



REPUBLIKA SLOVENIJA  
MINISTRSTVO ZA INFRASTRUKTURO

**ENVIRONMENTAL REPORT ON A STRATEGIC  
ENVIRONMENTAL ASSESSMENT FOR THE  
TRANSPORT DEVELOPMENT STRATEGY IN THE  
REPUBLIC OF SLOVENIA**

Izvajalec:



**Ljubljana, October 2014**

**Project title:** Environmental Report on a Strategic Environmental Assessment for the Transport Development Strategy in the Republic of Slovenia

**No. of the contract:** 2430-13-371726

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**Preparation date:** July 2014, amended: October 2014

**Task no.:** 1307-13 OP

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## **LIST OF ABBREVIATIONS**

ARSO	Slovenian Environment Agency
DARS	Motorway Company in the Republic of Slovenia
DRSC	Slovenian Roads Agency
CLC	Corin land cover
SEA	Strategic environmental assessment
EEA	European Environment Agency
EIONET	European Environmental Information and Observation Network
EIA	Ecologically important area
EC	European Council
EU	European Union
EU-ETS	European Union Emissions Trading System
GURS	Surveying and Mapping Authority of the Republic of Slovenia
HT	Habitat type
IBA	Important bird area
IVZ	National Institute of Public Health of the Republic of Slovenia
PPT	Public passenger transport
CH	Cultural heritage
MKO	Ministry of Agriculture and the Environment
MESP	Ministry of the Environment and Spatial Planning
MI	Ministry of Infrastructure
ReNPVO	Resolution on National Environmental Action Plan
MEMP	Marine Environment Management Plan
WMP	Water Management Plan
NGO	Non-governmental organisation
OP NEC	Operational programme for complying with national emission ceilings for atmospheric pollutants
OP ETID	Operational programme for environmental and transport infrastructure development 2007–2013
OP GHG-1	Operational programme for limiting greenhouse gas emissions until 2012
RES	Renewable energy sources
ReNPVO	Resolution on National Environmental Action Plan
SPSS	Spatial Planning Strategy of Slovenia
Strategy	Transport Development Strategy in the Republic of Slovenia
CHR	Cultural heritage register
SAC	Special area of conservation
pSAC	Possible special area of conservation
SPA	Special protection area
EIA	Environmental impact assessment
SPSS	Spatial Planning Strategy of Slovenia
SBCS	Strategy for Biodiversity Conservation in Slovenia
SORS	Statistical Office of the Republic of Slovenia
TEN-T	Trans-European Transport Network
GHG	Greenhouse gas
DB	Drainage basin
WB	Water body
WHO	World Health Organisation
SFS	Slovenia Forest Service
IRSNC	Institute of the Republic of Slovenia for Nature Conservation
IPVHS	Institute for the Protection of Cultural Heritage of Slovenia

## **1. NON-TECHNICAL SUMMARY**

### **1.1 Introduction**

The Environmental Report includes an assessment of the draft Transport Development Strategy in the Republic of Slovenia, which was prepared by the Ministry of Infrastructure in October 2014 (version 9.5).

- The Transport Development Strategy in the Republic of Slovenia is considered a programme with likely significant effects on the environment. For this reason, it is necessary, in accordance with Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment, to assess in the procedure of strategic environmental assessment before its adoption the consequences of the impacts in the Strategy planned measures and to take a position on measures that are unacceptable due to their environmental impact or non-compliance with environmental objectives. Directive 2001/42/EC requires that member states take a position and also consult on the cross-border impact of plans and programmes.

### **1.2 Explanation of the course of the strategic environmental assessment**

The ministry responsible for the environment has issued Decision No 35409-24/2012/14, on the basis of which it is necessary, along with the drafting of the Strategy in accordance with the Environment Protection Act, to carry out a strategic environmental assessment, and within this procedure, also an assessment of the acceptability of the impact on protected areas on the basis of the Nature Conservation Act.

The scope of the Environmental Report is defined in the report entitled “Starting points for drafting an environmental report for the programme of transport infrastructure development in the Republic of Slovenia”. The final report, which takes into account all proposals from spatial planning authorities, was produced in June 2014.

After a positive opinion is acquired from the ministry responsible for the environment, which also includes opinions of ministries and organisations which, given the contents of the programme, are competent for individual aspects of protection of the environment, human health, cultural heritage and landscape or for protection and use of natural assets, a public display of the Environmental Report and the Strategy will be held. In the time of the public display, a public presentation as well as a cross-border impact assessment should also be made. Remarks and opinions from the public are collected during the public display, which are either taken into account in amending the Strategy and the Environmental Report or rejected on a reasoned basis. The strategic environmental assessment concludes with the acquisition of a decision on the suitability of the Environmental Report and acceptability of the Strategy.

It was established during the strategic environmental assessment that the implementation of the Strategy will probably have a significant cross-border environmental impact. In June 2014, in accordance with Directive 2001/42/EC, the ministry responsible for the environment started the process of cross-border consultations under the Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context.

Procedures of individual phases of the strategic environmental assessment, including a timetable, are shown in Table 1.

**Table 1 Planned timetable for the strategic environmental assessment (SEA)**

No.	SEA phase for the Transport Development Strategy	Period of implementation of an individual phase
1	Examining plans and programmes	November 2013 - January 2014
<b>2.</b>	<b>Starting points for drafting the Environmental Report for the programme of transport infrastructure development in the Republic of Slovenia</b>	<b>June 2014</b>
2.1	Reviewing environmental objectives, standards and external impacts on programme implementation	December 2013 - January 2014
2.2	Determining environmental objectives of assessment and indicators for attaining these objectives	December 2013 – June 2014
2.2	Involving the ministry responsible for the environment and relevant spatial planning authorities in the scoping phase	March – July 2014
2.3	Start of the cross-border assessment procedure	June 2014
<b>3.</b>	<b>Environmental report</b>	<b>July 2014</b>
3.1	Review of data on the environment or parts of the environment impacted by the programme	December 2013 – June 2014
3.2	Analysis of environmental impacts	December 2013 – July 2014
3.3	Evaluation of environmental impacts	June - July 2014
3.4	Proposal for mitigating measures and monitoring of the situation	June - July 2014
<b>4.</b>	<b>Amending and publicly displaying the Environmental Report, acquiring a decision</b>	<b>December 2014</b>
4.1	Acquiring an opinion from the ministry responsible for the environment and relevant spatial planning authorities	September – October 2014
4.2	Supplementing the Environmental Report	September – October 2014
4.3	Public display and public presentation	November - December 2014
4.4	Cross-border consultation	December 2014
4.5	Supplementing the Environmental Report and its submission to the ministry responsible for the environment	December 2014

### **1.3 A brief description of the Transport Development Strategy in the RS**

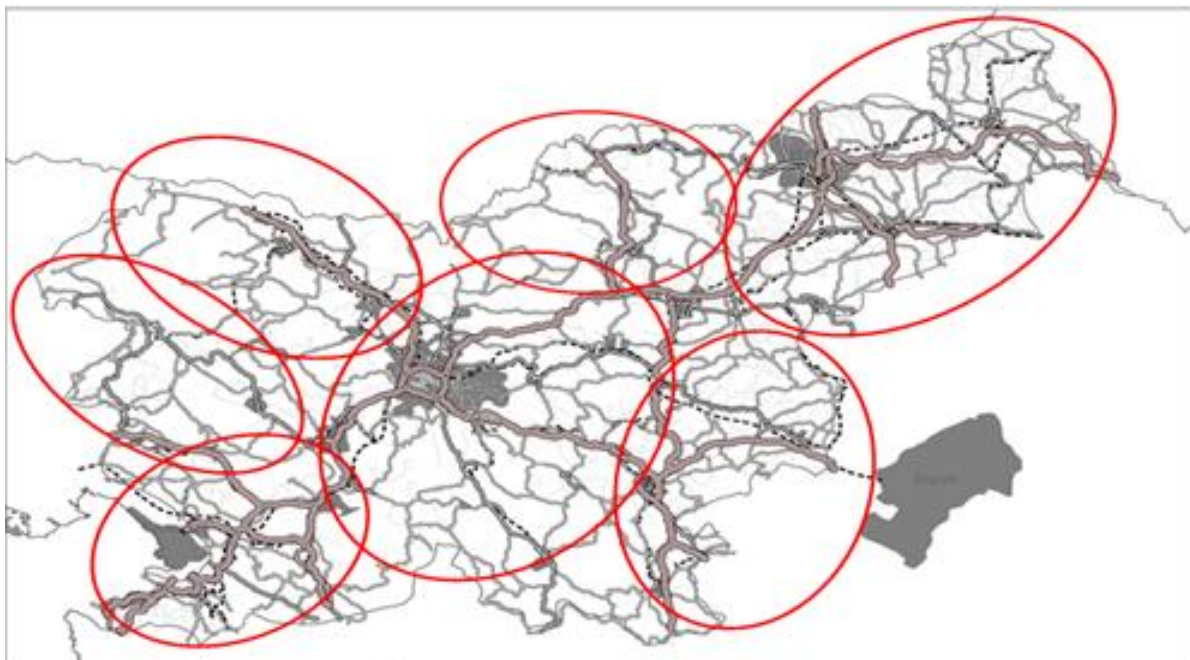
The Transport Development Strategy in the RS has been produced for the purpose of:

- defining the comprehensive development of transport and transport infrastructure up to 2030 (and beyond if this is necessary to ensure comprehensiveness of the task),
- facilitate regular and proportionate financing of transport infrastructure,
- facilitate the basis for drawing EU funds in the financial perspective:.

