

# **General Transport Master Plan for România Environmental Report Non-technical summary**



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General **Transport Master Plan for**  
**România**  
 Environmental **Report**  
 Non-technical **summary**

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## Abbreviations and Acronimes

**A:** Motorways („Autostrăzi”)

**CF:** Railway line

**CFR SA:** National Railway Company, the entity responsible for managing and administering the national railway infrastructure

**CLC:** Corine Land Cover

**CNADNR:** National Company of Motorways and National Roads in Romania, the entity responsible for the management and administration of national road infrastructure.

**CO:** Carbon monoxide

**CO<sub>2</sub>:** Carbon dioxide

**D N/E:** National and European Road („Dumuri Naționale si Europene”)

**DC:** Communal Road („Drumuri Comunale”)

**DJ:** County Road („Drumuri Judetene”)

**DN:** National Road („Drumuri Nationale”)

**DRDP:** Regional Directorate of Roads and Bridges

**EA/AA:** Appropriate Assessment

**EEA:** European Environmental Agency

**EIA:** Environmental Impact Assessment

**ER:** Environmental Report

**EU:** European Union

**GD:** Government Decision

**GEO:** Government Emergency Ordinance

**GHG:** Greenhouse Gas

**GIS:** Geographical Information System

**GTMP:** General Transport Master Plan

**MECC:** Ministry of Environment and Climate Change

**MT:** Ministry of Transport

**N<sub>2</sub>O:** Nitrous Oxide

**NEPA:** National Environmental Protection Agency

**NIS:** National Institute of Statistics

**NOx:** Nitrogen oxides

**NSWM:** National Strategy for Waste Management

**NTM:** National Transport Model

**PM<sub>2.5</sub> / PM<sub>10</sub>:** Particulate Matter

**SCI:** Site of Community Importance

**SEA:** Strategic Environmental Assessment

**POST:** Sectorial Operational Programme for Transport

**SOx:** Sulphur dioxide

**SPA:** Special Protection Area

**TDW:** tons deadweight (deadweight - maximum load capacity of a merchant ship, representing reserves of fuel, oil and water, supplies and payload)

**TEN-T:** Trans-European Transport Network

**TEU:** Containers equivalent (20-foot equivalent)

**WG:** Working Group

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## 1. Introduction

The General Transport Master Plan for Romania (GTMP) is part of plans category that are subject to the Strategic Environmental Assessment (SEA). In accordance with the decision no. 145790/23.10.2012 issued by the Ministry of Environment and Climate Change - Impact Assessment and Pollution Control Directorate, Master Plan is subject to environmental assessment procedure, according to GD 1076/2004 on establishing the environmental assessment procedure for plans and programs, respectively the *appropriate assessment procedure*.

This Environmental Report was prepared by AECOM Ingineria, company enrolled in the National Register of environmental studies elaborators, according to Order no. 1026/2009, for the preparation of environmental reports, environmental impact reports, environmental balances, site reports, appropriate assessment studies and security reports, at position 567.

The Environmental Report includes the following information:

- general information on the GTMP content, main, specific and environmental objectives of the GTMP;
- analyse the relationship with other relevant plans and programs;
- relevant aspects of the current status of the environment and its likely evolution if GTMP is not implemented;
- environmental characteristics of the area likely to be significantly affected;
- existing environmental problems relevant to the transport sector;
- environmental protection objectives, established at national, community or international level, that are relevant to GTMP;
- potential significant environmental effects and appropriate assessment findings;
- potential significant environmental effects, including on health, in a transboundary context;
- proposed measures to prevent, reduce and compensate as completely as possible any adverse effect on the environment of implementing the plan or program;
- statement of the reasons which led to selecting the chosen alternatives and a description of how the assessment was carried out, difficulties found when processing the information requested;
- description of the measures considered for monitoring the significant effects of implementing the plan or program;
- general conclusions drawn from the Strategic Environmental Assessment
- a non-technical summary of the information provided.

For the GTMP was conducted the Appropriate Assessment Study and conclusions of this study were included in the Environmental Report.

## 2. General presentation of the General Transport Master Plan

General Transport Master Plan (GTMP) provides a development strategy of the transport sector in Romania for the coming years and has implementable solutions for the problems and requirements of the transport sector in Romania.

Master Plan identifies projects and policies considered to be the most suitable to meet the requirements of the National Transportation system in Romania for the next 5 to 15 years for all transport modes, while providing a solid and analytical base, when choosing those policies and projects .

GTMP is a strategic document that will underpin the integrated planning investments in transport for the period 2014-2030 and is a mandatory document without which Romania will not be able to access structural funds for transport for the period 2014-2020.

GTMP is the document that sets priorities for investment in the TEN-T core network and comprehensive network and secondary connectivity, expected to be completed with RDFE and cohesion funds.

GTMP contribute to the development of the Unique European Transport Area in accordance with Article 10 of Regulation (EU) No.1315 / 2013 of the European Parliament and of the Council.

*The general objective of the General Transport Master Plan is:*

***Ensure conditions to create an efficient, sustainable, flexible and secure transport system, key concern for the economic development of Romania.***

This article recognizes the vital importance of an efficient transport system in the country's economic development. Development of the transport system (including modes of road transport, rail, air, naval, intermodal) should focus on:

- **Economic efficiency:** the transport system must be economically efficient in terms of transport operations and for the users themselves. In particular the benefits from the transport system should exceed the costs of transport. The investment should favour the equity to Romanian citizens.
- **Accessibility:** a transport system that allows facilitating access between all country regions. Moreover, the transport system must be configured to allow economic development at national and regional levels.
- **Reduce the environmental impact:** the development of a modern transport infrastructure, taking into account the environmental effects, minimizing the impact on air quality and noise reduction associated to transport activity.
- **Sustainability:** the so-called sustainable transport modes that are more efficient in terms of energy consumption and produce less emissions should be developed with priority;
- **Security and Safety:** investment in transport sector must produce a safer transportation system.

*The specific objective of the plan is:*

***Development of transport policy instruments to promote the development of a sustainable transport system, with balance between modes of transport, on which to base the development of POS Transport for 2014-2020 period and other decisions related to optimal planning of investment in the transport infrastructure .***

#### *Environmental Objectives of the GTMP*

For GTMP were established and agreed at the meeting of the working group constituted for the environmental assessment procedure general environmental objectives (OM1) and four specific environmental objectives (OM1-1 - OM1-4) as follows:



- OM1. Development of a modern transport infrastructure, taking into account the environmental effects
- OM1-1. Promoting investment in transport projects that contribute to a sustainable transport system with measures to avoid and reduce adverse effects, such as: pollutants emissions in the atmosphere, noise pollution in urban areas and on roads with heavy traffic, water and soil pollution due to diffuse sources, the impact on the landscape and cultural heritage;
- OM 1-2. Reduction of greenhouse gas emissions from the transport sector;
- OM 1-3. Protection of human health by improving the environment conditions and safety of transport;
- OM 1-4. Reducing the impact on biodiversity by providing measures to protect and conserve biodiversity and ensure consistency of the national network of protected areas.

For GTMP elaboration were considered for the following time horizons:

- short term, for 2014 year;
- medium term, for 2020 year;
- Long-term for 2030 year.

For GTMP were analysed four scenarios:

1. *"Do nothing" Scenario - which does not propose any measure or investment for the development/modernization of transport infrastructure (DN)*
2. *"Reference case" ("Do Minimum") - which takes into account projects already under construction/implementation or for which funding is ensured (DM or Ref).*

This scenario includes a number of 106 projects of which:

- 51% addresses to road sector (include work for building road links, motorways, bypasses, works for the rehabilitation of bridges/crossings, road rehabilitation);
- 28% addresses to the railway sector (include works for rehabilitation/modernization of railways and railway stations, rehabilitation of bridges/passages/tunnels/ railway culverts, current repairs, other types of projects - for the environment/equipment acquisition)
- 19% addresses to the naval sector - ports and waterways (including development works and port infrastructure modernization, navigation conditions improvement on the Danube)
- 2% of all projects identified address to the aviation sector (including projects for rehabilitation/modernization of airports)

„Do Minimum” Scenario does not propose any project for the intermodal sector.

3. *"The Development Scenario" required by the specification book consider infrastructure projects needed to eliminate bottlenecks, increasing accessibility of regions and cities in Romania identified for the time horizons 2014, 2020 (2020 Strategy), 2030 (2030 Strategy).*

This "Development scenario" includes an assumed number of road projects that will contribute to expanding the network of motorways/expressways/bypass compared to the reference case scenario, propose investments for rehabilitation of existing roads and considerable investment in the railways sector by modernizing the main corridors of the TEN-T (Trans-European Transport corridors), in order to reach 160 km/h speed including improvements in terms of rolling stock and station modernizations, investments for the improvement of navigation on the Danube and creation of new waterways, and investments for modernization/development of ports, airports modernization.

The following table shows the nature of the investment proposed for the development scenario - the list of projects available on 10/22/2014.

The Environmental Report for the development scenarios "Do Something" and "Core TEN-T" take into account in the environmental assessment an extended version of projects (the so-called "worst-case scenario"), which includes, besides the projects presented in the GTMP version of 08.31.2014 (see

Annex 3A) and projects that require a further reevaluation/testing using the National Transport model. The list of proposed investments for this maximal alternative that takes into account the observations/comments from the public during the GTMP public debate (1-15.10.2014) is presented in Appendix 3C. Types of investments proposed for each transport sector, are presented in the following table.

<b>Development Scenario requested through the Specification Book (ES/EES) 22.10.2014</b>
<b>Types/categories of proposed investments</b>
<p><b>120 projects</b> of which:</p> <ul style="list-style-type: none"> <li>• 64 projects address to the road transport sector and includes the following types of projects: <ul style="list-style-type: none"> <li>– 8 projects for new motorways - 887 km;</li> <li>– 17 projects for the construction of express roads (including certain bypass on their route and penetrations to the bypasses) - 2241 km;</li> <li>– 15 projects for the construction of bypasses - 182 km;</li> <li>– 24 projects for road rehabilitation Transregio and Eurotrans - 3225 km.</li> </ul> </li> <li>• 16 projects address to the rail sector and includes projects for improving travel times, rehabilitation of railway, electrification and rolling stock acquisitions - 4536 km;</li> <li>• 12 projects address to the intermodal transport sector;</li> <li>• 14 projects address to the water transport sector (ports and waterways) and includes the following types of projects: <ul style="list-style-type: none"> <li>- Development and modernization of port infrastructure - 11 projects;</li> <li>- Improvement of navigation on the Danube (585 km) - 1 project;</li> <li>- Construction of a new Bucharest-Danube channel (104 km) - 1 project;</li> <li>- Works for bank protection of Sulina Channel (63 km) - 1 project.</li> </ul> </li> <li>• 14 projects addressing air transport sector.</li> </ul>

#### 4. „Core TEN-T” Scenario.

In addition to the terms of reference, AECOM team commissioned by the European Commission, elaborated a second development scenario called "Core TEN-T" (CTT) which differs from previous scenario only through the number of projects proposed for the road sector - for this sector are taken into account only projects contributing to the completion /expansion of the Core TEN-T network (see Annex 3B). This scenario proposes, for the road sector, 10 motorway projects and one investment project in terms of transport safety. Of these projects, two are also included in the development scenario (ES and EES). For the other transport sectors (rail, water, air and intermodal) hierarchy of investments is similar to that proposed development scenario required by the terms of reference ("Do Something").

The following table shows the nature of the proposed investment for the "Core TEN-T" Scenario.

The lists of the proposed investments are presented also in the annexes of the Environmental Report.

Development Scenario additionally proposed by the Consultant (CTT) „Core TEN-T” Scenario – 22.10.2014
Total no. of projects
<p><b>67 projects</b> of which:</p> <ul style="list-style-type: none"> <li>• 11 projects address to the road transport sector and contains the following categories of projects:               <ul style="list-style-type: none"> <li>- 1 project that includes interventions for safety for black spots (eg: realization of continuous lanes, refuge for pedestrians, speed restrictions, traffic monitoring systems, safety parapets, etc.);</li> <li>- 10 projects for motorway construction (1589 km)</li> </ul> </li> <li>• 16 projects address to the rail transport and includes projects for improving travel times, rehabilitation of railway, electrification and rolling stock acquisitions - 4536 km</li> <li>• 12 projects address to the intermodal transport sector;</li> <li>• 14 projects address to the water transport sector (ports and waterways) and includes the following types of projects:               <ul style="list-style-type: none"> <li>- Development and modernization of port infrastructure - 11 projects;</li> <li>- Improvement of navigation on the Danube (585 km) - 1 project;</li> <li>- Construction of a new Bucharest-Danube Channel (104 km) - 1 project;</li> <li>- Works for bank protection of Sulina Channel (63 km) - 1 project.</li> </ul> </li> <li>• 14 projects addressing air transport sector.</li> </ul>

To establish the implementing hierarchy of projects were used the following evaluation criterias<sup>1</sup>:

- A. Economic impacts
- B. Transport policies - Extension/completion Core TEN-T network/Comprehensive;
- C. Environmental Impacts
  - o Natura 2000 Network.
  - o Noise pollution
  - o Atmosphere pollution at local level (pollutant emissions like: particulate matter, NO<sub>x</sub>, SO<sub>2</sub> and COVs).
  - o Climate change.
  - o Transport safety

<sup>1</sup> National Assessment Guide for Projects in the Transport Sector and Project Prioritization Methodology of the Master Plan, Volume 2, Part C: Guidance on Developing the Cost-Benefit Economic and Financial Analysis and Risk Analysis, AECOM

- D. Sustainability
- E. Economical balanced development – mobility and accessibility increase.

