

# ENVIRONMENTAL IMPACT ASSESSMENT OF THE PROJECT OF “RENEWAL OF ZSSK ROLLING STOCK FLEET”

## ОЦЕНКА ЭКОЛОГИЧЕСКОГО ВОЗДЕЙСТВИЯ ПРОЕКТА "RENEWAL ZSSK ROLLING STOCK FLEET"

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**Abstract:** *The fundamental principle of the Transport Policy of the Slovak Republic is sustainable development, which is based on promoting sector balance, oriented on transport users, promoting equal opportunities, efficient use of land and resources, open access and gradual shift of costs to those who cause them. Stemming from the White Paper, this approach is reflected in the basic principles leading to proportional and structurally balanced sustainable transport development and to establishment of new, mutual relations directed internally as well as abroad. Further growth of mobility cannot continue in the same manner as in the past, i.e. without gradual introduction of new environmentally-friendly transport policies the growth may soon become of unsustainable dimensions. Technological innovation may contribute to reorganisation of the transport system in order to make it able to fulfil growing demand for mobility and, at the same time, ensure energy savings and greater respect for the environment.*

**KEYWORDS:** ENVIRONMENT, MOBILITY, TECHNOLOGICAL INNOVATION

### 1. Introduction

A recent notion of humanity development identified only with the economic growth has now been corrected so that it would lead also to fulfilment of social goals, in particular to reduction of poverty, enhancement of the quality of life, improved opportunities for better education and health. This change of orientation requires a comprehensive approach to development of mutual relations management between natural and human, branch and structural aspects of development on all levels [15]. As a result of this changed orientation, a concept of sustainable development was created, which is further developed and internationally applied. Since 1960s the knowledge that an unlimited or uncontrolled growth, whether of human population, consumption or pollution etc., is not sustainable under the circumstances of real, existing and limited resources is becoming more wide-spread [1].

It is, therefore, necessary to replace the model of industrial civilisation by a more sustainable and just concept. Sustainable development concept is nowadays considered as a possible solution for adverse consequences of global trends in society development and their negative impacts on the environment. The emphasis is put on the need to base this concept on healthy ecosystems, strong economy and well-functioning social issues [7].

### 2. Concept of a sustainable development

In its draft Sustainable Development (SD) Principles, the EU has declared that SD is the key factor of all EC policies stipulated by the Treaty. This document determines the crucial objectives such as environmental protection, social equity and cohesion, economic prosperity and meeting the international responsibilities. In fulfilling these objectives the EU is guided by the following political principles: promotion and protection of fundamental human rights, solidarity within and between generations, open and democratic society, involvement of citizens, involvement of social and business partners, policy coherence and governance, policy integration, use of best available knowledge, precautionary principle, “polluters pays” principle [2].

However, in respect of the age and historical position of rail transport, the newest data on the European level show that railways can offer the major social and environmental advantages in terms of energy consumption, atmospheric emissions, transport overburdening and accident rate etc. [8]

### 3. Transport as one of the major climatic threats

The topic of climatic changes is becoming increasingly urgent. It is implied that the cause behind environmental degradation is mainly

energy production, while little or no attention is paid to its use. In this respect it is important to pay more attention to transport and mobility.

Economic and technological progress keeps contributing to increase in the volumes of transported goods and passengers all throughout the planet.

Different transport modes are responsible for approximately 30% of global warming, which is a share larger than that of energy production or industry. In Europe, even despite increasingly cleaner engines, the carbon dioxide emissions do not decrease, but keep growing (+ 25% since 1990).

According to the European Environment Agency, it is necessary to re-think the whole mobility concept. The Agency also claims that the two main factors, which have historically dominated decision-making regarding transport issues (time and costs), have now to be considered alongside the third, equally significant factor, which is the environmental sustainability. This new factor has to be taken into consideration already at the beginning of infrastructure planning [12].