The vision of transport policy in the Republic of Slovenia is defined as the provision of sustainable mobility of population and supply to the economy. In order to tackle specific problems related to transport and transport infrastructure, transport measures in the Strategy are envisaged separately for seven transport regions, namely:

1. North-eastern Slovenia comprises two statistical regions, i.e. Štajerska and Pomurje. With its motorway links, the area is well connected to the international (TEN-T) as well as the regional network. The Pragersko-Maribor-Šentilj and Pragersko-Hodoš railway corridors are part of the core TEN-T network, so it is important to provide sufficient capacity and compliance with the TEN-T standards. Suitable multimodal suburban and city connections have to be provided for the cohesion centre of Maribor.

2. South-eastern Slovenia covers the Spodnjесavska statistical region and part of the South-eastern Slovenia region (Bela Krajina). The main problem is the accessibility of the Bela Krajina area to the regional centre of Novo Mesto and the motorway network (third development axis).
3. North-western Slovenia encompasses the Gorenjska statistical region, whereby the area of Kranj and Škofja Loka is closely connected with the capital city of Ljubljana. The main problem is the Ljubljana-Jesenice single-track railway line, which represents a bottleneck for goods transport, and the improvement of passenger transport services. Problems also occur in the suburban connection of Škofja Loka to Ljubljana, tourist centres of Bohinj and Bled and the area of Cerklno.
4. The Goriška area covers the Goriška statistical region, where the accessibility of the River Soča valley to the regional centre of Nova Gorica and central Slovenia is a great problem (fourth development axis).
5. The major problem of Koroška is its poor accessibility to the motorway network due to the limit of traffic flow being reached on some sections as well as less advantageous geographical features (third development axis).
6. In the area of Primorska, the biggest problems are the traffic flow of the Koper-Ljubljana corridor for goods transport (especially the existing railway lines) and the connections to tourist centres and the Croatian border.
7. The area of central Slovenia exceeds the statistical region, since it includes Notranjska, the area of Kočevje (3A development axis), Zasavje and Spodnja Štajerska (Celje), where traffic flows mainly gravitate towards Ljubljana. Accessibility to Ljubljana (the Ljubljana motorway ring, suburban and regional connections) and the low level of public transport services are regarded as major issues.



**Figure 1 Traffic-gravitational areas for which specific problems and measures are determined (Strategy, 2014)**

The strategy pursues six general objectives. Four specific objectives are assigned to these six objectives, which more specifically determine measures for eliminating the established problems. Sub-objectives, which

are specified aspects and/or areas where specific problems need to be solved are determined for all of the specific objectives.

The general objectives of transport policy are:

- improving mobility and accessibility;
- improving supply to businesses;
- improving traffic safety and protection;
- reducing energy consumption;
- reducing costs to users and operators;
- reducing environmental burdens.

The specific objectives and sub-objectives of the Strategy are:

- Specific objective no. 1: Improving transport connections and harmonisation with neighbouring countries:
  - Sub-objective 1a: Eliminating congestions on borders
  - Sub-objective 1b: Improving the accessibility of international interurban passenger transport (including transit traffic)
  - Sub-objective 1c: Improving the accessibility of international interurban goods transport (including transit traffic)
- Specific objective no. 2: Improving national and regional connections within Slovenia:
  - Sub-objective 2a: North-eastern region
  - Sub-objective 2b: South-western region
  - Sub-measure 2c: North-western region
  - Sub-objective 2d: Goriška
  - Sub-objective 2e: Koroška
  - Sub-objective 2f: Primorska
  - Sub-objective 2g: Central Slovenia
  - Sub-objective 2h: accessibility within regions (to regional centres)
- Specific objective no. 3: Improving the accessibility of passengers to the main cities of agglomerations and within them:
  - Sub-objective 3a: Ljubljana
  - Sub-objective 3b: Maribor
  - Sub-objective 3c: Koper
  -
- Specific objective no. 4: Improving the organisational and operational structure of the transport system to ensure efficiency and system sustainability:
  - Sub-objective 4a: Harmonisation of legislation, rules and standards with European requirements and best practice
  - Sub-objective 4b: Improving the organisational system structure and cooperation between respective stakeholders
  - Sub-objective 4c: Improving the operational system structure
  - Sub-objective 4d: Improving the transport system safety
  - Sub-objective 4e: Environmental impact reduction/mitigation
  - Sub-objective 4f: Improving energy efficiency
  - Sub-objective 4g: Financial sustainability of the transport system

Groups of measures divided into general measures and measures related to the railway, road, public passenger transport, air and maritime transport and urban centres are determined for each of the twenty-one sub-objectives. A description and the reason is given for each measure. The measures are not represented at the level of concrete projects, but at the level of established needs (at the strategic level).

#### **1.4 Environmental impact assessment method**

In order to present the starting situation, all the information available for defining the state of the environment has been reviewed. Descriptions of important characteristics of the existing state of the environment focus on those characteristics of the environment that are important for the strategic level of transport policy planning, and on the criteria relevant for assessment and indicators for monitoring of situation.

Important environmental objectives are defined on the basis of:

- strategic documents of the Republic of Slovenia and assumed commitments specified in ratified international treaties or regulations of the European Union,
- consideration of the analysis of the existing state, and
- identification of environmental impacts that could be caused by transport infrastructure.

The conformity of the objectives and sub-objectives regarding the environmental objectives was examined in the Environmental Report, as was the internal conformity of the sub-objectives of the Strategy and internal conformity of environmental objectives of the Environmental Report.

An evaluation of the consequences of the implementation of the Strategy on individual segments of the environments and on the environmental objectives has been carried out in accordance with the Decree laying down the content of the environmental report and on the detailed procedure for comprehensively assessing the effects of implementing plans on the environment (Official Gazette of the Republic of Slovenia, No. 73/05).

An assessment of individual groups of alternative measures regarding their compliance with the environmental objectives has also been made. The assessment of individual groups of alternative measures was based on determining an average grade of compliance with important environmental objectives of the Strategy for each individual transport policy measure.

On the basis of the assessment, guidelines and mitigating measures that need to be taken into account in supplementing and implementing the Strategy are provided. The attainment of important objectives of the Strategy is determined with indicators. In particular, indicators are proposed which are already being used to measure the state of the environment in Slovenia as part of the EIONET-SI network, which was emphasised due to Slovenia's obligation to report to the European Environment Agency.

#### **1.5 Environmental protection objectives**

Assessments of the following fields of the environment and related environmental objectives was made in the Environmental Report:

<b>Soil and mineral resources</b>	
Environmental objective 1	Ensure sustainable management of land and protection of soil.
Environmental objective 2	Prevent exploitation of natural resources by using at least 70% of recycled materials from construction waste generated in the construction and reconstruction of transport infrastructure.
<b>Air</b>	
Environmental objective 3	Ensure the attainment of long-term objectives for annual quantities of pollutant emissions determined for the transport sector in the Operational programme for complying with national emission ceilings for atmospheric pollutants.
<b>Climate factors</b>	

Environmental objective 4	Adjusting transport infrastructure to climate change and reducing annual quantities of greenhouse gas emissions below the target values determined for the transport sector in the Operational programme of measures for reducing greenhouse gas emissions in the period up to 2020.
<b>Voda</b>	
Environmental objective 5	Limiting the effects of the pressure of transport infrastructure on surface water, groundwater, transitional waters, coastal waters and sources of drinking water.
<b>Nature</b>	
Environmental objective 6	Ensuring cohesion of populations and preserving biodiversity.
Environmental objective 7	Protecting areas with nature protection status against interventions with a considerable impact.
<b>Human health</b>	
Environmental objective 8	In areas of excessive ambient air pollution, considerably contributing to reducing the annual number of days with excessive daily pollution of ambient air with particulates, which must not exceed 35 in a calendar year.
Environmental objective 9	Reducing noise pollution caused by transport, and approaching the levels recommended by the World Health Organisation.
<b>Population and material assets</b>	
Environmental objective 10	Improving social cohesiveness, traffic safety and sustainable mobility.
<b>Cultural heritage</b>	
Environmental objective 11	Preservation of the scope and characteristics of cultural heritage structures and areas.
<b>Landscape</b>	
Environmental objective 12	Ensuring the preservation of extraordinary landscapes and landscape areas with distinctive features at the national level and a quality landscape image.

