

David, PhD(c), Laurentiu (Presenter)

Ontario Institute for Studies in Education, University of Toronto
252 Bloor Street West, Toronto, Ontario M5S 1V6, e-mail: david_larry@hotmail.com

Fistung, Ph.D, M.Sc.Eng, Frantz Daniel

Economics Center of Industry and Services – Romanian Academy, Bucharest,
Calea 13 Septembrie, nr.13 Sector 5, e-mail: dfistung@yahoo.com

On the Road to Sustainability - The Case of the Romanian Transport Sector

Theme: Resilient Societies

ABSTRACT

This paper undertakes a macro-level analysis of the present transportation sector in Romania while exploring potential strategic options within the context of integrating the existing European environmental policies that address the sustainability factor. The intention is to develop a framework that will help the Romanian sector of transport to identify the targets and strategies for the development and deployment of such policies in order to minimize the effects of the existing pollutant modes of transportation. The fast adoption of such pertinent strategies for the development and implementation of a public transportation, rail, naval and multimodal transportation seems to be the key factor in the introduction of a sustainable transport system in Romania.

Despite some very serious obstacles that are presently challenging the Romanian transport system, the development of a transportation infrastructure that is built upon the principles of sustainable development will ask for a reorientation in favor of new transportation modes that are less pollutant and much more energy efficient. It is assumed that in order to allow for such retrenchment to occur some key changes in the Romanian transport policy priorities will need to take place.

Keywords: *sustainable transportation, energy efficiency, transportation infrastructure, European policies*

JEL classification: *H23, L91, L98, Q56, R41*

Introduction

Transport is one of the key factors in the developing process of modern economies. However, while on one hand the society demands ever greater mobility, the public, on the other hand, is becoming increasingly intolerant to congestion, chronic delays, noise, environmental impacts and poor quality of some transportation services. As the demand for transportation keeps increasing, the community's answer cannot be limited merely to building new infrastructure and opening up of new markets.

In the past two decades Romania has recognized a huge change at different levels, particularly political, economical, social and legal. Romania has become a NATO member towards the end of the twentieth century, and recently a member of the European Union. Membership in these organizations triggers the obligation to meet some timely expectations – standards, by-laws etc. Presently, the Romanian transport system needs to be optimized in order to meet the demands of enlargement and sustainable development, as set out in the conclusions of the European Council in Gothenburg. According to the Council, a modern transport system must be sustainable from an economic and social, as well as, an environmental perspective.

One issue that has been raised in the past about the various strategies for sustainable transportation was tailored around the possible future economic consequences. While on one hand, the investments in transportation, particularly on highways, have been seen as promoters of economic growth and development, on the other hand, the environmental considerations have been viewed as constraints to the expansion of the transportation system, but at the same time as potential brakes on the economic growth. The existing widespread concerns are that environmental protection is costly and that economic losses could result from interference with market preferences for auto mobility and suburban living. The implications of the fact that the desire for environmental protection must be traded off for the desire of economic development has permeated many policy discussions. Recently, a broader view has emerged. Evidence supporting the social and environmental consequences of transportation has made it clear that consumers are paying only a portion of the full costs of their deliberate preference for a particular type of transportation, particularly road. (Maddison, Pearce, et al., 1996)

Presently, most problems are caused by the effects of deficiencies, as well as, failures of the market. Specifically, in Romania, the main contributing factors are the omission and the underevaluation or incorrect estimation of the transportation costs. In the presence of the negative externalities, one may think that a „market fall” might exist, in the sense of reduction in intensity of those activities having as a result the increase of the benefits that may be experienced by the society as a whole. For this reason the transport services have had the tendency to continue their activity up to the level where the marginal net benefit, obtained along with the last kilometer covered, was zero (the phenomenon of indifference for the last kilometer covered). For this reason, it seems that those who are affected the most by the effects of the negative externalities caused by the transportation sector agree to pay more for reducing these effects than those ones who are causing them. There are two alternatives regarding the modalities of reducing the negative externalities caused by transportation. The first alternative pertains to those actions that aim at the reduction of transport activities, in general. The second alternative refers to the adoption of some technical measures that might render results similar to those resulting from the decreasing of the transportation activities. In order to maximize the efficiency resulting from the externalities limiting actions, on the basis of minimum costs, it is necessary to employ a mix of the two previously mentioned alternatives.