### 4. Transport policy of the EU

Transport is one of the key factors of development of every modern society, while in itself it is not a goal but a means of economic progress and a precondition for achieving social and regional solidarity. The aim of transport policy is to establish transport conditions and minimize the risks related to access to transport market and transport infrastructure, and ensure continuously growing transport demand of the society (transport of goods and passengers) in the required time and quality, while at the same time reducing negative effects of transport on the environment. The framework for achieving these objectives has to be sustainable development, which includes economic growth, social solidarity and ecological acceptability [11].

The objective of the Common EU Transport Policy is to remove obstacles at the borders between the Member States so as to facilitate free movement of persons and goods between the Member States of the European Union [5]. Its prime objectives are to complete the internal market for transport, ensure sustainable development, innovate transport sector and increase safety standards. In an ideal case all European regions should be mutually interconnected by Trans-European railway and road corridors, the construction of which, however, lags behind due to insufficient funding [4].

The EU Transport Policy should ensure meeting of two contradictory goals: transport development and protection of the environment. It is necessary to propose a European strategy for a

reasonable regulation of transport flows, connections of various carriers, and a strategy of transport limits. Railway transport shall play an important role in the future [13].

#### 4.1. Interoperability of Trans-European conventional railway system

Existence of differences in national regulations and technical conditions of railway administrations in Member States of the European Union, which are result of separated development of railway industry, prevent the international railway transport from unlimited operation of trains on the whole Trans-European railway network. Due to forced stops of trains at borders when they are taken over between individual railway managers and carriers, the transport periods are prolonged and thus the competitiveness of rail transport as compared to road is reduced. In the last decades these differences caused reduction of the share of railway transport on the European transport market down to 28 %, with anticipated further reduction down to 11.2% by 2030 in case the problem with railway heterogeneity is not solved.

Smooth, obstacle-free train operation on the Trans-European railway network requires comprehensive compatibility of infrastructure characteristics, rolling stock characteristics and efficient interconnection of information and communication systems of various infrastructure managers, carriers and business partners. In order to enhance competitiveness of the Community railways towards other transport modes which are operated without obstacles thanks to technical compatibility of infrastructure and vehicles, in order to reduce ecological impacts of transport on the environment, to reduce overloaded traffic on European roads and in order to establish a pan-European transport system, the characteristics of which would ensure fast and safe fulfilment of transport needs of the Community, on 23 July 1996 the European Parliament adopted Directive 96/48/EC on interoperability of Trans-European high-speed railway system. As Directive 96/48/EC deals with interoperability only within high-speed railway system and as the results of the study on integration of national railway systems showed the need of integration in the rail sector as a whole, on 19 March 2001 the European Parliament adopted Directive 2001/16/EC on interoperability of Trans-European conventional railway system including further directives and regulations stated below with a direct effect on the overall interoperability of the Community railways:

- Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certificate,
- Directive of the Council 2004/49/EC of 29 April 2004 on safety on the Community's railways and amending Council Directive 95/18/EC on the licensing of railway undertakings and Directive 2001/14/EC,
- Directive 2004/50/EC of 29 April 2004 amending Directive 96/48/EC and Directive 2001/16/EC,
- Regulation no. 881/2004 of the European Parliament and the Council of 29 April 2004 establishing the European railway agency,
- Communication from the Commission to the European Parliament and the Council of 4 July 2005 COM (2005) 298 on the deployment of the European rail signalling system ERMTS/ETCS.

Interoperability is the main precondition for a well functioning Trans-European conventional railway system. It means an ability of transport system to ensure safe and smooth movement of transport vehicles on the infrastructure and to reach specific performance levels determined for the system. This ability lies in implementation of managing, technical and operational conditions while meeting the basic requirements.