## **1.6 Assessment of compliance of objectives**

The assessment of compliance establishes conflicts or mutual interactions that exist between different objectives, as well as pronounced conflicts of interest of the pursued objectives.

The results of the assessment of the compliance of the objectives of the Strategy in terms of environmental objectives show that all objectives are in principle compliant with the environmental objectives.

The results of the assessment of the internal conformity of the sub-objectives of the Strategy show that neither of the sub-objectives of the Strategy has been assessed as non-compliant with others, which means that measures for attaining the sub-objectives of the Strategy always positively contribute to the attainment of another objective if there is a connection between them.

The results of the assessment of the internal conformity of the environmental objectives show that neither of the sub-objectives of the Strategy has been assessed as non-compliant with others, which means that measures for attaining the environmental objectives always positively contribute to the attainment of another environmental objective if there is a connection between them.

## **1.7 Data on the Baseline State of the Environment**

### Soil and mineral resources

Forests are a predominant category of actual land use (59.2 per cent) in Slovenia. In terms of actual use, forests are followed by permanent grassland, with 17 per cent of total area, arable land covers 9 per cent, while developed and related land covers more than 5 per cent of the territory of the country. Other land use categories cover less than 2 per cent of territory. In terms of actual use, agricultural land covered 33 per cent of territory in 2014. The area of so-called commercial forests is 1,076,078 ha, protected forests comprise 98,947 ha and forest reserves 9,501 ha.

The construction, reconstruction and maintenance of transport infrastructure facilities generates large quantities of waste, which needs to be processed in an environmentally-friendly manner. Excavated soil comprises most of the waste generated by new construction and upgrading of existing transport infrastructure.

### Air

The objectives related to improving air quality are defined by EU laws (NEC directive) and the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone. Managing and reducing emissions is also an objective of the National Environment Protection Programme, which contains several operational programmes with similar objectives. Lower emissions would mean less ground-level ozone, acidification and eutrophication. Road traffic is one of the main sources of emissions of NO<sub>x</sub>, while emissions of PM<sub>2,5</sub> particulates in urban environments is a key factor in the pollution of ambient air in these areas.

For the transport sector as well as other sectors, changes to the Operational programme for complying with national emission ceilings for atmospheric pollutants, which need to be drafted after the adoption of the new Directive on national emission ceilings for certain pollutants will set a reduction in emissions of pollutants for the 2020–2029 period and for a period after 2030, with the obligation to attain the indicative objectives of reducing emissions of pollutants from the proposed new Directive.

The indicative objectives to reduce emissions of pollutants for the transport sector are as follows:

- reducing nitrogen oxide emissions in the 2020–2029 period by at least 39 per cent compared to 2005,
- reduction of nitrogen oxide emissions after 2030 must not be lower than 71 per cent compared to 2005,
- reducing emissions of PM<sub>2,5</sub> particulates in the 2020–2029 period by at least 25 per cent compared to 2005,
- reduction of emissions of PM<sub>2,5</sub> particulates after 2030 must not be lower than 70 per cent compared to 2005,

### Climate factors

Slovenia has fulfilled its obligation arising from the Kyoto Protocol by reducing GHG emissions in the 2008–2012 period by more than 8 per cent compared to the starting emissions, whereas the increase of emission sinks due to forest management and implementation of the EU-ETS. In Slovenia, GHG emissions in the base year 1986 were 20.35 million tonnes of CO<sub>2</sub> equivalent; an 8 per cent reduction means that emissions in Slovenia between 2008 and 2012 did not exceed an average of 18.73 million tonnes of CO<sub>2</sub> equivalent per year.

In the structure of greenhouse gas emissions for 2011, the greatest share is represented by CO<sub>2</sub> (82.9 per cent), with the main source being generation of electricity and heat, followed by transport. CH<sub>4</sub> comprises 10.1 per cent, with agriculture and waste management being the main sources. N<sub>2</sub>O contributes 5.7 per cent, with agriculture being the main source. Emission of F-gases (HFC, PFC and SF<sub>6</sub>) comprise 1.3 per cent of total emissions, with industrial processes being the main source.

Among the sectors subject to Decision 406/2009/EC on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments



up to 2020, the transport sector had the highest share in 2011: 49.5 per cent, followed by fuel consumption in households and service industry with 17.0 per cent and agriculture with 16.5 per cent, respectively.

### Water

There are two drainage basins in Slovenia: the Adriatic Sea basin and the Danube river basin. The Danube River basin covers 81 per cent of Slovenian territory, while almost a fifth of the territory belongs to the Adriatic Sea basin. Basic hydro geographic units are separated by the main rivers into the Mura River basin (Pomurje), the Drava River basin (Podravje) and the Sava River basin (Posavje) with the Kolpa River (Pokolpje), and the catchment areas of the Soča River (Posočje) and other Adriatic rivers.

An assessment of the ecological condition of surface waters shows that 38 per cent of bodies of surface waters/watercourses failed to reach a good ecological condition. A good chemical condition of surface waters has been established for more than 95 per cent, and a poor chemical condition for less than 5 per cent. According to the latest data from the Environment Agency (ARSO), a total of 21 bodies of water were included in state monitoring of ground waters. A poor chemical condition was found in the Savinja, Drava and Mura basins, while a good chemical condition was established for other bodies of water. Water protection areas in Slovenia cover around 4,491 km<sup>2</sup>, approximately one fifth of the Slovenian territory. The aquifers with the highest vulnerability are found in a larger number in the Kras plateau and in the region of Gorenjska (fissured and karst aquifers) and in the alluvial plains of the Drava and Mura rivers (alluvial aquifers). Slovenia's coast is only 46.6 km long. The territorial waters of the Republic of Slovenia measure slightly more than 300 km<sup>2</sup>. The largest and most frequent source of marine pollution are sudden spills of crude oil and oil derivatives from maritime cargo transport. Floods threaten more than 3,000 km<sup>2</sup> or just under 15 per cent of the country's territory. Half of the flood areas are located in the Sava River basin, 40 per cent in the Drava River basin and 4 per cent in the Soča River basin.

### Nature

In spite of its modest size, Slovenia has a great diversity of species, with a large number of species in a small territory. On a global scale, it has one of the most biodiversified underground systems, and with more than 58 per cent of forest cover (with well-preserved species), it is one of the most forested countries in Europe.

The most important mechanisms for preserving plant and animal species and their habitats include the establishment of **protected areas, Natura 2000 areas and important ecological areas (IEAs). These areas overlap**, and thus 13.3 per cent of Slovenia's territory is protected, 67.7 per cent comprises important ecological areas, while 37.2 per cent of the territory is part of the Natura 2000 network. Registering and protecting valuable natural features, which account for 13.2 per cent of the country's territory, is also in place. The areas in Slovenia designated as Ramsar wetlands are: Cerknica Lake and surroundings, the Sečovelje salt pans and the Škocjan Caves. Due to their exceptional importance, the Škocjan Caves are on the UNESCO World Heritage List.

There are still large forest complexes in Slovenia, which represent an exceptional natural feature due to their rarity, complexity and role in the ecosystem. To ensure the possibility of broad areas of movement for species (large carnivores and other large mammals) and increased probability of their survival, movement is of key importance in these forests. Large forest complexes in the southern part of Slovenia are included in an important ecological area: core habitat area of large carnivores. In its existing state, the Ljubljana–Postojna motorway section presents a serious threat to the undisturbed movement of large carnivores (brown bear, wolf, lynx), and several studies have already been made of this topic.

### Human health

#### *Air quality*

The biggest problem in Slovenia regarding air quality is pollution with particulates and ozone in the summer. Measurements of PM<sub>10</sub> particulates show that the limit values are occasionally exceeded throughout Slovenia, especially in the interior, where long-lasting temperature inversions occur in the winter. An analysis of the sources of PM<sub>10</sub> particulates has shown that the main cause of pollution with PM<sub>10</sub> particulates is road traffic, especially in urban centres with heavy traffic (Ljubljana Basin), while in valleys with little wind (Zasavje and Celje basins), heating devices and industrial sources are additional sources of pollution. Remote transport from the Po Valley in Italy contributes significantly to ozone pollution, which is pronounced in the Primorska region.

The highest average annual concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> particulates and the most days when the ceiling concentration of PM<sub>10</sub> particulates was exceeded in the 2005–2012 period was recorded in measuring stations in cities under the impact of transport emissions. In rural areas, concentrations of PM<sub>10</sub> particulates are significantly lower. Background levels, which mark the contribution of particulates constantly present in the environment, are extremely low.