For projects selected for this scenario was established as a hierarchical structure for implementation: "Development based on economic sustainability" or "Do Something" (ES) based on A, B, D criteria and "Development based on economic and environmental sustainability" (EES) or "Do Something Policy" based on the A, B, C, D, E criteria.

*The scenario chosen for GTMP is the scenario "Development based on economic and environmental sustainability." This scenario provides the best economic and environmental performance, with the best cost-benefit ratio.*

The Environmental Report, for the "Do Something" development scenario and "Core TEN-T" development scenario takes into account, in the environmental assessment an extended version of projects (the so-called "worst-case scenario"), which includes, besides projects presented in the GTMP version of 31.08.2014 and projects requiring a further reevaluation / testing using the National Transport model.

### 3. Relationship with other plans and programs

There were analysed the most important plans, programs, strategies, policies, existing conventions both at national and at European level that are related to the transport sector in order to identify common issues and themes with those of the General Transport Master Plan under the strategic environmental assessment.

The list of documents reviewed is:

- European regulations
  - o Regulation (EU). No. 1315/2013 of 11 December 2013 on the Union guidelines for the development of trans-European transport network and Decision repealing no. 661/2010/EU<sup>2</sup>
- European and national policies
  - o EU Transport White Paper 2011 (EU White Paper on Transport 2011)<sup>3</sup>
  - o Governing Programmes 2013-2016 - Transport policy proposed by the Romanian Government<sup>4</sup>
  - o Integrated Strategic Plan in transport and infrastructure domain - June 2009 (Ministry of Transport Policy)<sup>5</sup>
- Partnership Agreement
  - o Partnership agreement proposed by Romania for the programming period 2014-2020 (Ministry of European Funds)<sup>6</sup>
- European and national programs

<sup>2</sup> [http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2013.348.01.0001.01.ENG](http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2013.348.01.0001.01.ENG)

<sup>3</sup> [http://ec.europa.eu/transport/themes/strategies/2011\\_white\\_paper\\_en.htm](http://ec.europa.eu/transport/themes/strategies/2011_white_paper_en.htm)

<sup>4</sup> <http://www.drp.gov.ro/download.php?6b3a2e12fa92184a320aeeaa3f853cf>

<sup>5</sup> [http://www.mt.ro/strategie/plan\\_strategic/planul%20strategic%20integrat%20revizuit%202009.pdf](http://www.mt.ro/strategie/plan_strategic/planul%20strategic%20integrat%20revizuit%202009.pdf)

<sup>6</sup> [http://www.fonduri-ue.ro/res/filepicker\\_users/cd25a597fd-62/2014-2020/acord-parteneriat/Acord\\_de\\_parteneriat\\_01.10.2013.pdf](http://www.fonduri-ue.ro/res/filepicker_users/cd25a597fd-62/2014-2020/acord-parteneriat/Acord_de_parteneriat_01.10.2013.pdf)

- An Integrated European Action Programme for Inland Waterway Transport - NAIADES I and II <sup>7</sup>
- Sectorial Operational Programme for Transport (POST) 2007-2013, Revision 2<sup>8</sup>
- Strategic Program for the Development of Airport Infrastructure at Bucharest Otopeni International Airport (1999-2015) - Law no. 220/2002 (Official Monitor No. 288 / 29.04.2002) approving GO no. 64/1999 (Official Monitor No. 405 / 26.08.1999)
- Strategic Program for the Development of Airport Infrastructure SN International Airport Constanta SA for the 2002-2015 period- GD. No. 623/2002 (Official Monitor No. 458 / 27.06.2002)
- Strategic Program for the Development of Airport Infrastructure SN International Airport Timisoara SA for the 2002-2015 period - GD. 60/2003 (Official Monitor No. 76/06.02.2003) amending GD 615/2002 (Official Monitor 488/08.07.2002)
- National plans
  - National Action Plan for Energy Efficiency (NAPEE) - developed in 2007, currently under review
  - National Spatial Plan (NSP) - Section 1 Transport Networks. Key rail and road transport networks (Law 363/2006)
  - LAW no. 203 of 16 May 2003 on the construction, development and modernization of transport network of national and European interest
  - Management Plan for the National section of the International Danube River Basin - Synthesis of management plans at basin/basin areas level
  - Development Plan of the Northeast Region 2014-2020, version June 2014<sup>9</sup>
  - Regional Development Plan of South East Region for 2014-2020, consultative version <sup>10</sup>
  - Regional Development Plan of South Muntenia Region for 2014-2020, consultative version July 2014<sup>11</sup>
  - Regional Development Plan of South West Region for 2014-2020, version June 2014<sup>12</sup>
  - Regional Development Plan of West Region for 2014-2020, consultative version <sup>13</sup>
  - Regional Development Plan of North-West Region for 2014-2020, consultative version <sup>14</sup>
  - Regional Development Plan of the Center Region for 2014-2020, consultative version <sup>15</sup>
  - Regional Development Plan of Bucharest-Ilfov Region for 2014-2020, consultative version June 2014<sup>16</sup>
  - Urban mobility plans
- European and national strategies
  - Europe Strategy 2020<sup>17</sup>

<sup>7</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2006:0006:FIN:EN:PDF>

<sup>8</sup> Programul Operațional Sectorial de Transport 2007 – 2013 (revizia 2 - aprobat la 26.07.2013) Ministerul transporturilor și infrastructurii. [http://www.ampost.ro/fisiere/pagini\\_fisiere/RO-POST\\_revizia\\_2.pdf](http://www.ampost.ro/fisiere/pagini_fisiere/RO-POST_revizia_2.pdf)

<sup>9</sup> <http://www.adrnorddest.ro/user/file/pdr/PDR%20NE%202014-2020%20-%20var%20mai%202014%20secured.pdf>

<sup>10</sup> [http://www.adrse.ro/DezvoltareRegionala/PDR\\_2014-2020.aspx](http://www.adrse.ro/DezvoltareRegionala/PDR_2014-2020.aspx)

<sup>11</sup> <http://www.adrmuntenia.ro/imagini/upload/pdr20142020draft31iulie.pdf>

<sup>12</sup> [Regionala/00000125/mwawx\\_Planul%20de%20Dezvoltare%20Regionala%202000-2002\\_98043b.pdf](http://www.adrse.ro/00000125/mwawx_Planul%20de%20Dezvoltare%20Regionala%202000-2002_98043b.pdf)

<sup>13</sup> <http://www.adrvest.ro/index.php?page=articol&aid=1106>

<sup>14</sup> <http://www.nord-vest.ro/planul-de-dezvoltare-regionala-2014-2020--eID1614.html>

<sup>15</sup> <http://www.adrcentru.ro/Lista.aspx?t=ADElaborare%20PDR%202014-2020>

<sup>16</sup> <http://www.adrbi.ro/media/9437/PDR-BI%20varianta%2012%20iunie%202014.pdf>

<sup>17</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:RO:PDF>

- European Union Strategy for the Danube Region<sup>18</sup>
- EU Strategy on adaptation to climate change (2013)<sup>19</sup>
- Marine Environment Strategy (Directive 2008/56/EC of the European Parliament and of the Council from 17 June 2008 establishing a framework for community action in the field of marine environmental policy)<sup>20</sup>
- Sustainable transport strategy for 2007-2013 period and 2020, 2030<sup>21</sup>
- Intermodal transport strategy in Romania – 2020<sup>22</sup>
- Romanian National Strategy on Climate Change 2013 – 2020<sup>23</sup>
- National Strategy for Sustainable Development of Romania 2013 - 2020 - 2030 Horizons
- National Strategy and Action Plan for biodiversity conservation 2010 -2020<sup>24</sup>
- National Strategy for Road Safety 2011-2020<sup>25</sup> - consultative version
- National Waste Management Strategy 2014-2020<sup>26</sup> approved by Government Decision no. 870/2013
- Conventions
  - Law 98/1992 ratifying the Convention on the Protection of the Black Sea against Pollution, signed in Bucharest on 21 April 1992 (known as the "Bucharest Convention")
  - Convention on the navigation regime on the Danube (Belgrade, 1948) ratified by Decree no. 298 of 30 October 1948 Additional Protocol of 26 March 1998 to 18 August 1948 Convention on Danube navigation system \*)
  - Law 14/1995 ratifying the Convention for the Danube River protection
- Other documents
  - The preliminary report for the transport sector elaborated within the project: „The operationalization of the national strategy and the development of the climate component of the Operational Programmes 2014-2020", developed by the MECC
  - The working document of the European Commission - "Adapting Infrastructure to Climate Change"<sup>27</sup>
  - „Joint Statement on Guiding Principles for the Development of Inland Navigation and Environmental Protection in the Danube River Basin)<sup>28</sup>.

Following this analysis the following conclusions were drawn:

- Main European and national transport objectives are shared with the GTMP and follow the below:
  - Ensuring economic development: transport sector should contribute to the development of national economy and the economic benefits should exceed its costs;

<sup>18</sup> [http://ec.europa.eu/regional\\_policy/sources/docgener/panorama/pdf/mag37/mag37\\_ro.pdf](http://ec.europa.eu/regional_policy/sources/docgener/panorama/pdf/mag37/mag37_ro.pdf)

<sup>19</sup> <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2013:0216:FIN:RO:PDF>

<sup>20</sup>

[http://europa.eu/legislation\\_summaries/maritime\\_affairs\\_and\\_fisheries/fisheries\\_resources\\_and\\_environment/l28164\\_ro.htm](http://europa.eu/legislation_summaries/maritime_affairs_and_fisheries/fisheries_resources_and_environment/l28164_ro.htm)

<sup>21</sup> [http://www.mt.ro/strategie/strategii%20sectoriale\\_acte%20normative/strategie%20dezvoltare%20durabila%20noua%20ultima%20forma.pdf](http://www.mt.ro/strategie/strategii%20sectoriale_acte%20normative/strategie%20dezvoltare%20durabila%20noua%20ultima%20forma.pdf)

<sup>22</sup> [http://www.mt.ro/nou/\\_img/documente/strategie\\_de\\_transport\\_intermodal\\_text.pdf](http://www.mt.ro/nou/_img/documente/strategie_de_transport_intermodal_text.pdf)

<sup>23</sup> [http://www.mmediu.ro/beta/wp-content/uploads/2012/10/2012-10-05-Strategia\\_NR-SC.pdf](http://www.mmediu.ro/beta/wp-content/uploads/2012/10/2012-10-05-Strategia_NR-SC.pdf)

<sup>24</sup> <http://biodiversitate.mmediu.ro/implementation/legislaie/politici/strategia-nationala-si-planul-de-actiune-pentru-conservarea-biodiversitatii/anexa-strategia-nationala-si-planul-de-actiune-pentru-conservarea/snpacb.pdf/download>

<sup>25</sup> [http://www.mt.ro/transparenta/2012/ianuarie/1\\_17%20Anexa1.pdf](http://www.mt.ro/transparenta/2012/ianuarie/1_17%20Anexa1.pdf)

<sup>26</sup> [http://www.mmediu.ro/file/2012-10-26\\_eipsngd.pdf](http://www.mmediu.ro/file/2012-10-26_eipsngd.pdf)

<sup>27</sup> [http://ec.europa.eu/clima/policies/adaptation/what/docs/swd\\_2013\\_137\\_en.pdf](http://ec.europa.eu/clima/policies/adaptation/what/docs/swd_2013_137_en.pdf)

<sup>28</sup> [www.icpdr.org](http://www.icpdr.org)

- Sustainable development: the transport system must be efficient in terms of power consumption, providing reserves for future generations;
  - Safety: the transport system must provide security;
  - Provision of funds: The Master Plan sets out priorities for investment in the TEN-T core network and global network and secondary connectivity, expected to be completed with funds
- The GTMP objectives integrate the relevant environmental objectives set at national/European level for the transport sector. In the selection process of projects the environmental criteria were used: climate change, air pollution, noise, impact on Natura 2000 network transport safety - protection of the population.

#### 4. Relevant aspects of the current environmental status

The analysis of the current environmental status had as main purpose highlighting the influence of the transport sector on the quality of the environment.

To analyse the current state of the environment were used as input data the existing information at national level (eg: Reports on the environmental status; the River Basin Management Plans; statistics and various reports elaborated by public institutions responsible for assessing and monitoring environmental factors; statistics available at the National Institute of Statistics, annual monitoring results available) available at the time of writing the Environmental Report.

There were identified the effects of the transport sector on the following environmental components: air, climate change, water, soil, waste, biodiversity, population and human health, noise, natural landscape, cultural heritage, sustainable transport, energy efficiency, conservation/natural renewable resource use, awareness degree of environmental issues from transport.

##### Air

The results of air quality monitoring conducted at national level for the reference period 2011-2012 led to the conclusion that in the urban agglomerations, road traffic is a major source of air pollution. *Most exceedances of the admissible limit values were registered in the traffic type monitoring stations located in the urban areas from Bucharest, Brasov, Iasi, Craiova. Pollutants for which exceedances were registered during the monitoring were: NO<sub>x</sub>, SO<sub>x</sub>, PM<sub>10</sub>.*

From the results analysis of the national emissions inventories of greenhouse gas with acidify and eutrophication effect, of ozone precursors can be concluded that for the period 2006-2011 the annual emission levels of sulphur dioxide, nitrogen oxides, volatile organic compounds and ammonia were below the levels set by the national emission superior limit<sup>29</sup>.

The transport sector is among the economic sectors with high share in the total greenhouse gas emissions with acidifying and eutrophication effect and ozone precursors inventoried. Road transport has the highest contribution to air pollution, especially in NO<sub>x</sub> emissions of heavy metals (Pb), NMCOV.