The European Association for Railway Interoperability (AEIF), acting as a common representative body for infrastructure managers, railway undertakings and industry, was granted a mandate to elaborate technical specifications for interoperability

(TSI) separately for each of the mentioned subsystems with regard to:

- safety, whereby all used components have to meet strict criteria ensuring safe movement of vehicles on transport infrastructure, including safety for servicing personnel at points of operation management,
- reliability and availability, whereby monitoring and maintenance of fixed and movable components, being part of train movement, have to be organised, performed and quantified so as to keep their operability under conditions stipulated in advance,
- health, whereby individual materials and components made of them cannot impose risks to health of the personnel,
- protection of the environment, whereby individual materials and components made of them cannot impose risks to the environment,
- technical compatibility, whereby technical characteristics of components of infrastructure and fixed installations have to be mutually compatible with the components built into trains operated on the Trans-European railway network [3].

In 2002 the Commission adopted the following TSI for Trans-European high-speed railway system:

- rolling stock,
- energy,
- control and command,
- operation and maintenance.

Technical specifications of interoperability for Trans-European conventional rail system were divided into three categories, the first TSI category dealing with rolling stock, telematic applications for freight, noise, control and command, operation and maintenance adopted by the Commission on the turn of 2005 and 2006. TSI of the second and the third category shall be adopted gradually in the following years. TSI define the basic parameters for components, parameters of interfaces connecting subsystems into a whole and other specific cases, which are necessary in order to ensure correct functioning of the whole system, including technical and geographical scope of application of the given TSI providing for interoperability of the Trans-European railway system. The adopted TSI apply to new or renovated lines and rolling stock, i.e. TSI:

- Noise subsystem – deals with noise parameters caused by freight wagons, passenger coaches, locomotives and multiple-unit sets when starting, passing through, standstill and parameters of inner noise in the driver's cabin.
- Rolling stock subsystem – deals with parameters of construction and mechanical components, track interaction and rolling stock measurements, braking, communication, environment conditions, system protection and maintenance in order to ensure technical compatibility not only within the subsystem, but also within the whole system. The focus is on ensuring interoperability in the rolling stock fleet management subsystem with respect to ensuring required performance when delivering transport services.
- Traffic operation and management subsystem – governs the rules for notices exchanged between infrastructure managers and railway undertakings, the scope of documentation, which the service personnel should have at disposal in order to ensure train operation, as well as physical and professional capabilities.
- Control-command and signalling subsystem – aimed at ensuring safe movement of trains of the Trans-European railway network.
- Telematic applications for freight – commercial operation of trains, wagons and intermodal transport units within Trans-European railway network requires efficient

exchange of information between different infrastructure managers, railway undertakings, service providers, forwarders, authorities and other parties to the transport process [6].

#### 4.2. Transport of passengers and goods in the Slovak Republic

Transport sector includes entities providing for public and commercial transport. Public transport includes entities providing transport services by rail, road, water, air or pipe and other auxiliary transport services. Commercial transport is carried out for own needs or needs of other parties, which belong to different industries of Slovak economy. Transport sector contributed in 6.0% to the creation of GDP in 2006 [9].

1993	1996	1999	2000	2001	2002	2003	2004	2005	2006
6.1	8.3	7.8	7.5	7.6	7.6	7.1	6.8	7.2	6.0

Table - Share of transport in GDP creation (%). Source: Statistics Office of the Slovak Republic - Note: Analytical framework of the published data on national accounts is based on the methodology of the "European system of national and regional accounts ESA 1995".

Public passenger transport by road and rail has continued to indicate a long-term trend of declining number of transported passengers and overall performance. Transport volumes in passenger road transport reduced by more than 30 % as compared to 1993, in case of rail transport the decrease amounted even to more than 50%. Volumes of waterborne passenger transport were reduced by more than 40%. In the monitored period (1993-2006) the volumes of air passenger transport rose substantially (from 37 million passenger-km in 1993 to 2,829 million passenger-km in 2006).

Transport of goods and transport volumes of road freight transport keep growing. Road transport has the major share in freight transport volumes - ca 67 %. Performance of rail freight transport decreased in 2006 by more than 30% as compared to 1993 and volumes transported by water grew in 2006 by ca 11% as compared to 1993.