#### *Noise pollution*

Noise pollution in the urban and natural environment in Slovenia is increasing, which is primarily a consequence of the increasing volume of traffic on international and regional transport corridors and in urban centres. In general, noise pollution in urban areas is greater than in rural and natural environments. The greatest source of noise is road traffic, while noise pollution is also higher on the railway network, and to a lesser extent around airports.

The level of noise pollution on the infrastructural network is summarised from the data on the operational monitoring of noise on the national road and railway networks. In 2013 and 2014, operational monitoring of noise was implemented for the entire road network managed by DARS d.d. and for all important state roads managed by the national Roads Agency (DRSC). Operational monitoring of noise for noise was implemented on a total of 637 km of roads, and operational monitoring for the motorway network on 607 km of roads, with levels of traffic from 2011 being taken into account for both. The results of the monitoring of road noise show the following:

- limit values are exceeded for a total of 2,882 buildings on roads managed by DARS, which house a total of 17,454 people, while critical values are exceeded for a total of 979 buildings with 7,239 people.
- limit values are exceeded for a total of 9,032 buildings on roads managed by DRSC, which house a total of 62,510 people, while critical values are exceeded for a total of 4,570 buildings with 29,270 people.

Almost half of all residents along the motorway network who are exposed to noise levels that exceed the critical limits live in the area around the Ljubljana Ring Road. State road sections with the highest number of residents exposed to noise pollution are found in Maribor, Ljubljana, Celje, Velenje, Jesenice and Domžale.

An analysis of the situation on the railway network, in which the situation on 1,298 km of primary railway lines was observed, was made in 2010 on the basis of traffic volume from 2008. Limit values are exceeded for a total of 7,474 buildings on the primary lines in Slovenia, which house a total of 38,603 people, while critical values are exceeded for a total of 4,501 buildings with 23,409 residents. Municipalities with the most residents exposed to noise pollution are Ljubljana, Jesenice and Litija, followed by Laško, Borovnica, Ptuj, Brezovica and Krško.

The results of monitoring of noise in the vicinity of Ljubljana Jože Pučnik Airport have shown that noise does not exceed the legally determined values, and considering the reduction in traffic in the past few years, the noise burden is also decreasing.

Noise reduction on the national infrastructural network is carried out on the basis of the operational programme for protection against noise adopted in 2012. Anti-noise measures on the motorway

network and on the busiest section of the railway network have already been taken or are in progress in accordance with the operational programme. Noise reduction measures have also been envisaged for the most exposed areas on the national road network.

Extensive anti-noise measures have been taken on the road and railway network. Most of the measures were taken on the motorway network, and to a lesser extent on state roads, while measures have also been taken in recent years on the national railway network. Approx. 133 km of noise barriers and 47 km of noise protection embankments have been installed on the motorway network, 11 km of noise barriers on state roads, and 25 km of noise barriers on the national railway network. Passive noise barriers have been installed in 430 buildings on the motorway network and in 690 buildings on the railway network.

#### Population and material assets

In addition to providing good road and transport connections with neighbouring countries, the construction of the motorway and expressway network has also significantly improved the connections among regions and accessibility by private motor transport within Slovenia. Poorer accessibility is noted mostly in low population density areas such as Posočje, Cerkljansko, Kočevsko and Bela krajina.

Public passenger transport in the joint transport system represents only a small share and does not enable fast, comfortable and price-efficient mobility at the regional level. Only about 8 per cent of journeys in Slovenia are carried out by public passenger transport. Another reason for the relatively low utilisation of public passenger transport is the relatively poor and uncompetitive level of service.

In 2012, 22,035 traffic accidents occurred in Slovenia, of which 130 with at least one casualty. 32 of these traffic accidents were at level crossings, of which 5 were fatal. More than 1,000 traffic accidents involving cyclists happen on Slovenian roads each year.

Approximately 50 km of national cycling routes were or are being constructed in Slovenia. Slovenia does not have a state-level document categorising national cycling routes or determining where and how they should be developed.

#### Cultural heritage

The Register of Cultural Heritage at the Ministry of Culture numbers 32,035 units of heritage. The number of registered units of cultural heritage has been increasing recently, particularly the number of registered archaeological sites.

Three monuments (Plečnik Žale Cemetery, the Franja Partisan Hospital, Memorial Church of the Holy Spirit in Javorca) have European Heritage Labels, and another two (pre-historic pile dwellings in Ig and Ljubljana Marshes, mercury mining tradition in Idrija) have been added to the UNESCO World Heritage list in the cultural heritage category.

#### Landscape

Five basic landscape areas are recognised in Slovenia, which are primarily defined by climate: Alpine landscapes, landscapes of the sub-Alpine world, landscapes of the Pannonian world, landscapes of the karstic world of central Slovenia and the littoral world. Extraordinary landscapes and landscape areas with distinctive features at the national level have a special status and are defined by the Spatial Planning Strategy of Slovenia – there are 93 areas of exceptional landscapes and 60 landscape areas with recognisable features. The state of Slovenian landscapes is characterised in certain areas by diversity, a high level of preservation of natural resources and preservation of cultural elements of the landscape. Meanwhile, many forms of degradation are noticeable in other areas, such as non-restored or poorly arranged quarries and gravel and clay pits, overly regulated watercourses, inadequate building interventions in the form of large cuts or embankments, inadequate levelling of terrain, and fragmentation caused by transport infrastructure.

## **1.8 Assessment of the impact**

### **1.8.1 Assessment of the impact of the implementation of the Strategy on the environment and environmental objectives**

#### Soil and mineral resources

Transport policy measures have a permanent impact on the management of forest and agricultural land. The greatest impact during construction is expected in the development of the road and railway networks, while development of the maritime and air transport networks will be limited locally. By occupying land, the construction of transport infrastructure causes extensive irreversible impact, which is reflected after development in the change in land use. Agricultural land and forests will be permanently destroyed on reconstructed sections only in a narrow strip along the existing route, while new construction will permanently destroy agricultural land and forest over the width of the road or railway line and maintenance areas. In addition, new transport routes have a permanent impact on the fragmentation of land, agricultural production, timber production and all functions of the forest. Short-term (reversible) impacts that could appear during construction include affected accessibility of agricultural land or forests, damage to agricultural land (trampling) and damage to produce due to the proximity of construction sites, soil pollution etc.

The construction of new and reconstruction of existing infrastructure is a source of large quantities of waste and also puts pressure on the use of natural resources. Waste is not generated only temporarily during construction, but permanently because of the maintenance of transport infrastructure. The impact of waste generation is permanent and in many cases irreversible in terms of natural resources, which is why this negative impact should be reduced with waste management measures.

#### Air

During the construction or reconstruction of existing infrastructure, emissions of pollutants have a short-term impact on the environment, and the effects of such emissions are mainly reversible. During the operation of transport infrastructure, major emissions are present in road, air and maritime transport. A generally accepted assessment is that the transition from road transport to railway or maritime transport reduces air pollution.

The implementation of measures aimed at attaining the objectives of the Strategy is expected to have a positive impact due to the reduction of pollutant emissions, primarily due to the transfer of cargo transport and partially also passenger transport from road to rail. Other measures of the Strategy are also expected to contribute positive effects due to the reduction of emissions, in particular measures directed at reducing traffic congestion and increasing the use of public road and rail transport.

#### Climate factors

The construction and use of new transport infrastructure has a permanent (reversible) influence in terms of greenhouse gas emissions, which are the main cause of climate change. Since fossil fuel (petroleum) is currently the most important source of energy in transport, the sector is the second biggest source of greenhouse gas emissions (after energy). In general, the measures of the Strategy related to rail transport have a positive or neutral effect on mitigating climate change. Greenhouse gas emissions from road transport pose a considerable threat to the mitigation of climate change. Implementing the general measures of the Strategy to encourage public passenger transport, and the use of more energy efficient road vehicles will help cause greenhouse gas emissions from road transport to stagnate in the medium term and even drop by 2030. An increase in greenhouse gas emissions in air transport is expected due to construction work, while a possible increase in greenhouse gas emissions due to an increased volume of air traffic does not represent a significant share in the structure of total emissions in Slovenia; maritime transport is similar: the share of greenhouse gas emissions from maritime transport in the structure of total emissions is insignificant.

Since measures regarding adjustment to climate change are treated as general measures at the strategic level of transport policy development, measures from the general measure group must be expanded by creating guidelines, methodologies and procedures for collecting information about extreme climatic

events and in the planning and implementing of measures to improve the resistance of transport infrastructure.

#### Water

Impacts on surface water, groundwater, transitional waters, coastal waters and sources of drinking water are characteristic of the period of new construction and reconstruction of transport infrastructure and also afterwards. They are largely limited to the local environment, while in the case of major pollution accidents the impact is also felt regionally and across the border. During construction, impacts are mostly short-term and reversible (for example, impact on water quality). After construction, impacts are mostly less extensive, although permanently irreversible (for example, impact on the morphology of watercourses, hydrologic conditions, retention basins). Uncontrolled leaching of hazardous substances from road surfaces can impact the quality of surface waters (bathing water) and ground waters (impact on drinking water). A permanent impact on the environmental objective is possible primarily in the construction of new corridors on the road and railway networks.