##### Climate Change

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<sup>29</sup> Annual report on the environmental status, 2012, ANPM  
[http://www.anpm.ro/Mediu/raport\\_privind\\_starea\\_mediului\\_in\\_romania-15](http://www.anpm.ro/Mediu/raport_privind_starea_mediului_in_romania-15)

The transport sector makes a significant contribution to greenhouse gases emissions (GHG). The analysis of information provided by the latest national inventory submitted by Romania in 2013 shows that it maintained the high contribution to emissions of greenhouse of the energy sector - 69.98% (the highest percentage) of total GHG emissions of which the subsector of energy industry is 42.43% and 16.89% transports<sup>30</sup>.

Compared with estimates of GHG emissions in 1990 from the transport sector, for the period 2000-2011 that were observed the following aspects:

- A slight decrease of the total quantity of NO<sub>x</sub> and CH<sub>4</sub> ;
- A significant reduction of the total quantity of NMCOV , CO, SO<sub>2</sub> ;
- An increase of the total quantity of emissions of CO<sub>2</sub> and N<sub>2</sub>O ;
- The total quantity of GHG emissions from the transport sector is still high;
- Road transport has a significant contribution to the total GHG emissions (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, NO<sub>x</sub>, NMCOV, CO);
- If until 2008 road, the road transport had a significant contribution to SO<sub>2</sub> emissions, after this year situation has changed, railway transport becoming the main SO<sub>2</sub> emissions generator;

Also the climate change can have effects on the transport infrastructure, this being vulnerable to the extreme weather events. Climate change impacts are manifested mainly by changes in the climate regime, leading to the occurrence of extreme weather events, e.g. rainfall, temperature increasing or decreasing, strong winds, storms, floods appearance, desertification, increased instability of slopes.

### **Energy efficiency and use of natural renewable resources**

Resource consumption for the transport sector involves the resources used to build/modernization/rehabilitation of transport infrastructure (land surfaces, stone, sand, water, wood) and resources used for effective deployment of the transport activity.

Transport is an activity sector with a significant dependence on fossil fuels. Nationally, between 2000-2011, transport was in third place in the hierarchy of large energy consumers (oil tonnes equivalent), after domestic consumption and the industrial one. Among transport modes, road transport is the sector with the highest consumption of energy (in 2011 it recorded consumption of almost 86% of total consumption for the transport sector).

### **Water**

The main environmental issues at national level for surface waters are represented by industrial and domestic wastewater discharge insufficiently treated.

Transport sector's contribution to pollution of surface and groundwater is insignificant compared to the industrial sector.

Transportation is not directly connected with the qualitative and quantitative changes in the status of groundwater.

Existing road and rail routes crosses a large number of surface water courses. At national level information is not available to perform an analysis on the way how the transport activity (by transport sectors) influences water quality for each watercourse that is directly related to the transport infrastructure.

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<sup>30</sup> National Inventory of Greenhouse Gas reference period 1998 - 2011, submitted in 2013



Danube is the main waterway in Romania and water source for different uses, source of food (fish fauna), hydro energy source through the Portile de Fier I and II.

The current regime of navigation on the Danube is regulated by the 1948 Belgrade Convention ratified by Decree no. 298 of 30 October 1948. Navigation in the lower Danube and on Portile de Fier sector is made in accordance with the rules set by the administrations in the areas indicated. Navigation in the other sectors of the Danube is performed in accordance with the rules established by the respective Danubian countries whose territory is crossed by the Danube and areas where the Danube banks belong to two different states, according to the rules agreed between these states.

Navigation regulation in the Romanian Danube sector between 1075 km and exit into the sea, was developed based on the fundamental provisions regarding navigation on the Danube elaborated by the Danube Commission and approved by MO no. 859/07.06.2013. This regulation includes in Chapter 10 special provisions for preventing pollution of the Danube waters and eliminates waste generated on the board of ships

The competent authorities of the Danube countries are invested with rights and obligations on the implementation of the requirements for pollution prevention on Danube for the navigation activity. Provisions to prevent pollution of the Danube are treated in Chapter II of the Danube Commission's Recommendations.

Danube water quality is influenced by the type of activities that take place on the Danube or are related to the Danube, and also with water quality flowing into the Danube.

Activities that may cause pollution of surface waters associated to the transport sector are:

- Hydro-technical works (dredging, drainage, etc.) that can cause changes in hydrology and morphology system;
- Various accidents occurring in freight transport sector (losses of pollutants);
- Uncontrolled discharge of pollutants into the water (rainwater contaminated with petroleum products, various substances used for snow removal)
- Navigation and works to ensure optimal conditions for navigation - navigation activity may contribute to the pollution of the Danube in the following situations: accidental spillage during the loading and unloading of goods, accidental spillage during refuelling manoeuvres for ships, various accidents where ships may be involved during transport or stationing in port (collisions with other vessels, fires/explosions on board, technical malfunctions that can lead to creaking, cracking of the vessel, etc.)
- Improper collection of contaminated rainwater with oil from the roads.
- Gases emissions from traffic contribute to acidification increasing in the atmosphere with direct and/or indirect effects on all components of the environment, including water quality.
- Building bridges/viaducts for ensuring passage of roads, railways across the water can cause hydro-morphological changes or require corrections of beds. The hydro-morphological characteristics of watercourses condition the status and ecological functioning of the aquatic environments.

## **Soil and subsoil**

To assess the current status and influence on soil of the transport sector were pursued the following issues: land use, processes affecting soil quality and critical areas for soil degradation.

Development of transport infrastructure would lead to occupation of land areas and changes in their category of use. Currently, as mentioned in the previous paragraphs, roads and railways occupies about 1.63% of the total area of the country.

The transport sector can contribute to soil pollution by accidental spills of petroleum products and chemicals, the use of anti-freeze/snow removal products on road surfaces in winter, through air emissions, through rainwater that washes the rolling surfaces.

Transport has a high contribution to pollutants emissions into the atmosphere, which in turn can contribute to soil pollution for the surrounding areas of roads.

*There are no information on the contribution of transport activity or of the works for construction/modernization/expansion of transport infrastructure that lead to soil pollution. The national records show that the soil quality is affected mainly by natural/or anthropogenic processes.*

The development of economic activities in improper conditions and the lack of a legal framework to prevent pollution and soil and subsoil protection led to the emergence of land areas contaminated with various pollutants. Most sites are contaminated and potentially because of the oil extraction activities and the oil industry. *Only one site is potentially contaminated because of the transport activity (more precisely a related activity - storage and refuelling).*

## **Waste management and hazardous substances**

The activity of transport and transport infrastructure cannot be considered as important sources of waste generation compared to industrial activities.

From the transport sector can be generated waste during construction/modernization/rehabilitation of transport infrastructure and as well in the operating phase (waste associated to the transport activity by road, rail, naval, air and intermodal) respectively for its maintenance.

Improper maintenance of the transport infrastructure, the quality of their structure could increase the amount of waste associated to the transport activity (waste resulted especially from repair work and maintenance of transport vehicles, such as waste oil, tires, used batteries etc.).

The main groups of waste which can be directly related to the activity of transport and transport infrastructure are:

- waste generated during construction/rehabilitation/modernization/maintenance of transport infrastructure and related facilities: waste of concrete, bricks, pottery remnants; waste of wood, glass, plastic; waste of asphalt, tar and tarred products; metallic scrap; excavation scrap of earth, stone, gravel; insulating materials waste; mixed construction and demolition waste; waste containing oil - eg. separators and decanters from the motorways area.

These types of waste may be inert, non-hazardous or contaminated with various hazardous substances the selective collection being in this case mandatory.

According to the information presented on the European Commission website<sup>31</sup>, in 2011 was conducted a study on "Management of construction and demolition waste in the EU - requirements arising from the Waste Framework Directive and assessing the situation on medium term". According to this study, Romania is among the countries that did not report the quantities of waste generated by construction and demolition activities.

- waste generated by transport activity;
  - spent car batteries;
  - end of life vehicles;
  - decommissioned ships;
  - used tires;
  - oil waste.
- Other types of waste generated during the operation of various objectives (CFR depots, road maintenance centres, car parking, airports, ports, etc.)

Collection, transportation and storage of waste is achieved only by the economic operators who are authorized, having the environmental permit required by law for the activities of collection/temporary storage/treatment/ recovery/disposal.

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<sup>31</sup> <http://ec.europa.eu/>

The hazardous waste and hazardous substances transport has no impact on the environment, but only in case of accidents involving transport means or in case of any accidental spills during transport. These types of accidents are unpredictable in terms of time, place, type or intensity. The main components that are affected and, in certain circumstances, can have long-term negative effects, depending on the transported substance/waste, are: air, soil/subsoil and water (surface and underground).

## **Biodiversity**

The consequences of transport activity on biodiversity are referring to significant changes in the structure and functioning of natural ecosystems, leading to:

- Loss and fragmentation of habitats - for example, conversion of land for building new transport corridors or expanding of the existing ones, represent the cause of biodiversity loss, leading to degradation, habitat destruction and fragmentation; fragmentation/barrier effect may cause adverse effects on ecosystems, resulting in the loss of biodiversity and ecosystem stability.
- Changes in the population density of certain species of flora or fauna;
- Wildlife mortality (through their involvement in various accidents)
- Impairment of habitats conservation status and of flora and fauna species.

It should be noted that some transport infrastructure dates from a time prior to the appearance of specific legislation for protected natural areas and Natura 2000 sites.

The development of transport sector (road construction, railway, motorways, etc.) has a direct and often irreversible impact upon flora, fauna respectively on the natural ecosystems.

The main anthropogenic pressures with significant impact upon biodiversity are coming from the development of socio-economic activities under development:

- residential and commercial development;
- agriculture and aquaculture (intensive);
- mining and energy production activities;
- **increased investment for infrastructure development (road, rail and river transport, tourism, production and transport of energy, etc.)**
- tourism and recreation;
- use of natural resources;
- expansion and intensification of agriculture;
- **expansion and modernization of existing touristic ports: dredging activities;**
- petrochemical industry, refineries;
- extractive industry: ore, sand in shallow coastal areas;
- power industry: wind farms, small hydropower etc.;
- military and defence activities (land-sea shooting, high-frequency antenna installation, etc.);
- invasive species (brought by people);
- pollution;
- climate change due to human activities;
- uncontrolled waste disposal;
- overgrazing;
- river regulation works, hydro-technical works and flood protection works;
- overexploitation of natural forests and massive deforestation;
- extension and development of human settlements.

### The Natura 2000 Network

A large number of roads and railways are crossing or neighbouring the protected natural areas.

Of the 148 Special Protection Areas (SPA) designated at national level, on the surface of the 129 SPAs already exists transport infrastructure elements, inside which are protected 309 bird species, of the 310 presented in the Birds Directive and in the SPAs from Romania<sup>32</sup>.

Of the 383 Sites of Community Importance (SCI) designated at national level, approximately 225 are already intersected by the current transportation infrastructure elements. 127 of the intersected SCIs contain priority habitats and 68 of the intersected SCIs contain priority species<sup>32</sup>.

According to the information included in the Natura 2000 Standard Forms, for the transport sector, investments in the transport sector that are currently exercising pressure on national Natura 2000 network are: aerodromes, heliports; railway/railway lines; transport corridors; roads, highways; roads, trails and railways; bridges, viaducts; noise pollution; tunnels; port areas.

The sector affecting mostly the SCI/SPAs (64.81% of the total of impact forms identified) is *Roads and motorways*. This sector affects 140 SCI/SPAs, 100 SCI (52 in interior and 48 in the neighbourhood) and 40 SPAs (23 in interior and 17 in the vicinity). The next sector is represented by the *Transport Corridors* - 11.57%, with 25 sites affected (12 SCIs and 13 SPAs), followed by *Railways /Railway lines* - 6.48% (9 SCIs and 5 SPAs)<sup>32</sup>.

Being declared part of the Pan-European Transport VII of EU, Danube is an important waterway that connects through the Rhine-Main-Danube Canal between Constanta port, industrial centres of Western Europe and the port of Rotterdam<sup>33</sup>. Danube is crossing from entering the country to its mouth in the Black Sea, regions with varied biodiversity, areas where there have been designated protected areas.

## Population and human health

The transport sector can have both positive and negative effects on the population and human health.

- Can have positive effects on economic and social development – the transport network is an important factor for the development of a society and development of various economic and social activities. The transport network enables accessibility respectively mobility of freight and passengers in a particular region and between neighbouring regions or far away.
- May have negative effects on the health of the population

Human health is affected by the environmental pollution and poor air quality lead to respiratory and cardiovascular diseases. In Romania, the main sources of air pollution are considered to be the transport activity (road traffic) and industrial activities. The main pollutants from transport activity affecting human health are: material particulates, COx, NOx, SOx, VOC, heavy metals, benzene and other unburned hydrocarbons.

Mortality due to respiratory and cardiovascular disease occupies a significant percentage of overall mortality. In urban areas the proportion is higher than in rural areas, the cause being that the urban environment is more polluted.

Another stressor that can worsen some conditions (deafness, mental illness, cardio-vascular, endocrine diseases) is noise. The transport sector has an important contribution to noise pollution, as evidenced by studies on the influence of noise on health made at national level in many urban centres with population of over 250,000 inhabitants (Bucharest, Brasov, Cluj, Craiova, Constanta, Galati, Iasi, Ploiesti, Timisoara) and confirmed by the information from the strategic noise maps made under the provisions of Directive 2002/49/EC of the European Parliament and Council, transposed into the national legislation by GD no.

<sup>32</sup> Appropriate Assessment Study for GTMP, AECOM - EPC Consultanță Mediu, May 2014

<sup>33</sup> Sustainable Spatial Development of the territory of Danube from Romania, Advisory Committee on Territorial Cohesion – consultative document

321/2005 on the assessment and management of environmental noise, for urban areas, airports and ports situated within them, as well as major roads and major railways.