There has been a growing recognition that many transportation projects have not been subjected to a rigorous economic analysis. This fact *per se* led to the partial cancellation of their cost effectiveness. In the future, Romania is obliged to implement proper policies for energy consumption reduction and for environment protection, despite the actual tendencies that aim at in the opposite ways. It is obvious that even though, rhetorically, the official

Romanian environmental strategy has been strongly in favor of a sustainable transport system development, in fact, the last two decades showed exactly the opposite. Though the road infrastructure development remains the first priority of the Romanian officials, the main funds allocated for these types of activities, unfortunately, are directed to projects that are not environmentally friendly. Those tendencies are not in accordance with the present European strategy and are dangerous for the future of the Romanian transport strategy to the point where Romania could be rejected from the future common European transportation network.

Actual tendencies regarding the European transportation strategy

The world transport strategy is expected to be reoriented according to the sustainable principles. In the past, the elaboration of policies for transport development, was made by taking into consideration some discretionary rules that were focused only on the existing situation, as well as the forecasting of some possible development scenarios that were directly related to some possible expected financial allocations. These specific policies underlined the interconnected relationship between the development of the transports and the global socio-economic evolution, as support for the increase of the general prosperity. Unfortunately, this approach was conjectural because most of the policies designed for transportation development, discretionarily used unregenerable resources or hardly regenerable in the environment, producing serious effects, on long term, to the environment and human health. As a result it appears, as unavoidable, the necessity for development of a new approach to transportation policies in the sense of achieving an equilibrium between transportation and protection of the surrounding environment. Such an approach may be that of the sustainable transportation, definition that comes from the main concept of durable development of the society. The concept of sustainable transportation was defined as "the complex system that meets the mobility requirements of present generations, without damaging the environment and human health while improving the efficiency of the energy consumption so that in the future will be possible to satisfy the mobility needs of other generations"(Fistung D., 1999).

In this context, the EU has initiated a number of policies and initiatives aiming at limiting the negative effects of transportation. The EU orientation has been oriented towards encouraging a shift from road transport to lower environmental impact modes, such as clean buses, railways, as well as waterways. The EU Commission has proposed that all member states introduce a charging infrastructure that will directly influence the transportation demand, by moving towards a situation where prices paid by transportators reflect the full costs to society. (e.g. the Euro vignette directive) Unfortunately, at this time the implementation of such measures, especially in Romania, is limited. From another perspective, some significant progress - albeit offset by the increase in demand and volume of transportation - has been made in vehicle and fuel technology, driven by EU legislation and initiatives. Similar actions have been pursued to improve the urban environment and land-use management through the EU Structural Funds programme "Urban II" and the Research Framework Programme, for example. The emerging view is that the economic development and environmental protection are both desired objectives along with social justice (equity); that transportation planners should be pursuing strategies, like Sectoral Operational Program on Transport – SOPT on infrastructure in Romania, that deliver on all counts, not just on the economic front; and that analyses should reflect the full range of concerns about projects—economic, social, and environmental. (Romanian Government, 2007)

In the future, it should be recognized the fact that the unconditional encouragement of policies that allow for unrestricted car use are not sustainable from an economical, social or

environmental point of view. An alternative and sustainable transport strategy would contain specific targets and measures to reduce the car use. This aspect could be achieved through a number of alternatives which would fall broadly into two distinct categories:

(a) reducing the travel demand (via means such as better urban planning practices including mixed use zoning, urban infill rather than continuing sprawl, development of more effective activity centers, etc), and

(b) reversing the current hierarchy of transportation priorities so that planning and funding are consistently directed to facilitating priorities in the following order:

- public transport
- rail
- multi modal
- walking
- cycling
- other transport modes (including private motor vehicles).

The first EU Sustainable Development Strategy (hereinafter EUSDS) was elaborated by the European Council in Gothenburg (EU Sustainable Development Strategy, European Council, 2001) and renewed in Brussels in 2006 based on the proposals from the World Summit on Sustainable Development that took place in Johannesburg in 2002. The EUSDS points out to the unsustainable trends pertaining to climate change and energy use, which threatens public health, poverty and social exclusion, management of natural resources, biodiversity loss, land use and transportation. The EUSDS released new targets for the EU countries with respect to the transport sector. First of them is about climate change and clean energy while the second one is about sustainable development. The operational objectives that are related to the transportation sector include the following (European Council, 2001):