#### 4.3. Transport Policy of the Slovak Republic by 2015

The fundamental principle of the Transport Policy of the Slovak Republic is sustainable development, which is based on promoting sector balance, oriented on transport users, promoting equal opportunities, efficient use of land and resources, open access and gradual shift of costs to those who cause them. Stemming from the White Paper, this approach is reflected in the basic principles leading to proportional and structurally balanced sustainable transport development and to establishment of new, mutual relations directed internally as well as abroad. Sustainable mobility development was defined as a global objective for transport policy of the Slovak Republic, i.e. establishment of conditions to satisfy constantly growing transport needs of the society (transport of goods and persons) in required time and quality, while simultaneously reducing negative impacts of transport on the environment. The global objective contains eight specific goals, which are: (1) ensuring competition within transport sector, (2) modernisation and development of transport infrastructure, (3) ensuring sufficient resources to fund transport, (4) reduction of negative impacts on the environment, (5) increasing the quality and development of transport services, (6) increasing safety and protection, (7) promotion of research and development in transport and (8) coping with transport globalisation.

#### 4.4. Modernisation and development of transport infrastructure

The Priority 2.1 (Specific aim 2 of the Transport Policy of the Slovak Republic) – Modernisation and Development of Railway Infrastructure, states that technical basis of railway transport in

Slovakia is not sufficiently ready for changing conditions and structure of transport market due to low technical level and quality of technical basis of railway transport and due to neglected maintenance and insufficient upgrading. The risk posed by low-quality transport infrastructure lies in decrease of transit volumes, decline in domestic transport and passenger volumes transported by regional and long-distance services, whilst the existing situation has the advantage of sufficient density of lines, stations and stops (high transport coverage of the territory), high capacities, good qualitative and structural basis of infrastructure and good connectivity of rail network of ŽSR to the neighbouring networks [14].

#### 4.5. Funding of transport sector

The Slovak Republic adopted the concept of modernisation of rolling stock with the aim to renew the obsolete RS fleet (Priority 3.3, Specific aim 3 of the Transport Policy of the Slovak Republic – Renewal of Rolling Stock Fleet). In relation to passenger rolling stock renewal, the financial-need formulation takes into consideration investment incentives that would remove lagging behind neighbouring railway administrations. As the state budget and financial possibilities of ZSSK would not allow for modernisation of the rolling stock fleet for passenger transport, it was concluded that it is necessary to make use of a contribution of the state, self-governing authorities and villages to the funding in the following period. The following measures were proposed:

- on the level of central state administration bodies/higher territorial units/municipalities – to support renewal of rolling stock for public transport providing long-distance services (under the condition that RS is used to fulfil public service obligations); taking into account transport needs of given stakeholders on the level of state and regional bodies/higher territorial units and municipalities.
- on the level of private entities:
  - provide for rolling stock renewal for delivering of services in public interest on the basis of public order and ensuring basic transport services covering the territory so as to meet ecological requirements,
  - provide for renewal of rolling stock delivering transport services by integrated transport systems within passenger transport.

#### Greening of transport and technical condition of the vehicles

The Transport Policy of the Slovak Republic (Priority 4.3 Greening of transport, Specific aim 4) comes to the conclusion that as regards greening of transport it is necessary among others to introduce stricter assessment of technical condition of vehicles and gradually discard vehicles not meeting the defined limits for noise and emissions.

#### Reduction of negative effects causing increased adverse climatic changes

It was calculated that shift of transport volumes from public road transport and individual transport to rail could reduce negative effects causing growth of adverse climatic changes in the amount of EUR 496,422 per year. The total present value is EUR 4,574,147.

#### Increasing qualitative parameters of transport infrastructure

In respect of enhancing the quality of transport infrastructure it is necessary to carry out its modernisation and development (Specific aim 5, Priority 5.1). From a technological point of view, the emphasis is put on enhancing of transport quality especially by traffic organisation, ensuring transport process that would be economical, safe and environmentally-friendly.