- Lack of a safe transport can have negative effects on human life and the living environment

Transport safety is a major societal issue. The main factors for maintaining a high level of traffic safety are: the education and training of road users, providing good technical condition of the transport infrastructure and vehicles used for transport, proper signalling of the transport routes, a transport infrastructure sufficiently developed to allow traffic flow, use of intelligent transport systems to provide real-time traffic information.

The Environmental Report summarizes the information on accidents during the activity of road, rail, water and air transport and their consequences.

Worldwide, the road transport can be considered the most unsafe transport sector. Road accidents are among the leading causes of mortality (according to World Health Organization statistics on road safety in 182 countries, 2013).

Deaths from road accidents in the European countries (except Romania) decrease with a percentage of 2.93% per annum. By 2003, the number of deaths from road accidents in Romania remained under the average of the rest of the EU countries, but after 2004, Romania began to record increases in the number of deaths over the average of all EU countries.

In Romania, annually die in road accidents, an average of about 2,000 people.

The total number of injuries (of all degrees) is, in absolute terms, lower than the European average, but the trend of the total number of injuries is in a significant increase in Romania, compared to the European average downward trend.

Deaths from road accidents in Romania are with approximately 50% more than the European average.

In 2011, in Romania, approximately 250 people were killed or were seriously injured on the railway - about 10% of deaths/serious accidents on the rail sector registered in the EU27.

Of the 55 ships accidents produced in 2011, 65% resulted in property damage (damage to engines, failure in the steering system, electric fire, damage to the hull, etc.), 23% resulted in wounded, 8% resulted in deaths, and the rest did not produce damage or casualties.

The number of air accidents that occurred in Romania in the period 1923-2012 raises to 59, after which 375 people died.

### **Landscape and Cultural heritage**

Development of a society can contribute to what is called visual impact ("pollution"). The transport sector contributes to the deterioration of the landscape by fragmenting habitats, vegetation clearing, and construction of structures over water, over valleys etc.

The transport activity, especially road and rail transport, by atmospheric pollution and produced vibrations may influence the built environment, including historical monuments in the vicinity of transport routes.

During the development of construction for the transport infrastructure, as with other major projects involving excavation, there is the risk of discovery of archaeological cultural objectives requiring establishment of specific protection programs.

At national level there is no information on historical monuments affected by the transport activity and construction works for transport infrastructure.

### **Sustainable transport**

Currently, the national sustainable transport situation is not satisfactory because of the following:

- lack of funding for development of the national transport network makes progress to be very low, good results were recorded for the road sector, for projects of modernization and rehabilitation of existing national roads;
- the infrastructure network has a limited capacity, which leads to the decline in traffic of freight and passengers taking over especially in the great cities, at certain times of the year, which took effect on traffic safety and worsening the transport quality parameters, not respecting the European transport policy objectives;
- road accident rate is still high compared to the situation at European level;
- nationally, the transport is among the largest sources of air pollution.

## 5. The environmental status evolution if the General Transport Master Plan is not implemented (zero alternative)

"Zero alternative" (not implementing the GTMP) includes:

- Existing infrastructure and "*Do minimum*" Scenario (Reference Case) - projects included in the "Do Minimum" Scenario are already under construction or are part of a firm program and follows to be built, leading to a clear commitment of funding, all necessary approvals being obtained and implementation to be completed before year 2015. Projects included in the "Do minimum" scenario are projects that are already in the implementation phase, have already funds allocated and will be implemented no matter if the GTMP will be approved or not.

Through the development of the "Do Minimum" Scenario the total demand for travel on the road infrastructure will increase obviously, the road network will become a more attractive mode of transport following the completion of these projects.

Through the TEN-T IV North Corridor rehabilitation will appear improvements in terms of travel times, on specific sections of the railway line (significantly reducing the travel time). However, by achieving the Reference Scenario the railway system remains uncompetitive compared to road and inland waterway system.

By achieving the proposed projects for the road sector, a significant increase will be in vehicle kilometres for motorways (206%) and a more modest increase of traffic on the national network (40%). Increasing the demand for transport and the number of travelled kilometres will raise the amount of fuel used, implicitly increased emissions of pollutants into the atmosphere and increased emissions of greenhouse gases.

Zero Alternative (existing infrastructure + "Do Minimum" Scenario) will not lead to major changes in current trends of the evolution of state of the environment (that will be difficult to achieve the objectives set at national level for each environmental factor). The "Do Minimum" scenario particularly encourages road transport (the proposed projects will increase the demand for road transport). At European level, the main cause of increasing road congestion and energy consumption and a source of social and environmental issues, it is precisely this increasing tendency of the demand for road transport for both freight and passenger.

By applying the Zero Alternative would maintain the current growth trends in the quantities of pollutants from the transport sector, especially in large urban areas and the sectors of heavy road traffic.

Achieving the projects proposed by the "Do Minimum" scenario can lead to a local change of the natural ground geomorphology through deforestation, scraping, digging, viaducts etc. The projects included in this scenario have provided measures of architectural harmonization with the natural landscape. Late identification and localization of the archaeological sites, necessary actions once with the implementation of new infrastructure projects, may prevent the development of measures to exploit and protect them.

The projects included in the "Do Minimum" scenario for the construction of new alignments or changing the existing alignments (modernization projects of roads and railways) will lead to changing the land use,

permanent occupation of some land areas. In the surrounding areas of new roads can occur changes in land quality due to deposition of sediment particles, heavy metals.

By achieving the "Do Minimum" scenario will increase road safety degree, congestion and traffic jams will be eliminated only on the rehabilitated sectors and areas where motorways will be built. The traffic safety remains low only on transport arteries where there aren't interventions for improving transport infrastructure.

With the current inadequacy of transport infrastructure to climate change (extreme weather conditions) can exacerbate its deterioration status. Climate change may have a negative impact on transport infrastructure (road and rail), higher temperatures, floods, landslides can also cause damage and disruption to its transportation system. Fluctuations in the flow regime of the rivers and Danube river have a direct negative impact on the sector of water transport.

In case of failure in achieving the investments to improve the transportation infrastructure (alternatives that allow bypassing the densely populated areas), people will still be disturbed by noise from road traffic growth in urban areas (due to lack of motorways and bypasses which determines routing traffic to peri-urban areas).

In this situation it becomes absolutely necessary to develop a strategy for development of the transport sector to maximize positive impact on economic growth, while minimizing the negative environmental impacts.

## **6. Environmental characteristics of the likely significant affected areas**

GTMP includes as development area the entire national territory. For projects proposed by GTMP are not yet known the technical details of execution and field studies have not been conducted. No information is available in order to be spatially located exactly. The analysis was conducted at a corridor level.

In this chapter there were analysed the "*Do Minimum*" and development scenarios ("*Do Something*" *ES/EES* and "*Core TEN-T*" - *CTT*) which through the proposed investments nature (type of specific works for the proposed projects) can induce changes in the current characteristics of the environment.

The two development scenarios (*ES/EES* and *CTT*) include the same investment category for the sectors of rail, water (ports and waterways), air and intermodal, differentiating only by the projects proposed for the road sector. For the road sector the "*Core TEN-T*" scenario only includes projects to extend/complete the TEN-T core network (motorway projects).

To assess the characteristics of effects and of areas likely to be affected by the implementation of the GTMP were pursued following: type of project proposed (the nature of the proposed investment and transport sector which is addressed), general characteristics of areas for implementation that could be modified (sensitive or vulnerable areas to pollution of air, soil, water, valuable areas for biodiversity, landscape, presenting cultural value, that are densely populated) risks to human health and the environment, during which effects will be felt on the environment and human health (the execution phase of the project or the operation phase).

For projects included in the reference case (named "Do Minimum") to determine the environmental characteristics of areas likely to be significantly affected were used conclusions of the phases of the environmental impact assessment and /or appropriate assessment, where appropriate.

For projects included in the baseline case it was ran the environmental impact assessment phase, phase that allowed early identification and assessment of potential negative effects on the environment and implementing measures to prevent/reduce the environmental impact.

The conclusions of the analysis of the environmental characteristics likely to be affected by the proposed projects are shown below:

- In terms of framing in the development regions of the country, it can be observed that most of the new works of infrastructure (motorways, bypasses) are proposed in central, west and northwest development regions.
- For all project types, regardless of the transport mode, the environmental effects are insignificant during execution, are locally in the front line work and are temporary.
- Projects involving the development of new transport corridors (motorways, bypass, road links) or extending existing roads (modernization projects) will cause permanent changes in the occupied land areas and land use category. Impact of changes on the kilometres of road network included in the "Do minimum" scenario compared to the situation in 2011 will be: 934 km of motorways to 501 km; 15649 km of national roads to 15479 km.
- In terms of land use category to be permanently occupied by the projects proposed in the "*Do Minimum*" scenario according to Corine Land Cover 2006 mostly falls in the category "arable areas" - 47%, "localities – discontinuous built up area"- 13%.
- For some road and railway projects that proposed new route alignments or for which the modernization/rehabilitation required expansion/modification of the existing route, deforestation works were necessary - for about 9.4% of the total number of projects included in the "*Do minimum*" scenario (10 projects proposed for the road sector).
- According to the information provided by the Appropriate Assessment study for GTMP, there are a number of projects included in this scenario that are neighbouring or intersect the Natura 2000 network:
  - From the total number of projects included in the "Do Minimum" scenario, 30 projects intersect SCIs (2 projects for the naval sector, 5 projects proposed for the rail sector, 23 projects proposed for the road sector) and 20 projects intersect SPAs (2 projects for the naval sector, 4 projects proposed for the rail sector, 14 projects proposed for the road sector).
  - From the total number of projects included in the "*Do minimum*" scenario 3 projects are at a distance less than 1 km from SCIs limit (2 rail projects, one project road sector) and 7 projects are at a distance less than 1 km from SPAs limit (4 rail projects, 3 road sector projects).
  - Most projects that are intersecting the Natura 2000 sites belong to the road sector.
- To ensure fauna connectivity in the location area of the projects were provided passages/culverts/bridges (they allow fauna crossing from side to side).
- Where it was found that the proposed projects affect the protected areas were proposed measures of restoration and/or habitats improvement in protected natural areas, replanting with species of the same category as the deforested ones.
- For a single project in the road sector was necessary to establish compensatory measures required as a result of the impact assessment on the integrity of Natura 2000 sites
- For road projects are forecasted increases in noise levels in areas where road routes (including both new and those that will be modernized/rehabilitated) approaches closer than 500 m from residential areas or protected areas. Measures were necessary to reduce the noise impact: absorbing panels' installation or planting forest belts.
- For projects from road and rail sector are necessary construction works or rehabilitation of bridges, culverts, viaducts etc. for watercourses crossing. According to the regulatory acts in terms of environment issued for these projects will be/are taken all the necessary measures so that they do not adversely affect the water flow, minor beds and banks and to prevent pollution of surface waters.
- There will not be affected archaeological sites or historical monuments. To protect the archaeological sites are required specific archaeological research before starting the execution works.



- No significant changes are expected in terms of air quality. It is estimated that emissions of pollutants into the atmosphere will reduce in the large urban areas by diverting heavy traffic outside localities. By improving the technical conditions of road transport, average speeds will be higher, journey times shorter, fuel consumption will decrease and thus the emission of pollutants into the atmosphere will reduce.
- Some road and railway projects that have proposed new route alignments or the modernization/rehabilitation required the route expansion/modification produce changes of the landscape through permanent occupation of land surfaces by deforestation.
- It is estimated that following the implementation of the proposed projects by this scenario will be an increase in the total emissions of greenhouse gases to the "Do nothing" scenario (situation without any investments in the transport infrastructure). The road sector remains still the main contributor to the total emissions of greenhouse gases, followed by rail, air and water sector.

The analysis of the environmental characteristics likely to be affected by the proposed projects through ES/EES and CTT development scenarios was made taking into account the spatial location of the proposed project, the type of project, the nature of the proposed investment, the category of construction works and analysis of the environmental results likely to be affected by similar projects included in the reference scenario. There were analysed the main changes that may occur both in the execution phase and the operational/exploitation phase.

The magnitude of the environmental effects depends upon the specific site project, execution period, the type of work that is done, the size of the project.

After analysing the influence of the proposed investments by the development scenarios (ES/EES and CTT) on the environmental changes can draw the following conclusions:

- By implementing the proposed project in the GTMP development scenarios, physical changes that appear are due to construction works (building motorways, expressways, bypasses, railways, modernization/rehabilitation of railways, airports modernization, ports modernization/development, navigation channels development etc.)
- Through the nature of construction works specific to the proposed investment by the two development scenarios (ES/EES and CTT), they will cause permanent changes in the occupied land areas and in the land use category. For the ES/EES scenario are proposed around 3128 km of new roads, rehabilitation of a number of 3225 km of roads and rehabilitation of 4536 km of railway, all of which will cause permanent occupation of a land surface. For the CTT scenario are proposed around 1589 km of new roads and modernization/rehabilitation of about 2930 km of railway.
- For all types of projects, regardless of the transport sector, the environmental effects are insignificant during the execution period and manifest locally in the front line work and have temporary character.
- The proposed routes for some of the projects included in the development ES/EES and CTT scenarios intersect the Natura 2000 network:
- In the development scenario (ES / EES), 64 projects intersect Sites of Community Importance (SCI) of the Natura 2000 network, of which 6 naval projects, 15 railway projects and 43 road projects. For Special Protection Areas (SPA), 54 projects overlap with sites, respectively 5 naval projects, 14 railway projects and 35 road projects. Air and intermodal infrastructure projects included in this scenario do not affect Natura 2000 sites.