- Adaptation to, and mitigation of, climate change should be integrated in all relevant European policies.
- By 2010 5.75% of transport fuel should consist of bio-fuels, as an indicative target;
- Reaching an overall saving of 9% of final energy consumption until 2017;
- Decoupling economic growth and the demand for transport with the aim of reducing environmental impacts.
- Achieving sustainable levels of transport energy use and reducing transport greenhouse gas emissions.
- Reducing pollutant emissions from transport to levels that minimise effects on human health and/or the environment.
- Achieving a balanced shift towards environment friendly transport modes to bring about a sustainable transport and mobility system.
- Reducing transportation noise both at source and through mitigation measures to ensure overall exposure levels minimise impacts on health.
- Modernising the EU framework for public passenger transport services to encourage better efficiency and performance by 2010.
- In line with the EU strategy on CO₂ emissions from light duty vehicles, the average new car fleet should achieve CO₂ emissions of 140g/km (2008/09) and 120g/km (2012).
- Halving road transport deaths by 2010 compared to 2000.

The introduction of policies that promote railways (both in passenger and freight transport) and public road transport is expected to lead to a more favorable development of the EU transportation sector. Improvements would be even greater if policies towards the more rational use of transportation modes (through improving vehicle load factors) would also be

implemented. The limited response of consumers to several policy instruments used in the past, including the very high taxation on fuels for private transportation on roads, and the increasing importance of the transportation sector in the future evolution of the EU energy, as a system make very important the implementation of the proposed policies of the White Paper for Transport which played a significant role in easing the pressures caused by rapid growth of the transportation sector. It is very possible that in the future, this kind of policy options will also contribute to improvements to traffic congestion, air quality etc. In order to obtain a better analytical insight into the results of this scenario, two alternative cases were defined (European Commission, 2002):

- A scenario assuming that the share of rail (both passenger and freight) and public road transport activity will remain essentially stable at the 1998 level up to 2010, in contrast to the actual trend of continuously diminishing shares of these modes. In other words this scenario assumes that, with the overall transportation volume (expressed in passenger-kilometers and tone-kilometers) remaining unchanged from actual levels, policies promoting rail transport and public road transport will lead to a stronger growth of these modes compared to today's reality. This growth will possibly occur to the detriment of other transportation modes, thereby leading to a higher share of rail and public road transportation.
- A scenario involving the assumptions previously made for rail and public road transportation activity but assuming, additionally, that load factors of all transport modes will increase significantly by 2010 in comparison to present trends. This means that all transportation modes will be used in a much more efficient way than today. This scenario is in line with the Commission's White Paper on Transport and is the most plausible scenario that can be implemented by the end of 2010 in order to curb the energy consumption and CO₂ emissions from transportation under future economic developments.

The Green Paper on Security of Supply (European Commission, 2000) released in November 2000 highlighted the important role of the transportation sector in the light of growing demand for energy and CO₂ emissions. Transportation in the enlarged EU accounted for 26% of overall CO₂ emissions in 2000. According to the actual developments, the emissions from transportation are expected to increase by 40% between 1990 and 2010 in EU-27. Some measures on transportation policy were taken at the Community level, which addressed the following issues that are expected to become part of Romanian legislation (European Commission, 2002) with respect to transportation sector:

- **Revitalizing the railways.** Rail transportation is, in some ways, the key issue in shifting the modal balance, particularly in the case of goods. The EU future plans include the opening up of markets, not only for international services, as agreed in December 2000, but also for cabotage in all member states' national markets. Moreover the plans include also the international passenger services. The opening up of markets is expected to be accompanied by further harmonization in the areas of interoperability and safety.
- **Improving quality in the road transportation sector.** In the near future, some legislation that will allow for the harmonization of certain clauses in contracts to protect carriers from consignors should be developed.
- **Promoting transportation by sea and inland waterways.** The way to revive short-sea shipping is to build a virtual sea "motorways" network within the framework of the master plan for the trans-European network. This will require better connections between ports, railways and inland waterway networks, together with improvements in the quality of port services. To increase maritime safety the Commission proposed minimum social rules to be observed in ship inspections and in the light of developing a genuine European maritime traffic management system.