#### Nature

Impacts on the fragmentation of habitats and biodiversity is characteristic of the period of new construction and reconstruction of transport infrastructure, as well as afterwards. They are mostly noticed in the local environment, while in the case of major interventions, the impact is also felt regionally and across the border (for example, migration of large carnivores). During construction, impacts are mostly short-term and reversible (for example, noise pollution from the construction site area, animals run over by construction machinery etc.). After construction, impacts are mainly permanent and irreversible due to the changed use of land (for example, cutting off of migration routes of carnivores, deer, amphibians, bats; increased noise pollution with traffic; obstacles in natural environment – electric lines; destruction of habitat, etc.).

Infrastructural development in a natural environment represents a permanent loss of habitat and permanently affects the natural distribution of habitat types and habitats of plant and animal species, their quality and the integration of populations. When development occurs in areas with nature protection status, impacts can be especially extensive and devastating, because they can permanently undermine the preservation of the natural environment and protection objectives for protected areas, Natura 2000 areas, IEAs and valuable natural features.

#### Human health

##### *Air quality*

Exposure to polluted air has a major negative impact on human health. It is estimated that 2 million people die prematurely due to polluted air every year. Most problems in securing an appropriate quality of ambient air in Slovenia lie in achieving the determined limit values for particulates. In the past few years, the prescribed limit values for PM<sub>10</sub> particulates were exceeded in almost all city municipalities.

Along with solid fuel heating units, transport is the major source of ambient air pollution with particulates. Particulates can have numerous negative impacts on health: they cause and aggravate asthma, cause atherosclerosis, worsen underlying respiratory and cardiovascular diseases, cause cancer etc. The mortality rate in cities, where pollution with particulates is high, is 15 to 20 per cent higher compared to cities with relatively clean air.

Emissions of particulates will be temporarily increased in areas where reconstruction or new construction measures for transport infrastructure are implemented (reversible impact). It is expected that the implementation of the measures of the Strategy will permanently reduce emissions of particulates from road transport, primarily due to the elimination of traffic congestion, better maintenance of road surfaces and the use of more energy-efficient road vehicles.

##### *Noise pollution*

Almost all transport policy measures have an indirect or direct impact on noise pollution. An increased impact on noise pollution is expected during the construction and use of infrastructure and network.

Impacts during construction will be short-term and mainly reversible. Impacts during operation will be long-term. As a rule, new transport corridors mean greater impacts on the environment directly along the corridors, but at the same time they reduce the impact on the environment on existing roads, whose surroundings are usually densely populated, by redirecting traffic flows.

Measures to reduce noise within the limits determined by law are envisaged in the Strategy. The implementation of noise protection measures will be necessary in the areas of major urban centres and transport corridors of railway infrastructure. Transport policy measures will indirectly relieve the existing road network, which will result in a reduction in noise pollution in the area of major transport junctions on the motorway network and in urban centres (Ljubljana, Maribor, Celje, Koper). Measures on the railway network and in the field of public transport will have the most effect on relieving the road network in major urban centres.

An increased level of noise pollution is expected in the vicinity of airports, especially in the case of increased volumes of air traffic. Among the measures in question, the Maribor and Portorož airports are potentially problematic from the aspect of noise protection, as both are located in the vicinity of residential buildings and tourist activity.

#### Population and material assets

The Strategy will have a positive impact on social cohesion, traffic safety and sustainable mobility. The implementation of measures envisaged in the Strategy will ensure the greater accessibility and connectivity of settlements with urban centres, improve accessibility to the motorway network and contribute to economic development. The construction of cycling paths and footpaths and arrangement of adequate access to recreational centres will have a positive impact on human health.

It is important primarily for urban areas to reduce the use of space for the construction of transport infrastructure with efficient transport policy planning, to reduce the harmful impact of polluted air and noise on human health (by introducing efficient public passenger transport), and to improve accessibility in order to shorten travel times. The Strategy also ensures an improvement in road safety, since it envisages the reconstruction of inadequate crossroads and level crossings.

#### Cultural heritage

The greatest impact on the preservation of the volume and characteristics of cultural heritage units and areas is expected during construction works on the road and railway network, while development of the maritime and air transport network will be insignificant, and limited only to the construction of facilities (buildings) on land.

Since a large part of the territory of the Republic of Slovenia has cultural heritage areas, there is a great probability that new construction in road and railway transport will encroach on them: cultural landscapes, historic landscapes, areas of urban heritage and their areas of influence as well as archaeological sites. The placement of infrastructure will permanently change the use of space in these areas, which is why adequate measures to preserve the features of cultural heritage areas need to be taken. Regarding the preservation of archaeological remains, interventions in the environment are considered as destructive (e.g. excavation), thus extensive archaeological investigation needs to be carried out in advance. Prior to the placement of transport infrastructure, it is necessary to conduct extensive preliminary archaeological research and consider the results when siting transport infrastructure and to take measures to protect archaeological remains.

#### Landscape

The determination of the impact on the quality of the landscape stems primarily from the visible features of space and characteristic landscape elements present in space. Landscape is most encroached on by transport links that extend into open areas, where the impacts of traffic are more

noticeable due to the higher level of landscape preservation. The impact is particularly great in the case of construction of infrastructure corridors in areas of exceptional landscape or landscape areas with recognisable characteristics and landscapes with preserved natural elements and exceptionally balanced cultural elements, which have great symbolic significance. Infrastructural facilities in space become an element of the landscape and part of the experience of the landscape, which is why they must be built in accordance with landscape types.

### **1.8.2 Cumulative impacts**

Cumulative environmental impacts are defined in this Environmental Report as:

- a combination of the impacts of implementing objectives and sub-objectives of the Strategy on various aspects of the environment,
- a combination of environmental impacts caused by the objectives and sub-objectives of the Strategy with the implementation of other programming documents of the RS.

The cumulative impacts of measures for the attainment of the objectives and sub-objectives of the Strategy have not been precisely assessed because the measures are prepared at the strategic level, are not determined in terms of time and place and are not precisely defined. It will be possible to assess with certainty the evaluation of cumulative impacts only in later phases of planning the development of transport infrastructure.

### **1.8.3 Cross-border impacts**

Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment demands that Member States take a position and consult on the cross-border impacts of planning and drafting programmes.

It was established during the strategic environmental assessment that the implementation of the Strategy will probably have a significant cross-border environmental impact. **In accordance with Directive 2001/42/EC**, the Ministry of the Environment and Spatial Planning began cross-border consultations in June 2014 under the Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context.

The measures of the Strategy are not determined in terms of space and time, and neither they are precisely defined. The measures are prepared at the strategic level, which is why during the drafting of the Environmental Report it was not possible to establish with certainty the probability of cross-border impacts. Measures related to the interventions for which an assessment is needed in accordance with the SEA Directive are planned to be re-assessed at the level of plans.

#### Soil and mineral resources

There will be no cross-border impacts, because the measures dictate interventions within Slovenia's territory.

#### Air

Cross-border impacts caused by the transport of pollutants across the borders of the Republic of Slovenia will be reduced in proportion to the reduction of emissions of pollutants from transport resulting from the implementation of the Strategy. The primary measures expected to have a permanent impact on air quality are envisaged in sub-objectives 1a, 1b and 1c.

#### Climate factors

The rate of reduction of greenhouse gas emissions from transport is harmonised with the international commitments of the Republic of Slovenia to contribute its share to mitigating climate change, which is why the measures of the Strategy will have a positive cross-border impact on climate factors. The primary measures expected to have a permanent impact on air quality are envisaged in sub-objectives 1a, 1b and 1c.

### Water

Cross-border impacts on the chemical condition of ground and surface waters are possible, including sea, if water courses are polluted (for example, continued leaching of hazardous substances as a result of traffic load, spillage of hazardous substances in extraordinary events) in the direction of neighbouring countries. Cross-border impacts on the ecological condition of surface waters due to interventions which would cause an impact on the hydrological regime of surface waters across the border as well as cross-border impacts on the quantity of ground water are also possible. The potential cross-border impact on water is possible primarily due to the measures envisaged in sub-objectives 1.a, 1.b, 1.c, 2.c, 2.d, 2.f, 2.g, 3.a and 3.c.

### Nature

The construction of motorways, expressways and railways without wildlife crossings could cause negative impacts in neighbouring countries (Croatia, Austria). Negative impacts are possible primarily on large carnivores, which have extensive habitats and migrate across several borders (the Dinaric-Alpine area for brown bear, lynx and wolf). Negative cross-border impacts on the cohesiveness of populations are possible in sub-objectives 1a, 1b, 1c and 2f.