- In the CTT scenario, 30 projects intersect Sites of Community Importance (SCI) of the Natura 2000 network, of which 6 naval projects, 15 railway projects and 9 road projects. For Special Protection Areas (SPA), 28 projects overlap with sites, respectively 5 naval projects, 14 railway projects and 9 road projects. Air and intermodal infrastructure projects included in this scenario do not affect Natura 2000 sites.
- By implementing the proposed projects through the development scenarios (ES/EES and CTT) are forecasted changes in air quality and noise levels at local level. It is expected to reduce pollutant emissions into the atmosphere and noise level in the localities crossed by existing national roads by taking over heavy traffic by the proposed new roads.
- For all GTMP development scenarios (ES/EES and CTT) are maintained the current trends of increasing the total greenhouse gases emissions. For all scenarios analysed by GTMP, the road sector has the highest contribution to the total greenhouse gases emissions, followed by railway, air and water sector. The largest contribution to the total greenhouse gases emissions will have the implementation of the CTT scenario.

## 7. Environmental problems relevant for the General Transport Master Plan

Based on the analysis of the current state of the environment (presented in Chapter 4 of the Environmental Report) and on the current situation of transport infrastructure (presented in section 2.1 of the Environmental Report) were identified environmental issues relevant to the transport sector, implicitly for the General Transport Master Plan:

Environmental aspect	Identified relevant environmental issues	Associated causes
<p><b>Air</b></p>	<p>Local exceedances of the admissible limit values for certain pollutants emitted into the atmosphere (NO<sub>x</sub>, SO<sub>x</sub>, PM<sub>10</sub>, NMCOV, heavy metals)</p>	<p>Transport sector's contribution to the total amount of pollutants is high even if in 2012 there were decreases in the total amount of pollutants emitted into the atmosphere compared to 2005.</p> <p>Road traffic is an important local source of air pollution in urban areas.</p> <p>Among the transport modes, road transport has the highest contribution to air pollution, especially in NO<sub>x</sub> emissions, heavy metals (Pb) emissions, NMCOV, suspense particles.</p> <p>The results of monitoring conducted under air quality monitoring stations show that in the urban areas road transport is a major source of air pollution.</p> <p>Old means of transport (58% of all vehicles registered in Romania are older than 10 years<sup>34</sup>), type of fuel used (about 94% of the registered vehicles are using fossil fuels, diesel type and petrol<sup>34</sup>), traffic increase leading sometimes to congestions, lack of adequate infrastructure leads to increased amount of pollutants emitted into the atmosphere.</p> <p>Lack of competitiveness between transport modes and the growing demand for road transport.</p> <p>Lack of bypasses for localities and the low number of motorways lead to a low average speed for transport, so there are recorded increased travel times and high levels of emissions into the atmosphere.</p>
<p><b>Climate change</b></p>	<p>High contribution of the transport sector to total greenhouse gases emissions (GHG).</p>	<p>Among the modes of transport, road transport produces the most significant adverse effects on air quality.</p> <p>Road transport has the highest contribution to GHG emissions, followed by air, rail and naval transport.</p> <p>The reasons for road transport has the highest</p>

<sup>34</sup>Ministry of Internal Affairs, Directorate for Driving Licences and Vehicle Registration, <http://www.drpcv.ro/info-portal/displayStatistics.do?page=4>

Environmental aspect	Identified relevant environmental issues	Associated causes
		<p>contribution to the total emissions of greenhouse gases are: the increasing demand for freight and passengers mostly by road compared to other modes of transport, increasing the average time travel, numerical increasing of the auto park, the current state of transport infrastructure, state of vehicles and type of fuel used (see chapter - Relevant aspects of the current state of the environment and its likely evolution if the General Transport Master Plan is not implemented, section - Climate change, Table 4.7.1 estimates of emissions / retentions by sequestering greenhouse gases for the period 2008-2011 for the transport sector).</p> <p>It is necessary to adopt measures aimed at reducing GHG emissions in the transport sector. As states the Romania's National Strategy on Climate Change 2013 - 2020, measures necessary for the transport sector to reduce GHG emissions are presented in <i>Chapter 5 - Relevant aspects of the current state of the environment and its likely evolution if the General Transport Master Plan is not implemented, Climate Change section</i></p>
	<p>Low vulnerability of transport infrastructure to extreme weather events</p>	<p>Climate change can have a direct impact on transport infrastructure. For example, upon the naval transport sector can manifest as a result of fluctuations in the flow regime of rivers and streams, on road and rail transport sector by deteriorating infrastructure and lack of thermal comfort caused to passengers<sup>35</sup>.</p>

<sup>35</sup> Guide on climate change adaptation

Environmental aspect	Identified relevant environmental issues	Associated causes
<b>Energy efficiency</b>	Fossil fuel dependency	<p>Transport is almost entirely dependent on fossil fuels. Nationally, between 2000-2011 period, transport has the third place in the hierarchy of large energy consumers (toe), after domestic and industrial consumption.</p> <p>The national transport network status, maintaining inefficient transport infrastructure systems, old auto park, the age of the railway rolling stock (20 years old)<sup>36</sup> do not allow energy efficiency increase in the transport sector.</p> <p>World Economic Forum, in their document "Global Competitiveness Report (2011-2012)"<sup>37</sup>, ranked Romania on 137th of 142 countries surveyed in terms of road infrastructure quality. Just over half of the national road network road condition is considered to have "good" status.</p> <p>Around 37% of the railway network is electrified, compared to the EU27 average of 52%<sup>38</sup>, average transport speed is below 100 km/h.</p> <p>Lack of competitiveness between transport modes leads to a high demand for road transport for both freight and passengers. Road transport is the sector with the highest energy consumption.</p> <p>Among the modes of transport, road transport is the branch with the highest consumption of energy (in 2011 recorded almost 86% consumption of the total consumption for the transport sector)<sup>39</sup>.</p> <p>According to the data provided by the Romanian Auto Registry during 2008-2011 were recorded increases in the number of auto fleet (cars, light vehicles, heavy vehicles, buses, mopeds and motorcycles), the increase being significant in cars and light vehicles sectors.</p>

<sup>36</sup> General Transport Master Plan - Report on existing conditions, AECOM, 2013

<sup>37</sup> Global Competitiveness Report 2011-2012 © 2011 World Economic Forum

<sup>38</sup> Transport and Environment, [http://www.anpm.ro/upload/16089\\_13%20TRANSPORTURI.pdf](http://www.anpm.ro/upload/16089_13%20TRANSPORTURI.pdf). Programs such as CIVITAS "Green alternatives for sustainable urban development of Europe" - Suceava, Ploiesti, Iasi, Craiova; "Reducing pollution by using in public transport ecological vehicles with alternative fuel", COMMERCE Project (Creating Optimal Mobility Measures to Enable Reduced Commuter Emissions) – Bucharest

<sup>39</sup> Database - Statistical Indicators for sustainable development of the National Institute of Statistics available at [http://www.insse.ro/cms/files/Web\\_IDD\\_BD\\_ro/index.htm](http://www.insse.ro/cms/files/Web_IDD_BD_ro/index.htm)

Environmental aspect	Identified relevant environmental issues	Associated causes
<b>Conservation/ use of natural renewable resources</b>	Transport infrastructure is underdeveloped and lacks the necessary facilities to enable the use of alternative fuels or electricity.	<p>The use of alternative fuels, cleaner, faces a number of problems, in addition to the high cost of vehicles and the low level of consumer acceptance, adding to the low autonomy of vehicles with alternative fuels and lack of electricity charging stations and refuelling with alternative fuels.</p> <p>In Romania, the usable potential of renewable sources is low due to technological limitations, economic efficiency and environmental restrictions. There are still required technological developments and marketing investments towards alternative fuels and their use in all modes of transport. It is very important the need to adapt the transport infrastructure and vehicles for use of alternative fuels.</p> <p>At national level there is a relatively small number of vehicles equipped with conventional engines, with internal combustion, using partially or fully alternative fuels. Over 94% of vehicles registered in the National Auto Park use petrol and diesel as fuel.</p> <p>Use of alternative fuels has made progress in terms of public transport. At national level took place a number of programs to modernize the auto park of the autonomous administration of public transport, which allowed primarily promoting electric vehicles, and non-polluting alternative fuels - for example in cities like Bucharest, Craiova, Ploiesti, Suceava, Iasi<sup>38</sup>.</p>
<b>Water (Surface waters)</b>	Deterioration of water quality	<p>The transport sector can contribute to the pollution of surface water through rainwater that washes pollutants deposited on roads platform, if not properly collected and treated before their discharge to natural emissaries.</p> <p>Many roads have inadequate traffic capacity, leading to congestion and increased risk of accidents, thus the occurrence of accidental pollution.</p> <p>Depth problems of the fairway can create difficulties also to the transport safety, increasing the risk of accidents.</p> <p>Human error, various accidents during handling operations, cargo loading and unloading may also lead to the occurrence of accidental pollution in ports area.</p>
	Deterioration of aquatic ecosystems	<p>Activities that may cause pollution of surface water associated to the transport sector are:</p> <ul style="list-style-type: none"> <li>- Hydraulic works (dredging, drainage, etc.) that can cause changes in hydrological and morphological system;</li> </ul>

Environmental aspect	Identified relevant environmental issues	Associated causes
		<ul style="list-style-type: none"> <li>- Various accidents occurring in the freight transport sector (losses of pollutants);</li> <li>- Uncontrolled discharge of pollutants into water (rainwater contaminated with petroleum products, various substances used for snow removal)</li> <li>- Navigation and works to ensure optimal conditions for navigation;</li> <li>- Improper collecting of rainwater contaminated with oil from the roads.</li> </ul> <p><i>There is insufficient information on the contribution of each of these activities to the degradation of aquatic ecosystems.</i></p>
<b>Water</b> <i>(Underground waters)</i>	Changes in the quality state of groundwater	Groundwater can be affected directly by soil pollution from accidental spills of petroleum products or various substances used during interventions for repairs, maintenance and snow removal by precipitation of substances from air emissions produced by transport vehicles.
<b>Soil and subsoil</b>	Damage to soil characteristics and functions, respectively changing its bio-productive capacity.	<p>Transport has a high contribution to emissions of pollutants into the atmosphere, which in turn can contribute to pollution of soil from roads surrounding areas.</p> <p>Intensification of erosion - Failure or lack of works to combat erosion and deposition of sediment during construction of transport infrastructure. Soil erosion can be increased by deforestation works sometimes inevitable for the development of transport infrastructure.</p> <p>Changes in land use due to construction works. Currently, as mentioned in previous chapters roads and railways occupies approximately 1.63% of the total area of the country.</p> <p>The railways embankments from the CFR railway station areas and the soil from CFR depots areas may be contaminated with petroleum products from accidental leaks during stationing of locomotives, with risk of seepage to aquifers (issue identified by entrepreneurs having rehabilitation works for railways).</p> <p>There is empirical evidence that the topography and road alignment, but also the very tight curves on major roads creates hazardous conditions for freight</p>

Environmental aspect	Identified relevant environmental issues	Associated causes
		transport vehicles during the winter months and the risk of collision <sup>40</sup> and increase the risk of accidental pollution.
<b>Waste and hazardous substances management</b>	Inefficient/uncontrolled management of waste from the transportation sector (including those resulting from construction and demolition)	<p>The main groups of waste which can be directly related to the activity of transport and transport infrastructure are: waste generated during construction / rehabilitation / modernization / maintenance of transport infrastructure and related facilities; used auto batteries; waste oils; waste tires; no longer used auto vehicles; used ships.</p> <p>Existing national records of the quantities of waste generated do not provide information by type of activity and by transport modes.</p> <p>Works of construction, rehabilitation, modernization of the transport network lead to the generation of high volumes of waste. Lack of specific legislative regulations on construction and demolition waste makes it difficult to manage them properly.</p>
<b>Biodiversity</b>	Loss, destruction or fragmentation of habitats through land conversion for development/modernization of transport infrastructure.	<p>Definitive occupation of land areas in protected areas due to the development of transport infrastructure.</p> <p>Poor planning of transport corridors had lead to fragmentation of natural habitats, affecting their conservation status and carrying out deforestation in protected areas.</p>
	Reducing population density of species of flora or fauna	<p>Pollution of water, soil and of the atmosphere associated with the transport activity and lack or failure to comply with measures to protect biodiversity required for transport infrastructure projects have the effect to reduce population density of species of flora and fauna.</p> <p>The deforestation works required for transport infrastructure development can also contribute to reducing the density of species of flora and fauna.</p>
<b>Population and human health</b>	Increasing environmental pollution, especially in urban areas	<p>Among the effects that transport can generate upon human health, the most important are related to emissions from traffic namely NO<sub>x</sub>, CO, CO<sub>2</sub>, VOC, SO<sub>2</sub>, particulates that can absorb on their surface heavy metals (Pb, Cr, Ni, Zn, Cd).</p> <p>Increase of pollution can affect the health of the population, can trigger/exacerbate a number of respiratory or cardiovascular diseases.</p> <p>Transport has a significant contribution to the total emissions of pollutants into the atmosphere.</p> <p>Another stressor that can worsen some conditions (deafness, mental illness, cardio-vascular disorders,</p>

<sup>40</sup> General Transport Master Plan - Report on existing conditions, AECOM, 2013



Environmental aspect	Identified relevant environmental issues	Associated causes
		<p>endocrine diseases) is noise from transport activity. The wear state of transport infrastructure, lack or defective implementation of measures to reduce noise of various modes of transport make the number of people affected and dwellings to be high. At national level, following the provisions of Directive 2002/49/EC of the European Parliament and Council transposed into national legislation by GD 321/2005 on the assessment and management of environmental noise is necessary to achieve the strategic noise maps (more information on the areas where they were made so far these noise maps and the authorities responsible for their implementation are found in Chapter 4 - Relevant aspects of the current state of the environment and its likely evolution of the situation if General Transport Master Plan is not implemented, section - Population and human health)</p> <p>Transport activity can cause direct and indirect effects on the environmental components water, soil and biodiversity.</p> <p>Pollution of surface water, groundwater and soil with various toxic substances due to traffic (continuous and accidental pollution) may affect the health of the population.</p>
	The lack of studies on the human health impacts from transport	So far, at national level, no studies have been done on the influence of the transport sector, by modes of transport on the environment and implicitly upon human health.
	Low transport safety	<p>The wear status of road transport infrastructure (see section 2.1 of the Environmental Report) and lack of bypasses of the localities led to increasing the risk of accidents involving transport vehicles resulted with human casualties and hence the increased mortality among the population. In Romania, die annually about 2,000 people as a result of road accidents.</p> <p>Many railway properties are not bordered and appropriately marked and the population is not sufficiently informed about the dangers they expose inadequate railway crossing. This explains why remains high number of people killed on the railroad. In 2011, in Romania, less than 250 people were killed or seriously injured on the railway- about 10% of deaths / serious accidents on the railway registered in the EU27.</p>
	Insufficiently developed and modernized transport network	The current state of the transport network, the lack of bypasses for localities in certain areas makes the average transport speed to be reduced and high travel times, both in terms of freight and passenger transport.