- **Striking a balance between growth in the air transport and the environment.** It is imperative to establish and implement legislation on air traffic. The accompanying measures should ensure that the inevitable expansion of airport capacity remains strictly subjected to new regulations pertaining to the decrease in aircraft noise and pollution.
- **Turning inter-modality into reality.** Action must be taken to ensure a full integration of those modes offering considerable potential transportation capacity in an efficiently managed transportation chain which joins up all the individual services. The priorities must revolve around the technical harmonization and interoperability between systems, particularly for containers.
- **Building the trans-European transport network.** An effort is expected to be made in order to reduce the saturation of certain major arteries and the consequent pollution. The Commission proposed to concentrate on removing bottlenecks in the railway network; the main concern is in completing the routes identified as the priorities for absorbing the traffic flows generated by enlargement, particularly in frontier regions; and in improving access to outlying areas.
- **Improving road safety.** Every day the total number of people killed on Europe's roads is practically the same as in a medium haul plane crash. Road accident victims, the dead or injured, cost society tens of billions of euro - but the human costs are incalculable. For this reason, the EU will endeavor to halve the number of such victims by the end of 2010.
- **Adopting a policy on effective charging for transport.** In this respect, the White Paper developed the following guidelines: (i) harmonization of fuel taxation for commercial users, particularly in road transport; and (ii) alignment of the principles for charging for infrastructure use.
- **Recognizing the rights and obligations of users.** European citizens' rights to have access to high quality services providing integrated services at affordable prices will be reinforced.
- **Developing high-quality urban transport.** A better approach is needed from local public authorities to reconcile modernization of the public transport services with more rational car use to achieve sustainable development.
- **Putting research and technology at the service of clean, efficient transport.** The research framework program provides an opportunity to put new applications such as inter-modality, clean vehicles and telematics into action; and to facilitate co-ordination and increased efficiency in the transport research system.
- **Developing medium- and long-term environmental objectives for a sustainable transportation system.** A sustainable transport system needs to be defined in operational terms of providing the policy-makers with more useful guidelines and information.

Romania's tendencies of transportation development and the major gaps according to the European strategy

The set up, in the next few years, of a unic European market in the field of transportation, makes necessary the adoption, by all member and candidate states, of certain measures that would permit the rapid interconnection. These measures must be taken, without any doubts, in order to support the sustainable transportation development else, more and major market distortions will appear, especially produced by the faster development of the unsustainable transportation modes compared with other more environmentally friendly. Elaborating major development strategies is a major thrust for sustainable development plans. Documenting and evaluating these sustainability initiatives—both their institutional framework and the substance of their accomplishments—could provide valuable models for further development of transportation in Romania according to sustainable principles. The adoption and application

in practice of new transportation policies does not imply an immediate and abrupt modification of Romanians' lifestyle. Within this context the most imminent question to address would be: What type of measures should be adopted in Romania for achieving, simultaneously, sustainable development of transportation while limiting the consumption of energy resources? The answer to this question should be focused around the energy efficiency aspect. Due to the increased number of cars and transportation vehicles the consumption of fuel increased in last two decades. The energy efficiency in the Romanian transportation sector, which is one of the most important issues, is exacerbated by the old infrastructure which is energy intensive.

Presently, the energy efficiency is one of the major targets for the transportation sector. There is a danger that if no measures will be implemented in the near future, the private car fleet will continue to grow due to the overall development of the country's economy in the detriment of the public transport, which is the actual solution to reducing the pollution caused by transport vehicles. If no investments will be made soon in modernizing the existing infrastructure, the pressure on the energy resources consumption will grow. The good aspect of it is that the pressure on the natural resources necessary for the development of the roads and rail infrastructure will decrease. From a different perspective though, the transportation sector is nearly fully dependent on fossil fuel. In early 1990's the increased economic development allowed for improvements in energy efficiency of public and private transportation in Romania. As a result, Romania recognized the greatest decline in energy consumption - 15% - among eastern European countries. Over the last decade things took a different twist. Presently, 80% of the energy consumed in Romania in the transportation sector was by road. (Guvernul Romaniei, 2008).