### Human health

#### *Air quality*

The implementation of measures to attain the objectives of the Strategy will reduce congestion in road and rail transport in the area of border crossings and thus reduce the negative impact on air quality in these areas. The primary measures expected to have a positive impact on air quality are in sub-objectives 1a, 1b and 1c.

#### *Noise pollution*

The potential cross-border impact on increased noise pollution has been assessed for three measures (R.1, Ro.21 and A.3), in sub-objectives 1a, 1b, 1c, 2d, 2f, 2g, 2h, 3a and 3c.

In the preparation of spatial planning and implementation documentation, all necessary mitigating measures should be ensured in order to prevent impacts of cross-border noise pollution. No cross-border impacts are expected if the guidelines are observed and mitigating measures taken.

From the aspect of noise protection, measures under sub-objectives 1a and 1c will have a positive cross-border impact, as they will improve traffic flow capacity in border areas, which is problematic, especially during the peak of the summer tourist season, and will consequently reduce noise pollution on international road connections in border areas.

### Population and material assets

Sub-objectives 1a, 1b and 2f will have a permanent positive impact on the population and material assets, as the implementation of measures will eliminate bottlenecks in rail transport, improve road safety in the Karavanke Tunnel and improve the international connection with Croatia. Better connections with Portorož Airport (sub-objective 1b) will have a positive impact on the development of tourism also in part of Croatia, while lowering the quality of the living environment (noise from aircraft).

### Cultural heritage

No sub-objective will have a cross-border impact on the volume or characteristics of units and areas of cultural heritage, as the measures demand interventions within Slovenian territory, and cultural heritage protection areas do not extend across the borders.

### Landscape

An impact on the image of landscape is possible during the placement of transport infrastructure in border areas if large-scale infrastructure is sited in an area that is clearly visible from a neighbouring



country (for example, measure R.1). Sub-objectives that contain measure R.1 are: 1a, 1c, 2f, 2g, 3a and 3c.

### **1.9 Assessment of alternatives**

The results of the assessment of alternatives indicate that almost all the envisaged measures are fully or partially in line with environmental objectives, whereby at least basic mitigation measures arising from the legislation will have to be provided in order to reduce environmental impacts in almost all interventions. Individual measures in the railway, road and air transport networks are assessed as conditionally harmonised according to the respective environmental objectives. The conditionally harmonised transport policy measures are as follows:

*Railway transport:*

- R.1 Koper – Ljubljana
- R.3 Ljubljana–Jesenice

*Road transport:*

- Ro.9 Connection of Koroška to the motorway system
- Ro.10 Connection of Hrastnik to Zidani Most
- Ro.11 Connection of Kočevje to Ljubljana
- Ro.12 Motorway network around Ljubljana
- Ro.15 Connection of Škofja Loka/Medvode to Ljubljana
- Ro.16 Road network around Maribor
- Ro.18 Connection of Ilirska Bistrica (HR) to the motorway system

*Air transport:*

- A.2 Maribor Edvard Rusjan Airport
- A.3 Portorož Airport

The most environmentally-friendly alternative is public transport; rail and maritime transport are more adequate alternatives than road transport, while air transport is the least adequate.

### **1.10 Guidelines and Mitigation Measures**

The guidelines and mitigation measures are defined for attaining the environmental objectives of the Strategy which have to be included in the Transport Development Strategy in the Republic of Slovenia. The producer of the Strategy is responsible for the implementation. During the strategic environmental assessment for the Transport Development Strategy, the consideration of measures is supervised by the ministry responsible for the environment.

The Environmental Report also defines specific mitigation measures for individual transport measures within a particular sub-objective. These have to be taken into account in the planning of a particular transport measure.

The most important general guidelines on environmental protection for planning transport policy are:

- The measures defined in the Strategy are of a strategic nature and their positions are not determined or prepared at the project level, which is why the strategic environmental assessment of environmental impacts for individual infrastructure measures will have to be prepared in the next phases of drafting project documentation.
- The strategic environmental assessment of acceptability of individual measures which could have significant impacts on protected areas has to be carried out at the level of a detailed plan or activity, in accordance with Article 25a of the Rules on the assessment of the acceptability of impacts caused by the execution of plans and activities affecting nature in protected areas.

- In selecting of measures, the development of public and rail transport should be prioritised over road and air transport, and reconstruction over the construction of new traffic routes to provide sustainable development.
- The need to integrate new rail and road connections should be examined in special studies (from the aspects of landscape, environment, project solutions and economic viability). Credible transport data and the cooperation of experienced experts from individual areas must be provided for the preparation of these studies.
- New infrastructural connections should be planned outside water protection areas, the best agricultural land, protected forests, protected cultural heritage areas, exceptional landscapes and landscape areas with recognisable features at the national level, floodplains and areas with nature protection status; otherwise, technical solutions that make the impact acceptable from all aspects should be ensured.

#### Guidelines and mitigation measures – Soil and mineral resources

By occupying land, the construction of transport infrastructure will cause extensive permanent impacts, which is reflected as a change in land use. To provide for the sustainable management of land and sustainable use of soil, the following guidelines are to be considered:

- Intervention in agricultural and forest land has to be reduced to the lowest level possible, and land with poorer growing potential and land outside dense forest complexes and forest areas with wood production functions as primary functions should be used.
- Transport infrastructure should be planned so as not to increase the chances of landslides in the wider area of interventions.

The construction of new, and reconstruction of existing, transport infrastructure is a source of large quantities of waste and at the same time puts pressure on the use of natural resources. The following guideline should be followed in order to prevent excessive exploitation of natural resources:

- Economical management of mineral resources should be supported with a measure that encourages a reduction in environmental burdens by using recycled materials in the construction and reconstruction of transport infrastructure.

#### Guidelines and Mitigation Measures - Air

In order to attain the long-term objectives for annual quantities of pollutant emissions in the air, attention should be paid to those measures of the strategy that have a significant impact on pollutant emissions, in particular in order to:

- ensure in the planning and implementation of environment protection measures from the Strategy that great attention is paid to the inspection of exhaust gases during regular technical examinations of motor vehicles,
- regularly update the road public transport fleet and ensure that new vehicles will be technically sound,
- limit the access or use of light commercial vehicles in city centres if they do not comply with environmental standards for new vehicles,
- pay equal attention to promoting the use of public transport in urban centres as to other forms of sustainable mobility (cycling, pedestrian zones).

Since the measures of the Strategy are mainly of local, it is recommended that some be included in the more detailed programmes of measures to reduce PM<sub>10</sub> particulate pollution which are prepared on the basis of decrees in the plans for air quality in areas of extensive pollution of ambient air which are already in force.

The reduction of private passenger transport should be a priority of all large cities with large numbers of commuters. In addition to measures to reduce private passenger transport in cities, which are based on the internalisation of environmental costs and which relate to the limiting parking time and charging high parking fees, strategies should be implemented to improve public transport; i.e. city as well as local transport. People would use public transport more often if it were available at more

favourable prices and did not additionally impede the everyday tempo. The stated measures will contribute to reducing pollutant emissions into the air and thus also contribute to the reduction of emissions of pollutants of ambient air to the national ceilings.

#### Guidelines and Mitigation Measures – Climate factors

The preparation of measures to attain the transport objectives referred to in the Strategy with the purpose of mitigating climate change must take into account the so-called indicative objectives to reduce greenhouse gas emissions, which are listed for individual sectors in the proposed Operational Programme for Reducing Greenhouse Gas Emissions by 2020 with a vision by 2030. The indicative sector objectives for reducing greenhouse gas emissions for transport are as follows:

- the rapid growth in greenhouse gas emissions must be halted and reduced by 9 per cent by 2020 in comparison with 2008 by introducing sustainable mobility measures;
- the trend of growing greenhouse gas emissions produced by traffic must be reversed so that emissions do not grow by more than 18 per cent by 2030 in comparison with 2005, which is a 15 per cent reduction by 2030 in comparison with 2008;
- a vision of further emission reduction by 90 per cent by 2050 must be integrated into measures for attaining the objectives of the Strategy.

To attain the environmental target value defined for the transport sector in the Operational Programme for Reducing Greenhouse Gas Emissions by 202 with a vision by 2030, the measures for attaining the sub-objectives of the Strategy which are especially important are included in the specific objective No. 4 “Improvement of organisational and operational structure of transport system for ensuring efficiency and system sustainability”, among which special focus in terms of mitigation climate change should be given to:

- Establishing charging stations for alternative fuels
- Internalising external costs, and
- Implementing restrictive parking policies in the urban area

The Strategy measures should be drafted in a way which is economic source-wise, meaning that the sensitivity of transport infrastructure to climate change as well as natural disasters and anthropogenic disasters humans are properly taken into account. For all measures of new arrangements of the transport infrastructure in terms of adjusting to climate change, it is necessary to:

- Provide the preparation of an analysis of the sensitivity of transport infrastructure to climate change, and
- Implement measures and adjustments on the basis of the analysis results which properly improve infrastructure resistance to climate changes.