#### Reducing negative impacts of transport on the environment

Transport sector as a whole has negative effects on all elements of the environment (air, water, soil, fauna and flora). However, the most affected is air due to impacts of combustion of hydrocarbon fuels used by motor vehicles. During the combustion process toxic or carcinogenic substances are created (VOC, CO, NOx, SO2, solid pollutants, heavy metals) as well as substances which contribute to

warming of the Earth atmosphere (CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub>). Development in emission produced by transport in Slovakia in the last years as regards impacts on the environment is influenced by two significant factors, i.e. negative impact of fast growing road transport, in particular the most unfavourable individual car transport, its increasing volumes and fuel consumption, which is positively inhibited by a more intensive application of a new generation of vehicles with environmentally and energetically more suitable parameters, equipped with three-valve catalyst, enabling significant reduction of produced harmful substances (CO, NO<sub>x</sub>, VOC). 2005 saw decline in the monitored harmful substances as compared to previous year, except for a slight increase in production of NO<sub>x</sub> pollutants and solid substances [9].

As regards the share of transport in the overall emissions of monitored harmful substances in 2005, transport contributed to CO emissions in 38%, to NO<sub>x</sub> emissions in 43%, and to NM VOC in 24%. Solid pollutants account for 18% and SO<sub>2</sub> emissions for 0.3% of the overall emissions in 2005. Share of transport in heavy metal emissions is ca 3.2%, while the major proportion in heavy metal emissions produced by transport in 2005 was accounted for by copper – 8.7%, lead – 3% and zinc - 3.1%. Similarly, other heavy metals showed slight increase in measured emissions as compared to the previous year. The main contribution to the overall emission production by transport is accounted for by road transport. Share of other transport modes is very small when considering individual pollutants [9].

In 2006 transport sector produced 2,407,595.21 tonnes of waste, out of which 64,193.80 tonnes of dangerous waste and 2,343,401.41 tonnes of other waste.

Reduction of negative impacts of transport on the environment is one of the main preconditions for achieving sustainable mobility, while taking into account the objectives of EU documents as well as national goals. By ratifying of the Kyoto Protocol – an international agreement stipulating the aim of reducing emissions causing climate changes to the level before 1990, the Slovak Republic committed to emission reduction by 8%. This commitment has to be met in all sector, not excluding transport sector which contributed by around 10% to the overall CO<sub>2</sub> produced by national economy.

At the same time reduction of negative impacts on the environment has to be ensured also by optimal balance of using the potential of individual transport modes, via shifting transport volumes to environmentally-friendly transport modes, including rail transport. Development of suburban rail transport may be considered an efficient way of greening of big suburban centres in accordance with the experience from abroad.

### **5. Promotion of sustainable development of population mobility**

Slovakia may achieve the goal of sustainable mobility only under conditions that would accept natural urban and transport connections in the context of transport regionalisation of the Slovak Republic. Rail and intermodal transport are an alternative to environmentally less acceptable road transport.

Efficient and environmentally acceptable nationwide transport services are defined so as to provide trans-regional and regional public and private economic and transport services in urban centres. Localisation of transport infrastructure maintains and develops natural cohesion of the regions.

The Priority 4.1 (Specific aim 4 of the Transport Policy of the Slovak Republic) – Development of Public Transport, focuses on promoting sustainable development of population mobility. Increasing share of individual car transport on the expense of public passenger transport due to increasing living conditions of the citizens has a negative impact on the environment. Therefore, public passenger transport plays an important role in the context of sustainable mobility and its development, and thus its promotion is one of significant priorities of transport policy of the Slovak Republic, similarly to the developed countries.

### **6. Strategic environmental assessment of the Operational Programme Transport for 2007-2013**

The Operational Programme Transport (OPT) is a strategic programme document of the Slovak Republic for drawing financial aid from the EU funds in the transport sector in the period of 2007-2013 [11].