Environmental aspect	Identified relevant environmental issues	Associated causes
		<p>Romania has a very limited network of motorways; In addition, only a small proportion of the road network is built to European standards.</p> <p>Fairway has deficiency both in terms of width and its depth. Problems of depth may create difficulties also for transport safety, increasing the risk of accidents.</p> <p>Rail lines need to be rehabilitated and rolling stock must be replaced (some with a history of over 30 years). On certain routes, the wear state of railways led to taking measures regarding the restriction of the speed limit, thus increasing the duration of the journey.</p>
<b>Landscape and cultural heritage</b>	Reduction and degradation of natural areas	<p>Development of new transportation corridors lead to permanent occupation of land areas and changes in land use category, sometimes accompanied by massive deforestation and natural landscape fragmentation.</p> <p>Construction works left unfinished due to lack of funds or derelict transport infrastructure (eg railway stations, ports, etc.)</p> <p>The low level of development of transport infrastructure (lack of facilities in local airports and stations, lack of motorways, lack of ring roads, the wear status of existing roads) may have effects on the efficient use of natural and cultural potential of the country.</p>
<b>Sustainable transport</b>	<p>Increased demand for road transport</p> <p>Energy consumption, pollutant emissions into the atmosphere and greenhouse gas emissions remain high</p> <p>Reduced transport safety due to high usage of the transport network</p>	<p>Lack of competitiveness between transport modes maintains high the demand for road transport for both freight and passenger transport. Among the modes of transport, road transport has the highest contribution to total emissions of pollutants into the atmosphere, greenhouse gas emissions and it is the largest consumer of energy.</p> <p>Road accident rate is still high compared to the situation at European level.</p>
<b>Public awareness on environmental issues and the relationship with the transport sector</b>	<p>Using road transport as the main mean of transport</p> <p>Using own vehicles rather than public transport</p>	<p>Lack of public information regarding the effects of transport on the environment, the importance of using public transport, reducing unnecessary travels, the use of less polluting transport alternatives, the importance of using alternative fuels.</p> <p>The existence of a low degree of involvement of the civil society in making decisions on development options of transport.</p>

## 8.Environmental objectives established at National, Community and International level relevant to General Transport Master Plan

Based on the strategies/plans aiming especially the environmental protection and the existing national environmental issues related to the transport sector, for GTMP have been proposed number of relevant environmental objectives which take into account the targets set at national and European for environmental protection (see also chapter 8 of the Environmental Report). These objectives have been set and agreed within the working groups.

There have been proposed 28 relevant environmental objectives for: air, climate change, water, soil, waste, biodiversity, population and human health, noise, natural landscape, cultural heritage, sustainable transport, energy efficiency, conservation/use of natural renewable resource, awareness on environmental issues from transport.

**Table 8.1 Relevant environmental objectives (REO) for the Environmental Assessment (EA)**

Environmental factors	Relevant Environmental Objectives (REO) for the Strategic Environmental Assessment	Targets	Environmental objective for the GTMP
<b>Air</b>	REO1. The reduction and limitation at national level of the pollutants emissions into the atmosphere generated by the transport sector (CO <sub>x</sub> , NO <sub>x</sub> , SO <sub>2</sub> , suspense particulates, heavy metals, VOCs, PAHs)	Maintain emissions within permissible limits according to Law 104/2011 on ambient air quality.	EO 1 EO 1-1 EO 1-3
	REO2 Minimization of the transport impact on the air quality in urban and rural areas	Maintain emissions within permissible limits according to Law 104/2011 on ambient air quality.	
<b>REO air source documents:</b>			
<ul style="list-style-type: none"> <li>• Transport White Paper</li> <li>• National and regional environmental objectives for 2007-2012</li> <li>• Sustainable Transport Strategy 2007-2013 and 2020, 2030</li> <li>• Law 104/2011 on ambient air quality</li> </ul>			

Environmental factors	Relevant Environmental Objectives (REO) for the Strategic Environmental Assessment	Targets	Environmental objective for the GTMP
<b>Climate Change</b>	REO3. Reduction of greenhouse gas emissions from the transport activity	Achieving the objectives set at European level, namely reducing emissions of greenhouse gases by 20% by 2020 compared to 1990 levels.  Achieving the targets set for the transport sector by 2050 Transport White Paper (for the year 2030, 20% reduction in GHG emissions compared to 2008 levels and in the year 2050 a 60% reduction compared with emissions in 1990).	EO 1 EO 1-2
	REO4. Improving the efficiency of the fuel used	Achieving the objectives set by Directive 2009/33/EC and Regulation 443/2009/EC on CO <sub>2</sub> emissions from cars, Regulation 510/2011/EC.  Increasing the use of alternative fuels (LPG, biogas, hydrogen, electricity) for transport and introduction of more efficient technologies in terms of fuel consumption	
	REO5. Reducing vulnerability of transport infrastructure to climate change (floods, extreme weather conditions, high/ low temperature, landslides etc.).	Protecting existing transport infrastructure and its development taking into account the need to adapt it to climate changes.	
<b>Source documents for REO climate change:</b> <ul style="list-style-type: none"> <li>• Romania's National Strategy on Climate Change 2013 - 2020</li> <li>• Sustainable Transport Strategy 2007-2013 and 2020 2030</li> <li>• National and regional environmental objectives for 2007-2012</li> <li>• Guide on adapting to climatic conditions</li> </ul>			
<b>Water</b>	REO6. Preventing damage to surface water and groundwater bodies	Compliance with the Water Framework Directive of the European Union Achieving the environmental objectives established for each water body.	EO 1 EO 1-1
	REO7. Reducing changes in morphology and hydrology of surface water bodies	Implement measures to reduce the changes appearance in the hydrological and morphological regime due to construction activity	
	REO8. Prevent / limit intake of pollutants into surface water and	Reducing the volume of wastewater generated by the transport sector. Reducing quantities of pollutants	

Environmental factors	Relevant Environmental Objectives (REO) for the Strategic Environmental Assessment	Targets	Environmental objective for the GTMP
	groundwater	emissions into surface water and groundwater. Maintaining the permissible limits for quality indicators of wastewater when discharge into the natural emissary or sewage system.	
<b>REO water source documents:</b> <ul style="list-style-type: none"> <li>• Water Framework Directive 60/2000 / EC</li> <li>• National and regional environmental objectives for 2007-2012</li> <li>• River Basin Management Plans</li> </ul>			
<b>Soil and subsoil</b>	REO9. Reduce consumption of natural resources	Proper planning of construction activities for projects proposed by GTMP to meet basic needs, avoiding waste and efficient use of natural resources	EO 1 EO 1-1
	REO10. Preventing and reducing pollution of soil and subsoil	Reducing air pollutant emissions in the transport sector  Significantly reduce the polluted areas	
	REO11 Transport infrastructure development correlated with the improved efficient use of land	Support the development on reclaimed land and sustainable land use (considering the fact that the development of a certain infrastructure, such as bypasses, can cause adjacent area development and occupation of new land)	
<b>Source documents for REO soil and subsoil:</b> <ul style="list-style-type: none"> <li>• National and regional environmental objectives for 2007-2012</li> <li>• National Strategy for Energy Efficiency</li> </ul>			
<b>Waste and hazardous substances management</b>	REO12. Reducing the amount of waste generated	Taking into account for the GTMP proposed projects the issues of reducing the amount of waste generated during construction activity.  Achieving the objectives of the National Waste Management Strategy 2014-2020.	EO 1 EO 1-1
	REO13. Increasing the amount of waste recycled and recovered from the transport sector	Taking into account for GTMP proposed projects the issues of reducing the amount of waste generated during construction activity.  Achieving the objectives of the National Waste Management Strategy 2014-2020.	

Environmental factors	Relevant Environmental Objectives (REO) for the Strategic Environmental Assessment	Targets	Environmental objective for the GTMP
<b>REO waste source documents:</b> <ul style="list-style-type: none"> <li>National and regional environmental objectives for 2007-2012</li> <li>National Waste Management Strategy 2014-2020</li> <li>National, regional and county plans for waste management</li> </ul>			
<b>Biodiversity</b>	REO14. Reducing pressure due to transportation infrastructure leading to damage of natural habitats and biodiversity	Planning transport projects in view of reducing the impact on natural habitats and biodiversity, to avoid as much as possible the natural protected areas  Reducing land conversion in the protected areas for the development of transport infrastructure  Sustainable development of infrastructure and vehicles by reducing the impact on biodiversity.	EO 1 EO 1-1 EO 1-4
	REO15. Limiting deforested areas	To reduce the deforested area due to the development of transport infrastructure.  Establish and implement compensatory measures for affected areas (eg: compensating land surfaces affected by deforestation with lands capable to be afforested).	
<b>Source Documents for REO biodiversity:</b> <ul style="list-style-type: none"> <li>National and regional environmental objectives for 2007-2012</li> <li>Directive on the conservation of natural habitats and of wild fauna and flora 92/43 / EEC</li> <li>Directive on the conservation of wild birds 79/409 / EEC</li> <li>GEO 57/2007 on natural protected areas regime, conservation of natural habitats and of wild fauna and flora approved with amendments by Law no. 49/2011</li> </ul>			
<b>Population and human health</b>	REO16. Population protection against risks associated with road and rail accidents, increased passenger and freight transport safety	Halve deaths from road accidents compared to the European average Improving the quality of transport infrastructure	EO 1 EO 1-1 EO 1-2 EO 1-3
	REO17. Protection of human health by improving the conditions of the environment by reducing the effects of transport on air quality	Maintain emissions within limits according to Law. 104/2011 on ambient air quality  Reducing air pollution associated with road traffic on the main arteries from localities	
	REO18. Reducing noise transport both at source and through mitigation measures so that overall exposure levels have minimal impact on human	Implementation of measures included in the Action Plans developed for different transport modes (GD no. 321/2005) and	

Environmental factors	Relevant Environmental Objectives (REO) for the Strategic Environmental Assessment	Targets	Environmental objective for the GTMP
	health	compliance with limit values for noise indicators L(zsn) and L (night) established by MO no. 152/558/1119/532 in 2008. Making bypasses for localities Improving the quality transport infrastructure	
	REO19. Increased mobility and accessibility	Traffic decongestion Improving interconnectivity between areas Increasing competitiveness between transport modes	
<b>Source documents for REO population and human health:</b> <ul style="list-style-type: none"> <li>Sustainable Transport Strategy 2007-2013 and 2020 2030</li> <li>National and regional environmental objectives for 2007-2012</li> </ul>			
Landscape and National Cultural Heritage	REO20. Protection of cultural and natural national heritage	Establish and implement for the transportation infrastructure projects proposed by GTMP measures to protect the cultural and natural heritage Reducing emissions of acidifying gases from transport sector	EO 1 EO 1-1
	REO21. Development of transport infrastructure taking into account policies of management, landscape protection and planning	Reducing effects on natural landscape and landscape integration of infrastructure works Ensuring a sustainable urban transport	
<b>Source documents for REO landscape and cultural heritage:</b> <ul style="list-style-type: none"> <li>European Thematic Strategy on the Urban Environment</li> <li>National Strategy for Cultural Heritage</li> <li>National and regional environmental objectives for 2007-2012</li> <li>Local Environmental Action Plans</li> </ul>			
Sustainable Transport	REO22. Modernization and development of national transport system so as to ensure the achievement of sustainable transport	Achieving the established objectives through the sustainable transport strategy	EO 1 EO 1-1 EO 1-2
	REO23. Improvement of transport behaviour in relation to the environment	Reducing pollution caused by transport activity	
<b>Source documents for REO sustainable transport:</b> <ul style="list-style-type: none"> <li>Transport White Paper</li> <li>Sustainable Transport Strategy 2007-2013 and 2020 2030</li> <li>National and regional environmental objectives for 2007-2012</li> <li>National Strategy for Sustainable Development of Romania 2013-2020-2030 Horizons</li> </ul>			