To attain the environmental objective in regard to adapting to climate changes, the following must also taken into account:

- Transport infrastructure in Slovenia has to be less sensitive to the consequences of extreme precipitation due to floods or road surfaces covered suddenly by snow, and the railway network in particular must not be affected by glaze ice in the long term.
- In planning every new construction or expansion of the existing transport network, an analysis of the sensitivity of transport infrastructure to the above-mentioned extreme weather conditions has to be conducted and on the basis of its results a plan of measures must made to reduce the consequences of these phenomena in the long term
- It has to be ensured that the implementation of measures to reduce the sensitivity of the transport network to extreme weather conditions becomes a central task of transport network management, whereby the purpose of implementing these measures has to be based especially on reducing damage caused to users of this weather-sensitive network if they cannot use it, and
- a measure on the development of guidelines, methodology and procedures for collecting information on extreme weather conditions and planning and implementing measures to reduce the sensitivity of transport infrastructure to extreme weather conditions should be added to the general measures in the Strategy.

### Guidelines and Mitigation Measures - Water

In order to limit the pressure of transport infrastructure on drinking water sources and prevent negative impacts on drinking water quality, the integration of transport infrastructure in water protected areas has to be avoided.

In the siting of traffic infrastructure, it is necessary to avoid placing facilities in areas at risk of flood and related erosion. In the case of interventions in these areas, it has to be proved that the existing flood risk of the wider area is not increased. The mentioned guideline needs to be considered in order to reduce the pressure of transport infrastructure on areas at risk of flood and to ensure that flood risk in individual areas does not increase.

In planning interventions in areas with high, very high and highly vulnerable aquifers it is necessary to study and plan the appropriate technical solutions to prevent the negative impacts of the construction and operation, as well as extraordinary events (e.g.: spillages of hazardous substances). Consideration of the mentioned guideline will reduce the probability of ground water pollution – ensuring a limitation on the effects of the pressure of transport infrastructure on ground water.

Transport infrastructure should not be sited in inshore or coastal land. An exception under Article 37 of the Water Act is possible only on the basis of expert argumentation that the facility cannot be sited elsewhere without causing disproportionately high costs. Also, the costs of decreasing the ecosystem services in the case of interventions in the coast-side area have to be included in the cost calculation. Consideration of the mentioned guideline will make the calculation of costs more concrete and also adequately balanced. The mitigating measure will prevent impacts on retention basins, the ecological state of watercourses and biodiversity along watercourses.

In maritime transport, measures should be envisaged to permanently reduce negative impacts on seawater quality. Consideration of the guideline will reduce the effects of the pressure of transport infrastructure on the sea.

### Guidelines and Mitigation Measures - Nature

For a sustainable preservation of natural environment and biodiversity, variants should be given priority which do not encroach on naturally preserved areas and have a lesser impact on the migration paths of wild animals.

In order to protect areas with nature protection status, it is necessary to consider the following guidelines:

- In the siting transport infrastructure, it is necessary to avoid locating facilities in areas of valuable natural features. By pursuing the guideline, types and characteristics of valuable natural features will be preserved.
- In siting transport infrastructure, it is necessary to avoid locating facilities in protected areas. If the encroachment cannot be avoided and if this is allowed by the act on the protection of individual areas, it is necessary to take into account the guidelines, starting-points and conditions for the protection these areas which are given in the protection regimes adopted with the protection documents.
- In siting transport infrastructure, it is necessary to avoid locating facilities in Natura 2000 areas.

The period for interventions has to be adjusted to the life cycles of animals and plants. Consideration of this measure will reduce disturbances to the life cycles of animals and plants, which will also increase the probability of attaining or preserving a favourable state of the populations. The probability of attaining the objective of preserving biodiversity will be higher.

If the electrification of a railway line is planned in an area of flight and migratory routes of birds, it is necessary to foresee appropriate technical solutions to prevent birds from colliding with power lines.

Consideration of the measure will reduce losses of individual bird specimens, which will also increase the probability of attaining or preserving a favourable state of populations. The probability of attaining the objective of preserving biodiversity will be higher.

It is expected according to the objective of the Resolution on National Environmental Protection Programme 2005-2012 that the size of protected areas in the territory of the Republic of Slovenia will grow. Therefore, the placing of transport infrastructure in areas proposed for protection should be avoided in order to prevent possible conflicts and negative impacts on attaining the environmental objectives of nature preservation.

General measures in road and railway transport need to be supplemented with a measure for the more adequate protection of individual species of wild animals against collisions with vehicles. A new measure with the following title should be added to the Strategy: Provision of migration corridors for wild animals and safety against collisions with wild animals. The measure will enable connectivity of habitats (re-establishing or preserving migration routes) of species and ensure the attainment of the environmental objectives related to nature protection.

### Guidelines and Mitigation Measures – Human health

#### *Air quality*

In order to attain the objectives of eliminating the incompatibility of air quality with the prescribed standards which is occurring occasionally and in a limited area, usually in city municipalities due to population density and in the region of Zasavje due to more industrial pollution, the Government of RS has adopted decrees on plans to improve air quality in areas with excessive ambient air pollution. Detailed programmes of measures to reduce pollution with PM(10) particulates will be prepared according to these plans. These programmes will have to be considered in their entirety in the implementation of the measures of the Strategy.

When preparing spatial acts for new infrastructural interventions or for the extension of the existing transport network, the following general guidelines have to be taken into account to attain the objective of reducing ambient air pollution in the area of impact of the respective intervention:

- Measures to reduce pollutant emission (prevention of traffic congestion occurrences, provision of smooth traffic flow at moderate speeds between 60 and 90km/h, traffic detours) have to be provided to the greatest extent possible;
- Implementation of measures to prevent an increase in traffic flows on individual sections of the road network and introducing measures to prohibit the entry of motor vehicles (especially goods vehicles) which do not meet the environmental standards for new vehicles in areas with excessive pollution;
- Introduction of measures in populated areas which are especially sensitive to ambient air pollution (residential buildings, health-care facilities, tourist areas) should be avoided.

#### *Noise pollution*

Noise pollution in Slovenia is highest on the road and rail networks, and is especially increased in urban centres and in areas of important transport hubs. Producers of excessive noise pollution are obliged to provide measures to reduce environmental burdening according to the Environmental Protection Act. Measures are necessary in areas where the environment is excessively burdened already, while mitigating measures also have to be carried out on all new transport corridors projected in the Strategy.

In siting measures on the road and rail networks, it will be necessary to provide general and technical solutions which ensure that noise pollution caused by traffic is not excessive. All necessary mitigating measures stem from the legislation and the Operational noise protection programme and are harmonised with the transport policy programme. In accordance with the Operational Programme and the noise protection legislation, environmental noise protection on the transport network has to be directed above all at reducing noise emissions at source, measures to prevent noise emissions and, if necessary, measures to provide appropriate living conditions in noise-polluted buildings.

When preparing spatial acts for infrastructural interventions, the following general guidelines for attaining the objective of reducing environmental noise pollution have to be taken into account:

- Measures to reduce emissions of noise at source (measures on the network, vehicle fleet, logistics measures, temporary or permanent rerouting of transit transport, lower speed limits in noise-exposed areas) have to be provided to the greatest extent possible.
- In areas which exceed the limit of environmental burden, measures have to be implemented to prevent noise and the growth of noise in the environment (noise barriers and embankments, covered galleries, etc.) and to provide living conditions in buildings (passive protection).
- Measures in quiet populated areas and/or in areas which under noise protection legislation are defined as especially noise sensitive (residential buildings, health care facilities, tourist areas) should be avoided.
- Measures in quiet open areas (protected area in accordance with the regulations from the field of nature preservation) should be avoided.

All important mitigating measures to ensure a reduction in noise emissions at source and prevent noise pollution, which is in accordance with the EU and Slovenian legislation in the field of noise protection, have already been included in the transport policy measures. The most important measures among the general transport policy measures from the aspect of protecting the environment against noise are measures that ensure a reduction in noise emissions, such as updating the transport fleet (rail passenger transport and goods transport, public transport, road vehicles), modernisation of road and rail infrastructure and measures to reduce the impact of noise on the environment. Measures that indirectly influence the redirection of traffic flows to long-distance transit transport corridors (to the railway network as a priority) and in the urban environment (public transport) are also important. Almost all general transport policy measures will have a positive impact on reducing noise pollution by road and rail transport.

#### Guidelines and Mitigation measures – Population and material assets

In accordance with the Resolution on Transport Policy of the Republic of Slovenia (Official Gazette of the Republic of Slovenia, no. 58/06), the Transport Development Strategy in the Republic of Slovenia has to follow the principles of sustainable and balanced regional development, and strive to reduce external transport costs. Priority is given to measures which provide better sustainable mobility for an extended period.