In the National Strategic Reference Framework for 2007-2013 (NSRF), the Slovak Republic has defined a vision for the overall convergence of Slovak economy to the EU-15 average via sustainable development. Individual priorities of the OP Transport promote the global objective, whereby the OP Transport shall increase performance and competitiveness of the economy and substantially speed up the process of overall convergence. Realisation of this objective shall contribute to enhanced accessibility of Slovakia, its regions and their interconnections, and in synergy with goals of other operational programmes also to reduce regional disparities and support development of economic activities and increase of Slovak competitiveness [14].

The strategic document Operational Programme Transport is a tool for gradual elimination of unsuitable parameters of transport infrastructure in the regions and solving pressing issues regarding safety, reliability and quality of transport.

### **7. Project of Renewal of ZSSK rolling stock fleet**

Slovak railway company, a.s. (ZSSK) is a rail operator providing for services in public interest concerning passenger rail transport on the network of ŽSR (Railways of the Slovak Republic) in the territory of the Slovak Republic, based on the Contract for services in the public interest concluded with the Slovak Republic, represented by the Ministry of Transport, Post and Telecommunications of the Slovak Republic. Slovak Railway company, a.s. carries out these services under the conditions stipulated by the above-mentioned contract and pursuant to the terms provided by the Decree of the Railway Regulatory Authority no. 654/2005 Coll., i.e. under the conditions of price regulation with defined maximum fare. ZSSK carries out commercial services only to a minimal extent.

Slovak railway company, a.s. was established on 1 January 2005 by a split-up of Železničná spoločnosť, a.s. as one of the two newly founded successor joint-stock companies. The project of split-up of the former company was based on the principles of the State Transport Policy stipulating performance of transport and business activities concerning rail passenger and freight transport. As regards ownership relationships, the founder and a hundred-percent shareholder of Slovak railway company, a.s. is the Slovak Republic. The rights of the State as the sole shareholder are exercised by the Ministry of Transport, Post and Telecommunications of the Slovak Republic.

The Project of Renewal of ZSSK rolling stock fleet concerning inter-regional public passenger transport consists of three parts or technical solutions:

- purchase of 10 suburban double-deck electric train sets for passenger rail transport,
- purchase of 10 suburban double-deck PUSH/PULL units, modification of 10 electric motive power units of 263 series, purchase of 2 electric multi-system motive power units,
- purchase of 12 inter-regional multiple-unit sets for passenger rail transport.

The project aims at fulfilling the strategic objective of the Operational Programme Transport in the programming period 2007-2013, in particular:

- Specific aim no. 4 – Development of public passenger transport (establishment of conditions for increasing volumes in passenger inter-regional transport),
- Priority aim no. 6 – public railway passenger transport.

The Project shall ensure renewal of a part of rolling stock fleet, which will be purchased or financed via a non-repayable financial contribution from the European Regional Development Fund, the State budget of the Slovak Republic (funds allocated to the Ministry of Transport, Post and Telecommunications), and via a financial contribution of ZSSK.

### *7.1. Consideration of the sustainable development principles in the Project*

The project of “Renewal of ZSSK rolling stock fleet” takes into consideration sustainable development principles, especially by contributing to renewal of obsolete and technically unsuitable rolling stock. The extent and scope of technical, transport, economic and environmental out-datedness of rolling stock at the moment is so large that it would be necessary to refurbish almost the whole fleet. Rolling stock renewal is a large-scope, time-demanding and financially-challenging process.

On the sector level, the project leads to promotion of sustainable mobility through development of public passenger transport, making use of the Contract on provision of services in public interest.

From an investment point of view, the project will be realised as purchase of new rolling stock. The new rolling stock (produced on the basis of a special order by ZSSK) will be subject to standard environmental requirements in terms of tender documents.