Environmental factors	Relevant Environmental Objectives (REO) for the Strategic Environmental Assessment	Targets	Environmental objective for the GTMP
<b>Energy Efficiency</b>	REO24. Improving energy efficiency in the transport sector by increasing the use of renewable energy resources and significantly reduces oil dependence.	Reducing energy consumption and fossil fuels Promoting the use of renewable energy in the transport sector	EO 1 EO 1-2
	REO25 Reducing energy consumption in the transport sector	Improvement of transport conditions and reduce journey times Start actions to reduce with at least 10% energy consumption, specific energy consumption for passenger-km and tonne-km in the transport sector by 2015 and achieving a progressive reduction of up to 15% in 2020 and up to 20% in 2030	
<b>Conservation of finite natural resources / use of renewable resources</b>	REO26. Reducing exploitation of finite resources and facilitate the use of the renewable ones	Start actions of introducing alternative fuels to the conventional ones in the transport sector, according to the EU objectives and target of increasing the use of biofuels to 10% in energy consumption for transport by 2020	EO 1
<p><b>Source documents for REO transport energy efficiency and conservation/use of renewable natural sources:</b></p> <ul style="list-style-type: none"> <li>• White Paper of Transportation</li> <li>• Sustainable Transport Strategy 2007-2013 and 2020, 2030</li> <li>• Energy Strategy of Romania updated for 2011-2020</li> <li>• European Directive: Clean energy for transport: an European strategy on alternative fuels (under approval)</li> <li>• Romania's National Strategy on Climate Change 2013 - 2020</li> <li>• Sustainable Transport Strategy 2007-2013 and 2020, 2030</li> </ul>			
<b>Raising awareness of environmental issues from the transport sector</b>	REO27. Informing and raising awareness about the environmental effects of transport activity.	Raising transport users awareness on aspects of transport effects on the environment Improving behaviour towards the environment through the use of less polluting resources and modes of transport	-
	REO28. Involvement and consultation of stakeholders throughout the decision-making process in establishing and implementing the proposed measures to reduce environmental impact	Establishing optimal measures to reduce environmental impact in the transport sector	



Environmental factors	Relevant Environmental Objectives (REO) for the Strategic Environmental Assessment	Targets	Environmental objective for the GTMP
<p><b>Source documents for REO raising awareness:</b></p> <ul style="list-style-type: none"><li>• Directive 2001/42 / EC of the European Parliament and of the Council, on the assessment of the effects of certain plans and programs on the environment ("SEA Directive")</li><li>• Government Decision 1076/2004 establishing the procedure of environmental assessment for plans and programs</li><li>• National and regional environmental objectives for 2007-2012</li></ul>			

## 9. Potential significant environmental effects

In determining the potential significant environmental impacts were considered the relevant evaluation criteria in Annex 1 to GD no.1076/2004. It was identified how the proposed GTMP scenarios (both for each mode of transport as well as cumulatively) lead to accomplishing the relevant environmental objectives established for each environmental aspect.

To quantify the effects of each scenario, by transport modes, it was used a numerical scoring system and a coding system based on colours.

**Table 9.1 Proposed scoring system for assessing potential environmental impacts for projects proposed by GTMP**

Note/ Colour code	Impact magnitude	Description
+2	Positive significant impact	Refers to the major effects (significant) of positive nature that manifests on long-term or permanent, have extensive coverage and contribute to the achievement the established environmental objective.
+1	Positive impact	Refers to minor effects (reduced) of positive nature, direct or indirect, that are felt locally and may partly contribute to achieve the established environmental objective.
0	No impact/ the effect can not be determined	No effects, extremely low or no accurate predictions can be made, further details are needed about the characteristics of projects and their size.
-1	Negative impact	Refers to minor effects (reduced) of negative nature, direct or indirect, which are felt locally and make it difficult to achieve the established environmental objective.
-2	Significant negative impact	Refers to the major effects (significant) of negative nature, which manifests on long-term or permanent, have extensive coverage and does not allow to achieve the established environmental objective.

For each scenario is shown the motivation of the identified effects on the established relevant environmental objectives, by environmental issues.

The cumulative effect has been evaluated by summing the scores for each objective for each sector of transport (road, rail, water - ports and waterways, intermodal) and for each of the four scenarios:

- Do nothing;
- Do minimum;
- Development Scenario (ES / EES);
- Core TEN-T Scenario.

By comparing scores for the four scenarios proposed by GTMP it was possible to determine which scenario has the most positive long-term effects and that can lead to achieving the established environmental objectives.

The proposed investments by General Transport Master Plan (GTMP) by development scenarios, can generate potential negative effects on the environmental objectives established for certain components of the environment: air, climate change, water, soil and subsoil, waste and hazardous substances management, biodiversity, energy efficiency.

The specific nature of the construction works of the proposed investment by the two development scenarios (ES/EES and CTT) will cause permanent changes in terms of occupied land area, the category of land use and landscape. For ES/EES scenario are proposed about 887 km of motorways, 2241 km of expressways, 182 km of bypass, the rehabilitation of a number of 3225 km of existing roads and modernization/rehabilitation of about 4536 km railway, all this will cause permanent occupation of new land areas. For the CTT scenario are proposed around 1589 km of new roads.

For all project types, regardless of the transport sector, the environmental effects are insignificant during execution, acts locally, in the front line work and have temporary character.

Impact on the Natura 2000 network of the implementation of GTMP development scenarios (ES/EES and Core TEN-T) was analysed in the Appropriate Assessment Study, conclusions of this study were included in the Environmental Report.

By implementing the proposed projects in the development scenarios (ES/EES and CTT) are projected changes in air quality, noise level and local landscape. It is expected to reduce emissions of pollutants into the atmosphere and noise level in the towns crossed by existing national roads by taking traffic by proposed new roads.

Development of transport infrastructure and increased transport activity may lead to an increase in the quantity of waste. These effects are manifested especially during project development, requiring appropriate waste management programs (limiting the generation of waste, recycling, reuse of waste where the situation permits, selective collection and disposal). Enhancing transport may lead itself to the generation of waste associated with this activity.

The projects will have direct effects on the consumption of natural resources. Natural resources needed to implement each project will be detailed in the environmental impact assessment (EIA) procedures as differs from one project to another and from one sector of transport to another.

For all developing scenarios of GTMP (ES/EES and CTT) are maintained the current trends of increasing the total emissions of greenhouse gases. For all analysed GTMP scenarios road sector will contribute to the overall emissions of greenhouse gases with the highest share,

followed by rail, air and water sector, due to the increase in the number of driven kilometres, growing trend of the national auto park and growing trend of the global transport demand (for the entire transport sector). Largest contribution to the total emissions of greenhouse gases will have the implementation of the CTT scenario.

Although the current traffic trend tends to lean predominantly toward road traffic, which is not necessarily the most efficient mode of transport in terms of climate impacts, alternatives proposed in the Master Plan have tried to support in a balanced manner all transport sectors to improve competitiveness and keeping open all alternatives and ways of transportation to serve the needs of the economy and population.

The analysis of potential impacts on environmental objectives by scenarios showed that the Development ES/EES Scenario is the best scenario for implementation. Negative effects of this scenario are offset by the positive effects. The establishment and implementation of optimal measures to prevent, reduce and control the environmental impact (both execution phase and operational phase) estimates that the negative effects of the implementation of projects proposed by GTMP will be insignificant and will allow achieving the established environmental objectives.

## **10. Potentially significant environmental effects, including on health, in transboundary context**

States that may be affected by transboundary plans/ programs approved in Romania are neighbouring countries: Bulgaria, Hungary, Moldova, Serbia, Ukraine and countries that have Black Sea coast, namely Russia, Georgia and Turkey.

In terms of GTMP effects on the environment and human health in transboundary context, are relevant the projects that are developed at border, crossing border rivers, those related to navigation on the Danube.

Analysis of significant potential effects was carried for the Baseline Scenario ("Do Minimum") and development scenarios for projects which include construction works and which had made by the holder indicative routes.

From the list of projects included in the Baseline Scenario, were identified 5 projects taking place near the border or relating to navigation on the Danube:

- 2 road transport infrastructure projects, including a project for the rehabilitation of an existing road, a project for the rehabilitation of a bridge over the Danube;
- 1 rail transport infrastructure project - upgrading existing railway line;
- 2 projects for naval sector - 1 project for improving navigation conditions on the Calarasi-Braila sector, 1 project to improve port infrastructure.

Among these could have a potential effect on the environment in transboundary context: the project of navigation conditions improvement for the Calarasi-Braila sector. For this project was conducted the environmental impact assessment procedure, currently in the implementation phase. The analysis of the environmental information available for these projects (environmental agreements, scoping stage decisions) shows that none of these projects do not induce a significant negative impact in transboundary context upon the environment and human health.

For the development scenarios similarly, for the transboundary context effects analysis were analysed the projects located in the border vicinity, that are crossing the border rivers or those that are related to navigation on the Danube. In this way have been identified 20 projects for the ES/EES development scenario and 15 projects for the "Core TEN-T scenario ". Depending on the type of investment these projects can be divided into three categories:

- Projects that include construction works and involves the development of new transport corridors (construction of motorways and express roads);
- Projects that include rehabilitation works and are developed on the existing transport corridors (existing railways rehabilitation);
- Projects to improve navigation conditions on the Danube or that involve the development of construction works in the Danube River area.

Core TEN-T Scenario differs from the Do Something scenario only by the proposed projects for the road sector.

For rail infrastructure projects works will be done on the existing alignments, these works will not have significant adverse environmental effects to be felt across borders.

Construction projects involving the development of new road transport corridors (express roads, motorways) that will allow considerable improvement of conditions and transport safety, facilitates active connections between communities living on both sides of the border and contribute directly to modernization/expansion of the trans-European Network (TEN-T) and pan-European corridors, helping to improve the connection between Romania and neighbouring countries.

Almost all projects with possible transboundary impact are located at a considerable distance from the Natura 2000 sites located within the territories of neighbouring countries (those that have been identified by database available on the website of the European Environment Agency), except the "Enhancement of navigation conditions on the Danube Portile de Fier II - Calarasi "(for which the procedure of environmental impact assessment is ongoing and in this situation it had begun the transboundary consultation process of the neighbouring countries).

By respecting the existing national and European regulations, assessing the level of detail and implementing the proposed measures, it is expected that the potential negative effects on the environment and human health caused by transport projects will not have a significant magnitude in transboundary context.

## **11. Proposed measures to prevent, reduce and offset as completely as possible any adverse environmental impact resulting from the implementation of the General Transport Master Plan**

Potential adverse effects on the environmental objectives established for certain environmental components, namely air, climate change, water, soil and subsoil, waste and hazardous substances management, biodiversity, energy efficiency. Thus, it was necessary to propose appropriate measures to eliminate, prevent, reduce and/or offset the likely adverse effects of these and additional measures to potentiate (strengthen) GTMP positive effects on the environment.

These measures include:

- Avoid sensitive areas (protected natural areas, densely populated, obstacles and natural barriers such as rivers, mountain areas, etc.) by choosing the best route alternative for projects included in GTMP, prevention and reduction measures for the environmental impacts where these areas can not be avoided. This is necessary since the planning stage (feasibility)
- Environmental impact assessment and appropriate assessment of the early stages of planning and design;
- Correlation of the proposed measures for GTMP with the proposed measures through programs, strategies and other national and European plans that are for the transport sector.
- Taking into consideration the environmental impact assessment and appropriate assessment of cumulative impacts of proposed projects by GTMP with other projects undertaken/proposed target area for placement.
- Selecting the best methods of design and construction in order to prevent and reduce environmental impact (reduction of the direct/indirect environmental impacts);
- Limiting the amount of land occupied temporarily or permanently by GTMP proposed projects;
- Prevention and control of pollution both in the construction phase and the operation phase for the proposed investments;
- Limitation of the effects on Natura 2000 sites
- Recommendations to adapt the transport sector (of the new achieved projects) to climate change

Measures have been proposed for both the planning and design phase and operation of the proposed investment.

It is recommended to implement these measures for the projects proposed by GTMP for development. It also recommended that when establishing the project implementation schedule for projects proposed by GTMP, to take into account the time necessary to achieve the appropriate assessment and/or environmental impact assessment.

## 12. Statement of reasons which led to the selection of the chosen GTMP version

The General Transport Master Plan is a comprehensive document prepared by AECOM on the experience and the technical background, nationally and internationally, and offers a strategy for development of the transport sector in Romania for the coming years. This document presents implementable solutions to the problems and requirements of the transport sector in Romania and will provide the basis to develop infrastructure projects funded by various funding programs at European level.

For the elaboration of the General Transport Master Plan and Transport Strategy, it was necessary to develop a National Model for Multimodal Transport for Romania (NTM), together with an Evaluation System.

The **first version of the General Transport Master Plan of Romania** was developed in 2012, representing a summary of the steps taken to prepare the *Master Plan*, the investment categories that are considered for the development of transport infrastructure, listing the general

and specific objectives, and the strategic context. The purpose of this version was to provide the information necessary to initiate the environmental assessment process.

**The Master Plan draft on short, medium and long term, basically a first draft of the Master Plan, was published in August 2013.** This version was the basis for the completion stage of the Environmental Report and discussion basis for the working groups of the SEA procedure.

In August 2013 - August 2014 period, the draft version of GTMP was analysed, debated and refined. An important role on completion of the GTMP have had consultations with stakeholders (Ministry of Transport, Transport operators and other third parties) as well as consultations within the Strategic Environmental Assessment procedure and Appropriate Assessment conclusions.

The final version of GTMP includes analysis of the following scenarios:

- "Zero development" scenario ("Do nothing") - which does not propose any measures or investment in the transport infrastructure - (DN)
- "Reference Scenario" ("Do Minimum") - which takes into account projects already under construction / implementation or have secured funding (DM or Ref.)
- "Do Something" Development Scenario required by the specification notebook that takes into account infrastructure projects needed to eliminate jams and increase the accessibility of regions and cities in Romania, identified for the time horizons 2014 2020 2030. Individual candidate projects to be included in the Master Plan (covering the fields of road, rail, water, air and intermodal), were tested by the National Transport Model (NTM) before their inclusion in the development scenario. To establish the hierarchy of project implementation were used high-level<sup>41</sup> evaluation criteria, such as: economic impacts, transport policy, environmental impacts (safety, climate change, air pollution, noise pollution, Natura 2000 network and natural protected areas, the impact on soil and water resources), sustainability, balanced economic development. Two situations were analysed "Development based on economic sustainability" and "Development based on economic and environmental sustainability".
- In addition to the terms of reference of the specification notebook AECOM team conducted a second development scenario called "*Core TEN-T*" (CTT) which differs from the „Do Something” scenario in the number of projects proposed and the nature of the proposed investments for the road sector - for this sector are taken into account only projects contributing to the completion/expansion of the TEN-T core network (motorways). For the other transport sectors (rail, water, air and intermodal) the nature of the investments is similar to the one proposed in the "Do Something" development scenario (include investments for railway rehabilitation, modernization of ports, airports modernization, improvement of navigation on the Danube) .