Energy consumption in the transportation sector of industry will continue to grow if no investments will be made in the public transportation sector which showed already a drifting decline during the last two decades. Road transportation will continue to be the largest energy consumer due to public transport and rail being gradually withdraw from the infrastructure due to inefficiency. If no support is given to renewable energy sources, Romania will continue to stand aside from developments of bio-fuel and bio-fuel market in terms of production and use. Presently, the last evolutions in the transportation sector did not encourage the development of solutions with respect to energy efficiency and sustainable development. Lack of investment during 1990-2004 combined with a poor service quality has led to a fall in the public transportation use. An increase in the number of road vehicles, particularly passenger cars (from 1.29mln in 1990 to 5.3mln in 2009, or from 55.7 passenger cars per 1,000 inhabitants in 1990 to 247.7 passenger cars per 1,000 inhabitants in 2009) was observed in the past. The number of freight motor vehicles grew from 258,701 in 1990 to 506,427 in 2009 which is an increase of about 196% (Guvernul Romaniei, 2010). The freight and passenger railway transport (in tons-km/year and respectively passengers-km/year) has been characterized by a sharp decline between 1990 and 2010. Only in the last six years the decline figures are: -10.3% and - 30% respectively (EUROSTAT, 2010). The increase in road traffic resulted in congestion not only in the cities but in the narrow rural and international roads. During the same period of time, a similar situation happened in the freight transport (in tons-km) and passenger transport (in passengers-km) of other transport means: inland waterways transport (- 16%, respectively - 67%), maritime transport (- 98%) and air transport (- 79%, respectively - 41%), except road. Significant decreases took place in bus (3.5 times) and mini-bus passenger transportation (2.5 times) usage over 1990 – 2004 periods. Compared with the EU countries, the interurban bus and mini-bus passenger-km per inhabitant/year are by far the

lowest in Romania. The average in the EU is around 1,000 passenger-km, compared with just 242 passenger-km in Romania. With respect to waterways, after a notable decrease between 1990 and 1999, the traffic in the port of Constanta reached 33 million tons in 2001 (compared with 42.4 mil. tones in 1990). With respect to airways, from 2000 to 2005 the number of the air passengers grew 1.77 times. Railway transportation is an ecological transportation and one of the most effective measures to reduce pollution, with positive results on both short and long runs. The poor condition of the rail infrastructure has triggered a reduction of the operational speed while the level of comfort was affected by the ageing passenger fleet. In addition, the train timetable does not appear to be suited for the current needs, in particular because of the extensive use of large train units at low frequencies. It appears that the largest (passenger) railway company is primarily operating trains without striving to meet their passenger needs; in other words, the railway public transportation is not customer-oriented enough as remains the case in many other EU countries.

Based on the present statistics, a rapid growth in car ownership will be experienced over the next 10 years. If the state of public rail and public transport will continue to deteriorate, the usage of public transportation will continue to drop. It is estimated that the overall passenger transportation average increase (in passengers-km) will be of 3.7% per year between 2005 and 2015 (Guvernul Romaniei, 2008)), with higher rates for road transportation and lower rates for rail transportation. It is evaluated that overall freight transport (in tons-km) has increased, in average, by 1.1% per year between 2001 and 2007 and is estimated by 5.3% per year from 2007, with higher rates for road transport and lower rates for rail transport. If no economic and political measures will be carried out, the already poor condition of the rail infrastructure will further continue to deteriorate and a further reduction of the operational speed and safety movement will take place, while the level of comfort will be affected by the ageing passenger fleet. In the same time the rail passenger company, owned by the State, is primarily responsible for operating trains and is not customer-oriented. All these issues will persist in the close future, if no improvements to both infrastructure and fleet will be made.

The past and present tendencies of the Romanian transportation development indicate that a lot needs to be done in order to establish a sustainable transportation sector. The average EU urban and interurban passenger-km per inhabitant is around 1,000 while in Romania it is only 247.7, which means that unless the public transport will become more attractive immediately, the number of private cars will continue to grow or at least will not help decrease the traffic in towns. (EUROSTAT, 2010)

Water transportation infrastructure condition is further deteriorating and in many cases the equipment is operating 20 years beyond its economic life. The Danube River which is under a “natural flow” has been subjected to a few and unsatisfactory measures adopted for improving the conditions of navigation and safety of operation on the river. In addition the quality of navigation on the Sulina Channel is in great need of consolidation of the riverbanks, and establishing topometric-hydrographic measurement and signaling systems on the Romanian section of the Danube River. Otherwise, the current traffic flow can drastically decrease in the future.