The new rolling stock will meet the current, most strict environmental criteria and norms in terms of EN, STN, valid TSI and UIC Leaflets (e.g. TSI- NOISE 01/16-ST05, part 2 for passenger coaches, UIC 563, EU Directive 1997/68EC and its amendment 2004/26/EC related to the number of produced emissions ...), observance of which shall guarantee substantial reduction of noise, products of combustion, reduced risk to ground and surface water by leaking oil products, energy savings, etc.

### *7.2. Preventive activity*

The project of “Renewal of ZSSK rolling stock fleet” takes into account the basic environmental principles:

- efficient use of resources,
- reduced pollution of the environment.

The project partially renews the obsolete rolling stock fleet and thus facilitates preventive activities in the scope of elimination of potential negative impacts of the obsolete rolling stock on the environment.

New units shall significantly affect ZSSK business results by their performances. Besides the possibility of increased revenues from fare, it concerns mainly reduction of operation costs related to:

- fuel consumption,
- electric energy,
- repairs,
- personnel cost,

which will significantly contribute to enhanced travelling culture as well as reduction of emissions and other impacts on the environment.

### *7.3. Harmonisation of technical conditions*

The level of performance, safety, service quality as well as costs of European rail transport depend in particular on compatibility and interconnection of systems in individual Member States, especially as regards interoperability of Trans-European conventional rail system. Train operation on the Trans-European railway network requires in particular compatibility of infrastructure characteristics, rolling stock characteristics and interconnection of information and communication systems of various infrastructure managers.

Directives on interoperability of high-speed and conventional rail system, Safety Directive and Regulation establishing European railway agency were adopted in order to remove technical and operational barriers of European railway system.

As regards interoperability, the European railway system is divided into subsystems, which are defined by technical specifications of

interoperability (TSI) and are a tool to achieve harmonisation of technical means and processes of control and command subsystems of railway operation. Each subsystem and its components if newly launched into operation or on the market, or substantially modernised, have to meet the requirements and parameters stipulated by European legislation and TSIs. Existing subsystems have to be fully compliant with European legislation and TSIs within the periods stipulated in the national implementation plan [3].

As on 1 January 2005 TSIs were adopted for the following subsystems:

- Control, command and signalling,
- Rolling stock in freight transport,
- Telematic applications for freight, and
- Noise [13].

TSIs for further subsystems of conventional rail system are in the process of elaboration. Gradual harmonisation of technical equipment and processes by infrastructure managers and railway undertakings in Slovakia is a priority in order to maintain their business activities in railway sector (Specific aim 5, Priority 5.2).

### *7.4. Enhancing internal safety*

Enhancing internal safety of transport concerns transport operation, establishment of conditions allowing reduction of accidents in all transport sectors and improvement of rules for transport of dangerous goods.

These tasks may be achieved by measures related to construction of transport vehicles, infrastructure and installations, measures related to traffic rules and enforcement of their application, as well as measures related to education and training of traffic participant.

Rail transport, compared to other transport modes, is a substantially safer manner of transporting passenger, as in the last 15 years no fatal injury involving passengers occurred in Slovakia [12].

Introduction of a centralised traffic management, automatic safety installations, rolling stock with higher resistance to impacts and modern safety management have contributed to significant reduction in the number of fatal injuries in case of rail accidents.

Random safety rules need to be gradually replaced by rules based on common standards stipulated via technical specifications of interoperability. New national rules will thus comply with the EU legislation and will facilitate migration to common approach to railway safety.

### *7.5. Project Proposal pursuant to Act no. 24/2006 Coll. on the environment*

The Project of “Renewal of ZSSK rolling stock fleet” funded from ERDF within the Operational Programme Transport for 2007-2013 is accompanied by a Project Proposal pursuant to Act no. 24/2006 Coll. on the environment.

