> assessment and monitoring tool developed/recommended by the project (web hits).</p>	<p>Survey conducted at the end of each workshop.</p>	<p>Risk – Many countries have not clearly defined national governmental responsibilities in the field of climate change mitigation or they have low priorities for CO<sub>2</sub> monitoring in transport.</p> <p>Assumption – countries have the political will and sufficient resources to make transport policy decisions to mitigate climate change.</p>
<p><b>Main activity 2.1: Capacity building and development of training materials including a user-manual with additional region-specific guidelines</b> on the basis of the user-manual (see item (1.6) above).</p>			
<p><b>Main activity 2.2: Organization of awareness-raising and capacity building workshops for Government officials at policy making level and key industry stakeholders.</b></p>			
<p><b>Main activity 2.3: Organization of capacity building training sessions at technical level on how to use the inland transport CO<sub>2</sub> monitoring and assessment tool with transport policy converter (ForFITS).</b></p>			
<p>Evaluation of the project by an external consultant.</p>	<p>Information reported by RCs and by delegates in main fora. Number of applications of ForFITS</p>	<p>Evaluation by an external evaluator after the conclusion of capacity building and training workshops.</p>	

## Annex 2: Results-based work plan

Expected accomplishment	Main activity	Timeframe by output/activity		
		Jan. 2011 – Dec. 2011	Jan. 2012 – Dec. 2012	Jan.2013 – Dec. 2013
EA1 - Increased awareness of the cause-effect relationship between the different transport modes, energy and CO <sub>2</sub> emissions based on internationally comparable information on inland transport CO <sub>2</sub> emissions	1.1. Preparation of a Global status report based on the regional surveys.	January 2011 to July 2011		
	1.2. Development of recommendations on common approaches to data collection and sampling of inland transport CO <sub>2</sub> emissions.	February 2011 to August 2011		
	1.3: Collecting and reviewing existing assessment models including an analysis and evaluation.	January 2011 to August 2011		
	1.4: Organization of international expert meetings.	July 2011, January 2012		
	1.5: Development of the ForFITS.		November 2011 to April 2012	
	1.6: Development of and setting up the web-based application of ForFITS.		April 2012 to September 2012	
	1.7. Piloting out (one per region) ForFITS.			November 2012 to July 2013

EA2 - Enhanced capacity to assess, monitor and to take actions to mitigate inland transport CO <sub>2</sub> emissions based on the ForFITS	2.1: Development of capacity building and training materials incl. a user manual with additional region-specific guidelines			August 2012 to May 2013
	2.2: Organization of awareness raising and capacity building workshops for Government officials at policy making level and key industry stakeholders – one or more workshops per region			April 2013 to September 2013
	2.3: Organization of capacity building training sessions at a more technical level on how to use ForFITS – at least one training session per region			April 2013 to September 2013
Project evaluation	3: Collecting and evaluating replies to questionnaires and other information. Preparing a final report on the project evaluation			October 2013 to December 2013

## References

UNECE website on Global Warming and Transport:  
[http://www.unece.org/trans/theme\\_global\\_warm.html](http://www.unece.org/trans/theme_global_warm.html)

UNECE website on the WP.29 Round Table on Climate Change and Transport:  
[http://www.unece.org/trans/events/ClimateChange\\_Transport.html](http://www.unece.org/trans/events/ClimateChange_Transport.html)

UNECE website on Vehicle Regulations and Transport Innovations  
<http://www.unece.org/trans/main/welcwp29.htm>

1st International Transport Forum in Leipzig (Germany), on 29-30 May 2008; Key messages:  
<http://www.internationaltransportforum.org/Topics/pdf/KeyMessages2008.pdf>

UNESCAP website:  
<http://www.unescap.org/ttdw/index.asp>

UNECLAC website:  
<http://www.eclac.cl/drni/>

UNESCWA website:  
<http://www.escwa.un.org/>

UNECA website:  
<http://www.uneca.org/>

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