*The promoted GTMP scenario is the "Do Something" Scenario - development based on economic and environmental sustainability.*

In selecting the projects have been considered the following aspects:

- Projects with limited economic benefits and significant environmental impacts will be excluded;

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<sup>41</sup> National Assessment Guide of the Transport Sector Projects and Project Prioritization Methodology of the Master Plan, Volume 2, Part C: Guidance on Developing the Cost-Benefit Economic and Financial Analysis and Risk Analysis, AECOM

- Projects that bring great economic benefits, but have a significant impact on the environment will be considered projects that can apply to be included in the development scenario based on economic sustainability;
- Projects that bring limited economic benefits but positive impact on the environment will be considered projects that can apply to be included in the development scenario based on economic and environmental sustainability;
- Projects that bring great economic benefits, but have a neutral or positive impact on the environment will be considered projects that can apply to be included in both scenarios.

In principle, both the objectives of the Master Plan and its constituent projects must meet certain well-defined evaluation criteria which also will have to meet the requirements of the European Commission.

These assessment criteria relate to economic impacts that can generate, how they contribute to the extension / completion of TEN-T core network, the impact on the environment (especially air pollution, emissions of greenhouse gases, noise pollution, impact on Natura 2000 network, transport safety), sustainability, balanced economic development.

The weight of evaluation criteria (listed in the previous pages) in determining the final score assigned to each project is presented in the following table:

Criteria	„Development based on economic and environmental sustainability” (EES)
Economic efficiency	50%
Trans-European Integration / TEN-T policy	20%
Environmental impact	20%
Sustainability	There is not a score granted but it is considered by the modal distribution
Balanced economic development	10%

The difficulties that have been met in the development process of the Strategic Environmental Assessment for GTMP are the followings:

- The GTMP proposed a certain number of investments, all over the national territory. For the investments proposed by the GTMP, the routes are only indicative, at corridor level, part of them being in a position to suffer changes during the implementation period. There are not known the type of works that are specific to every project, their volume, developing/implementation period or execution details in order to achieve a quantification of the impacts of each project. Considering these aspects concerning the determination of the environmental analysis likely to be affected and the potential effects on the environment caused by GTMP were made based on the nature of the proposed investment.
- Environmental Report did not include fieldwork to collect data and information on the exact characteristics of the location areas for the proposed investments, the evaluation was performed using existing national statistical data and GIS analysis.



- Lack of quantitative and spatial data on the current contribution of each sector of transport to the generated impact on human health and environmental components.
- Quality of information and existing public data - for example, there are contradictions between information available for the same data set.

### **13. Measures envisaged for monitoring the significant effects of the implementation of the General Transport Master Plan**

The monitoring program of the General Transport Master Plan effects entails identifying or preventing negative effects of the relevant environmental objectives and allows proposing additional protection measures to reduce environmental impact and to address areas likely to be affected.

The monitoring program aims to:

- How the relevant environmental objectives are met through the implementation of General Transport Master Plan - acquiring and recording information about significant environmental impacts, implementation and monitoring of all types of effects: positive, negative, direct, indirect, cumulative;
- The validity of predictions on the assessment of potential environmental effects and conclusions of the Strategic Environmental Assessment or of Appropriate Assessment;
- Identifying the possibility of unforeseen adverse effects and appropriate remedial actions that may be taken;
- If the proposed measures to mitigate/reduce environmental effects are implemented and verifying their effectiveness;

The monitoring program includes all environmental aspects and defines the following:

- Items that will be monitored taking into account the relevant environmental objectives for General Transport Master Plan;
- Indicators that should be followed (these indicators allow effective control and mitigation measures, reaching proposed objectives and the targets);
- Implementation period / frequency of monitoring (frequency of monitoring depends on the problem identified, sometimes it takes a single monitoring, sometimes regular monitoring and long lasting);
- Responsible (who is responsible for organizing and coordinating the monitoring system).

The reference period for the application of monitoring measures includes four phases: planning, design, construction and operation.

To have a good control in terms of monitoring the effects of implementation of the Master Plan is recommended that within the Managing Authority for GTMP to be designated a monitoring department/compartiment. It will have to follow up, systematically check whether GTMP targets are met (strategic, operational, general, specific and environmental objectives) based on financial, environmental or other indicators established, how the proposed investments are

implemented, if and how are taken into account the GTMP proposed environmental measures and what are the results of such measures.

At the end of the implementation period should be developed a report including information on environmental monitoring, monitoring methods, monitoring results and measures to reduce the environmental impact of proposed investments GTMP.

## 14. General conclusions

The conclusions drawn from the Strategic Environmental Assessment are the followings:

- Investments proposed by the General Transportation Master Plan (GTMP) for the development scenarios, can generate potential negative effects on the environmental objectives established for certain environmental components, namely air, climate change, water, soil and subsoil, waste and hazardous substances management, biodiversity, energy efficiency.
- Of the four scenarios proposed GTMP was chosen scenario oriented on the "development based on economic and environmental sustainability" (EES scenario). Compared with the other scenarios "Do nothing", "Do minimum" and Core TEN-T scenario, the ES/EES development scenario will help to reduce the overall impact of transport on the environment sector.
- The analysed "Do Minimum" scenario considers projects that are being implemented and have secured funding sources. From the available environmental information provided by the contracting authority results that the vast majority of these projects was driven the procedure for assessing the environmental impact (there are the decisions of the employment steps or environmental agreements issued by the competent environmental authority, which determine the conditions for implementation) only for a small number of projects have undergone the procedure for assessing the environmental impact studies and/or appropriate assessment studies. This scenario, especially in the road sector, make it difficult to achieve the environmental objectives established without proposing additional measures to those already established in the design phase. At European level, the primary cause of increasing road congestion and energy consumption growth and a source of social and environmental issues, it is precisely this tendency to increase the requirements for road transport for both freight and passenger.
- "Core TEN-T" scenario differs from ES / EES development scenario by number and type of projects proposed for the road sector By implementing the GTMP proposed projects in the development scenarios, physical changes that occur are due to construction works (building motorways, expressways, bypasses, railways, rehabilitation and modernization of railways, modernization of airports, ports modernization / development, navigation channel realization, etc.)
- The specific nature of the construction of the proposed investment by the two development scenarios (ES / EES and CTT) will cause permanent changes in terms of land area occupied, the category of land use and landscape.
- For all types of projects, regardless of the transport sector, the environmental effects are insignificant during execution, acts locally in the front line work and have temporary character.
- The routes proposed for some of the projects included in the development ES/EES and CTT scenarios intersect Natura 2000 network:
  - In the "Do Minimum" scenario, 30 projects intersect SCIs of the Natura 2000 network among which 2 projects for the naval sector, 5 projects proposed for the

rail sector, 23 projects proposed for the road sector. For Special Protection Areas (SPA), 20 projects overlap with sites - 2 projects for the naval sector, 4 projects proposed for the rail sector, 14 projects proposed for the road sector. Air infrastructure projects included in this scenario do not affect Natura 2000 sites.

- In the development scenario (ES / EES), 64 projects intersect Sites of Community Importance (SCI) of the Natura 2000 network, of which 6 naval projects, 15 railway projects and 43 road projects. For Special Protection Areas (SPA), 54 projects overlap with sites, respectively 5 naval projects, 14 railway projects and 35 road projects. Air infrastructure projects included in this scenario does not affect Natura 2000 sites.
- In the CTT scenario, 30 projects intersect Sites of Community Importance (SCI) of the Natura 2000 network, of which 6 naval projects, 15 railway projects and 9 road projects. For Special Protection Areas (SPA), 28 projects overlap with sites, respectively 5 naval projects, 14 railway projects and 9 road projects. Air and intermodal infrastructure projects included in this scenario do not affect Natura 2000 sites. The total areas potentially-affected by the implementation of projects proposed in the CTT scenario represents 0.83% of sites of community importance and 0.91% of the total special protection areas.
- By implementing the proposed projects through development scenarios (ES / EES and CTT) are projected changes in air quality, noise level and local landscape. It is expected to reduce emissions of pollutants into the atmosphere and noise level in the localities crossed by the existing national roads by taking traffic by proposed new roads.
- For all GTMP development scenarios (ES / EES and CTT) current trends of increasing total emissions of greenhouse gases. For all scenarios analysed by GTMP road sector will have the highest contribution to the overall emissions of greenhouse gases, followed by rail, air and water, this is due to the increased number of driven kilometres and increased trend of the national auto park. Largest contribution to total emissions of greenhouse gases will have CTT scenario implementation.
- Development of transport infrastructure can lead to increased emissions of greenhouse gas and air pollutant emissions at national level compared with the reference year 2011. Taking into account traffic estimations and weather forecast we can conclude that the transport sector will enable achieving the objectives and targets set for air and climate change component. Achieving these objectives does not depend entirely on improving the state of transport infrastructure. There are other factors that may influence variation in air pollutant emissions and emissions of greenhouse gases. These factors are:
  - improving the marketing of alternative fuels and vehicles to allow the use of these fuels;
  - developing facilities to fuel vehicles with alternative fuels especially for road and rail sectors;
  - economic development of regions;
  - cost associated to used fuels and vehicle maintenance;
  - types of fuel used;
  - supply and demand for cleaner performance vehicles
  - tax / tax levied on vehicles;
  - pollution taxes;
  - need for individual mobility;
  - technological improvement of vehicles;
  - behaviour of road users;

- inefficiency or lack of public transport services;
- average speed of traffic (the transition between localities, inside the locality, etc.).
- application and enforcement of measures to prevent, reduce the environmental impact GTMP proposed;
- increasing amount of freight and number of passengers on railway /naval / air sector detrimental road sector;
- Energy efficiency in the transport sector is not entirely dependent on the technical conditions of rolling track of vehicles, depends also on the degree of loading of vehicles, physico-geographical characteristics of areas where transport infrastructure is located (mountains, plains, hills), vehicle weight.
- To reduce the potential negative effects on the environment, both during execution and during operation, it is necessary to propose appropriate measures to eliminate, prevent, reduce and / or offset the likely adverse effects of these and additional measures to potentiate (strengthen) the GTMP positive effects on the environment. These measures include:
  - Avoid sensitive areas, necessary since the feasibility and designs stage (protected natural areas, densely populated, obstacles and natural barriers such as rivers, mountain areas, etc.) by choosing the best alternative route for projects included in GTMP and provision of measures to prevent and reduce effects on the environment where these areas can not be avoided; it is necessary an unitary environmental impact assessment in order to eliminate the likely subjectivism
  - Environmental impact assessment and appropriate assessment since the earliest stages of planning;
  - Correlation of the proposed measures for GTMP with the proposed measures through programs, strategies and other national and European plans that are for the transport sector.
  - Selection of the best methods of design and construction in order to prevent and reduce environmental impact (reduction of the direct / indirect environmental impacts;
  - Correct evaluation of the proposed and implemented protection environmental measures efficiency
  - Limitation of land areas temporarily or permanently occupied by GTMP proposed projects;
  - Pollution prevention and control both the construction phase and the operation phase;
  - Limitation effects on Natura 2000 sites. Most of the potential significant impacts can be avoided by reconsidering project routes and their positioning outside the boundaries of Natura 2000 sites (preferred option for sites with small areas) or, where applicable, outside the occupied areas by habitats and species of community importance (option required for sites which occupy large areas and already incorporates a considerable anthropogenic presence). For situations where avoidance of Natura 2000 sites intersection or of critical areas within them is not possible, it is necessary to consider possible measures to reduce and, where appropriate, compensate significant impacts;
  - Several recommendations for the transport sector adaptation (new proposed investments) to climate change;
  - Reduction of environmental costs in choosing the alternative routes and implementation of transport projects proposed by GTMP;

- Complying with the existing national and European regulations, assessing the level of detail and the implementation of the proposed measures is expected that the potential negative effects on the environment and human health caused by transport projects will not have significant impact in transboundary context
- The scenario proposed by GTMP is focused on "Development based on economic and environmental sustainability" (EES scenario), this scenario compared to the Reference scenario ("Do Minimum") provides the following economic and environmental benefits:
  - o Improvement and development of transport infrastructure will allow increasing the average transport speed, decreasing travel time and thus reducing fuel consumption and emissions of pollutants into the atmosphere;
  - o The projects proposed by GTMP will increase the safety and reliability of travel time, reducing the risk of accidents involving casualties and property damage;
  - o Decrease of transport infrastructure vulnerability to climate change – through the possibility of introducing for the proposed investments specific execution conditions;
  - o The projects proposed by GTMP will enable increasing competitiveness between modes of transport, the possibility of using less polluting modes of transport;
  - o Improvement transport services (investment in rolling stock, modernization of railway stations, airports modernization, modernization of ports etc.)
  - o Circulation improvement on the Danube or on internal channels;
  - o Development /improvement of intermodal freight and passengers transport;
  - o Balanced economic and social development at local, territorial and national level.
  - o Will reduce the journey time - increasing the average speed for the road sector, reducing travel times.
  - o Will contribute to the intermodal transport development (construction of new intermodal terminals, modernization/development of the existing ones)
  - o Will contribute to the national economic development (projects included in the Master Plan benefits are considerable; we can expect that they will amount to 2% of Romania's GDP in the period 2020-2050).