ZSSK is regularly facing decline in the number of transported passengers by rail public transport and increased competition of bus, air as well as individual car transport. As compared to other carriers, ZSSK as a railway undertaking is bearing an investment burden of a substantial extent – the rolling stock fleet presents an investment of several million, or even billion SKK. Together with high track access charges and the so-called tariff commitment imposed by the Regulatory Authority of the Slovak Republic (which limits revenues from fare), ZSSK is in the situation which does not create conditions for solving the key problem – decline, or loss of interest by passengers in rail public transport. The current effort of rail transport is to compete with other modes, in particular road transport. One of the main conditions for establishing greater competitiveness is purchase of rolling stock for passenger transport. Nowadays, the rolling stock fleet of the company is significantly physically and morally obsolete and its modernisation or renewal is indeed necessary, in order to limit faultiness of rolling stock and increase the overall reliability, safety and operational economy. The majority of the rolling stock fleet does not meet the criteria for modern passenger coaches stipulated by current requirements on the quality of transport, comfort, travelling culture and fault-free

operation. Failure to meet these requirements will lead to further lagging behind other railway undertakings, to loss of competitiveness on the transport market and subsequently to further deepening of the loss.

Purchase of the new rolling stock will not increase the current capacity of all vehicles operated by ZSSK, because the obsolete rolling stock (used in other activities of ZSSK, i.e. outside the Project scope) will be gradually put out of operation and discarded. The projected activity, de facto, has no alternative solution from the investment point of view. ZSSK might resort to two solutions concerning renewal of its rolling stock fleet:

- modernisation of the rolling stock fleet,
- purchase of new rolling stock.

These variants have to exist in a mutually balanced proportion, however, none can present an absolute solution in the approach to the investment asset, which is rather financially demanding and which will be exposed to substantial loss of its original useful value immediately after being launched into operation – to moral and physical wear.

The proposed project is not subject to an obligatory environmental impact assessment (EIA) in terms of Act no. 24/2006; the projected activity is thus not listed in Annex no. 8 of the Act, the so-called List of proposed activities subject to environmental impacts assessment.

#### 7.6. Positive impact of the Project on the environment

The Project shall result in renewal of the rolling stock fleet with a minimal negative impact on the environment. As regards emissions of the main pollutants caused by traffic, the main share in their overall production is caused by road transport. The rail transport accounts for less than 1% of the total emissions. As the project concerns rolling stock, it will present a mobile source of air pollution, and emissions will thus be dispersed and not concentrated in one location. Thanks to the construction arrangement of brakes in the new train sets the burdening of citizens with noise will also be minimal. Waste produced during the projected activity will be related exclusively to cleaning of the new trains sets (it will present communal waste), to their maintenance (accumulators, filters, etc.) and liquidation of obsolete vehicles to be replaced (waste consisting of ferrous metals). Destruction/discarding of the given types of waste will be carried out in the form of recycling, burning or storing at a disposal site.

### 8. Conclusion

Slovakia currently sees a tendency towards increased road transport, in particular freight and individual car transport, whilst rail transport, suburban, bus and urban public transport face decline. This unfavourable situation in transport contributes to increasing burdening of the environment, including residential areas, by emission of harmful substances and noise from traffic.

At the same time reduction of negative impacts on the environment has to be ensured also by optimal balance of using the potential of individual transport modes, via shifting transport volumes to environmentally-friendly transport modes, including rail transport. Development of suburban rail transport may be considered an efficient way of greening of big suburban centres in accordance with the experience from abroad.

Compared to other transport modes (road, water and air transport), rail has demonstrably fewer negative impacts on the environment. The standing of rail transport on the Slovak transport and economic market is strengthened not only by favourable characteristics related to ecology, but also related to costs and social and economy effects, which are subject of general interest in all developed countries. The project is assumed to have positive effect due to replacement of obsolete rolling stock by modern-construction vehicles, which will lead to reduction in noise, emissions, vibrations and tremors affecting people and surroundings, in reduction of risks related to

possible danger to surface and ground water and soil, as well as in decreased energy consumption and waste production.

As the Project shall substantially contribute to reduce burdening of the environment, at the moment no measures were proposed to minimize its possible negative impacts on the environment.

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