Conclusions

Romania’s transport system case is idiosyncratic. On one hand, the transport sector of the economy inherited an outdated system in terms of both infrastructure and road vehicles. On

the other hand, from an environment perspective, the old system have had some good elements built-in that have not been exploited and/or developed, in the past decade or so, to its full potential. In this respect, if before 1990's the Romanian transport policies emphasized largely on the usage of railways, especially for the movement of commercial goods and merchandise, presently this type of transport mean is lagging well behind the road transport which has been more supported by the after 1990's transport system policies. Notwithstanding this, in the future, in Romania, the inappropriate transport system orientations will need to be modified given the existing circumstances related to the expectations of the European community, as well as by the examples of neighboring countries. In this respect, both Hungary and Austria have initiated programs that restrict the movement of the in-transit merchandise by asking all road transporters to use piggyback type of intermodal transport system.

Recommendations

In order to improve the collaboration between the national transportation planners and the local and regional officials it is expected that a number of proper measures should be in place for each region/locality. Also, these measures should meet the national necessities and the EU demands and legislation. In our opinion, some major measures must be adopted by the Romanian authorities, in order to achieve sustainable transportation development and the European requirements:

- the development of a long-term strategy that would support the development of a sustainable transportation system with positive effects on both the environment and public health;
- the evaluation on a long term basis, taking into consideration all the economic, ecologic and social implications, of such sustainable system development;
- the definition of some specific qualitative objectives based on the environment and public health protection's criteria and standards which shall implicitly respect the principles of sustainable development;
- the evaluation of possible socio-economic implications of the new strategies based on the principles of sustainable development;
- the implementation of proper measures for monitoring the implementation of proposed sustainable strategies; a number of well-defined indicators should be used for baseling;
- sustainable measures should be adopted, concomitantly, at national and local levels and must include environmental, social and economic measures. In our opinion, a very important measure that must be adopted is to internalize the negative externalities, most of them produced by the road transportation. In that way, the transportation market could be rebalanced, and the sustainable transportation modes encouraged developing themselves;
- real encouraging the most environmentally friendly modes, such rail, for example, in opposition with the actual tendencies, in favour of road. The rail network needs significant improvement given the usage and poor condition of the infrastructure for efficient connections – on several tracks sectors the speed is restricted - before the interoperability will be possible. Frequency, journey time, level of comfort and higher accessibility to more areas of the country, need a lot of improvement otherwise is unlikely that railway transport will play a significant role in transport, in the detriment of other means. If there will be no measures to justify the price it is unlikely that trains will become a favorite mean of transportation, but rather necessary, therefore not contributing too much to the option of increasing the environmentally friendly transport options in Romania.

References

1. European Commission. (2000). *Green Paper on Security of Supply*, Brussels.
2. European Commission. (2002). *The White Paper on Transport*, Brussels
3. Maddison D., Pearce D., et al.(1996). *The true costs of road transport*, London: Earthscan Publications Ltd.
4. European Council. (2001). *EU Sustainable Development Strategy*. Gothenburg.
5. European Council. (2001). *Presidency Conclusions*, SN/200/1/01/REV1, Gothenburg from http://ec.europa.eu/governance/impact/background/docs/goteborg_concl_en.pdf.
6. EUROSTAT.(2010). *Statistics* from http://epp.eurostat.ec.europa.eu/portal/page/portal/transport/data/main_tables.
7. Fistung D..(1999). *Transporturi. Teorie economica, ecologie, legislatie*, Bucharest: ALL BECK Publisher.
8. Guvernul Romaniei, Ministerul Transporturilor. (2008). *Strategia pentru transportul durabil pe perioada 2007-2013 si 2020, 2030* from http://www.mt.ro/strategie/strategii%20sectoriale_acte%20normative/strategie%20dezvoltare%20durabila%20noua%20ultima%20forma.pdf
9. Ministerul Administratiei si Internelor, DRPCIV. (2010). *Indicatori statistici 2009 privind evidentele auto, permisele de conducere si examinarile* from <http://www.drpciv.ro/info-portal/downloadFile.do?menu=newsletters&lang=ro&id=71>
10. Romanian Government-Ministry of Transport. (2007). *Sectoral Operational Programme-Transport 2007-2013*. Bucharest from http://post.mt.ro/POS_Transport_final_EN.pdf.
11. Romanian Government-Ministry of Transport. *Environmental Report (SEA) of Sectoral Operational Programme – Transport Infrastructure Romania (2007)*, from http://post.mt.ro/SEA/SEA_report_TRAN_EN_FINAL.pdf.