Measure A.3 Portorož Airport will increase capacity and enable the arrival of larger aircraft, which could result in an increase in noise pollution in the wider area (including a cross-border impact). In order to not worsen the living environment, a guideline noting the possibility of developing Portorož Airport from the aspect of providing a multi-modal connection with other major airports in the wider region should be examined in future phases of planning should be added to measure A.3.

Updating the vehicle fleet, primarily by buying new vehicles with lower greenhouse gas emissions (for example, natural gas or electric vehicles), depends on financial capacities of individuals. Measures should also envisage financial incentives to purchase vehicles powered by environmentally-friendly fuel.

General measures on the road and railway network need to be supplemented with a measure that provides for the adequate availability of infrastructure to all users. The measure is expected to encourage more active involvement in terms of infrastructure adjustments in order to make it more accessible to less mobile persons, such as the arrangement of accesses from pavements to the road, the application of disabled-friendly public transport; setting up public electric power charging stations, adjustments to wheelchair use, etc.

When planning the transport policy, the priority should be given to the improvement of transport connections to less developed regions (e.g.: Sub-objective 2b (Ro.4 measure) and sub-objective 2c (Ro.7) since the accessibility with sub-urban transport to these areas cannot be improved. Measures

for the attainment of sub-objectives 2a, 2b and 2d should be re-examined and adjustments should be made if necessary.

#### Guidelines and Mitigation Measures – Cultural heritage

The development of transport infrastructure can have an impact on units and areas of culture, especially in terms of degrading the landscape features of the surroundings of cultural heritage units, damage to cultural heritage facilities, the destruction of archaeological remains during the construction of facilities with vibrations which could cause damage to buildings of cultural heritage. To avoid these impacts, the following must be considered:

- Infrastructure corridors should not be placed in areas of cultural heritage as a priority.
- Prior to siting transport infrastructure, it is necessary to conduct extensive preliminary archaeological research and consider their results when siting transport infrastructure and taking measure to protect archaeological remains..

#### Guidelines and Mitigation Measures - Landscape

To ensure the preservation of extraordinary landscapes and landscape areas with distinctive features at the national level and a high-quality landscape image, it is necessary to pursue the following guidelines:

- Infrastructure corridors should not be sited in exceptional landscape areas or landscapes with distinctive features at the national level.
- Proper technical measures must be used to provide high-quality landscape scenery, especially in interventions in naturally preserved and culturally rich landscape units.

### **1.11 Monitoring**

Indicators for monitoring the environmental impact of the Strategy were proposed on the basis of the results of the environmental assessment. Indicators that are measurable and whose state is already being monitored in Slovenia are proposed as priorities. Indicators are examined by the producer of the Strategy, the Ministry of Infrastructure.

Monitoring of the following indicators has been proposed:

- land cover and land use,
- emissions of gases that cause acidification,
- emissions of particulates in the air,
- emissions of ozone precursors,
- greenhouse gas emissions,
- potential risks to waters in the event of accidents during the transport of hazardous substances,
- collisions with wild animals,
- habitat fragmentation,
- exposure to noise from traffic,
- investment in transport infrastructure,
- volume and structure of passenger transport and traffic,
- number of traffic accidents, casualties and injured in road and rail transport.

### **1.12 Concluding assessment**

In the Environmental report, according to the Decree laying down the content of environmental reports and on the detailed procedure for assessing the effects of the implementation of the plan on the environment (Official Gazette of the Republic of Slovenia, No. 73/05) the impacts of implementing the Transport Development Strategy in the RS on the environment (soil and mineral resources, air, water, climate factors, nature preservation, cultural heritage, landscape, human health and population and material assets) were defined, described and evaluated.

In general, it was established that all groups of measures are acceptable from the environmental aspect with the suitable placement of spatial interventions and implementation of all necessary mitigating measures. The most environmentally-friendly alternative is public transport; rail and maritime transport are more adequate alternatives than road transport, while air transport is the least adequate.

**The producers of the Environmental Report assessed that the impacts of implementing the Transport Development Strategy in the RS, with consideration of the guidelines and mitigating measures, are acceptable for attaining the environmental objectives.**



## **2. INTRODUCTION**

### **2.1 General**

The Environmental Report includes an assessment of the draft Transport Development Strategy in the Republic of Slovenia (*hereinafter referred to as Strategy*), which was prepared by the Ministry of Infrastructure in October 2014 (version 9.5).

The Transport Development Strategy in the Republic of Slovenia is considered a programme that has a significant impact on the environment, which is why it is necessary, in accordance with Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment, to assess in the strategic environmental assessment before its adoption the consequences of the impacts in the Strategy of planned measures and to take a position on measures that are unacceptable due to their environmental impact or non-compliance with environmental objectives. Directive 2001/42/EC requires that Member States take a position and also consult on the cross-border impact of plans and programmes.

### **2.2 Description of steps in the strategic assessment of environmental effects**

On 4 June 2013, the ministry responsible for the environment issued Decision No 35409-24/2012/14, on the basis of which it is necessary along with the drafting of the Transport Development Strategy in the Republic of Slovenia, in accordance with the Environment Protection Act to carry out the strategic environmental assessment, and within this procedure also an assessment of the acceptability of the impact on protected areas on the basis of the Nature Conservation Act.

The purpose of both these assessments, which are laid down by law, is to prevent or, at least, significantly reduce activities that can have significant adverse impacts or consequences on the environment and protected areas, whereby the principles of sustainable development, comprehensiveness and prevention are realised. Within the environmental impact assessment procedure, impacts are determined based on the Environmental Report, which must be provided by the producer of the programme, the Ministry of Infrastructure. The procedure is conducted by the ministry responsible for the environment. Within the scope of the said procedure, the cooperation of all state bodies and organisations responsible for individual sectors, as well notification and public participation are all provided for.

The Environmental Report defines the state of the environment, identifies the relevant environmental objectives, criteria for evaluation and indicators, and the method for taking objectives into consideration when preparing the programme. National and European strategic documents formed the basis for defining the relevant environmental objectives. The evaluation criteria and methods for determining and evaluating the impacts on the environment of implementing the programme were selected so as to enable the maximum determination and an adequate evaluation of the important effects of the programme for the attainment of environmental objectives.

In accordance with the Decree laying down the content of an environmental report and on the detailed procedure for assessing the effects of certain plans and programmes on the environment, the Environmental Report defines, describes and evaluates the impacts of implementing the Strategy on the environment (soil and mineral resources, air, waters, climatic factors), conservation of nature, cultural heritage, landscape, human health and population and material assets), while groups of alternative measures and cross-border impacts were also assessed. When the cumulative nature of impacts was being established, programmes adopted at the state level and cumulative impacts among the various aspects of the environment were taken into account, while the cumulative nature of plans and interventions will be assessed at hierarchically lower planning levels. The Appendix for assessing the acceptability of impacts on protected areas is enclosed as a separate document.

In the procedure of the strategic environmental assessment, a report entitled “Starting points for the drafting of an environmental report for the programme of transport infrastructure development in the Republic of Slovenia” was prepared in the scoping phase. This report defines:

- Environmental objectives of the programme in terms of its characteristics; especially its area and content;
- Assessment criteria which can represent the levels of deviation from the indicators of state of environment, levels of attaining the environmental objectives or other criteria which provide for a suitable impact assessment;
- Relevant environmental areas which are being assessed;
- Methodology of establishing the impacts.

A draft of the report “Starting points for the drafting of an environmental report for the programme of transport infrastructure development in the Republic of Slovenia” was prepared in February 2014 and submitted for an opinion to the competent ministry, which acquired the opinion of the relevant spatial planning authorities. An opinion on the Report has been acquired from the following authorities:

- Ministry of Agriculture and the Environment, Environment Directorate, Comprehensive Environmental Impact Assessment Division (opinion No. 35409-24/2012/22 of 25 March 2014),
- National Institute for Public Health (opinion No. 354-15/14-2/219 of 13 March 2014),
- Slovenian Environment Agency (opinion No. 35001-103/2014 of 05 March 2014) and
- Nature Conservation Institute (opinion No. 8-II-97/2-O-14/TK of 12 March 2014).

The Report has been supplemented in several phases, and harmonisation meetings with the Comprehensive Environmental Impact Assessment Division were held in the meantime (on 12 May 2014 and 29 May 2014). The final report “Starting points for the drafting of the Environmental Report for the programme of transport infrastructure development in the Republic of Slovenia” was made in June 2014.

After acquiring a positive opinion from the ministry responsible for the environment, the Environmental Report is publicly disclosed in the course of the strategic environmental assessment (the disclosure lasts at least for 30 days), while a public presentation is also organised in this period. During the public disclosure, remarks and opinions are collected, which are then properly integrated into the Strategy and the Environmental Report or rejected on a reasoned basis. The procedure of the strategic environmental assessment concludes with the acquisition of a decision on the suitability of the Environmental Report and the Strategy.

It was established during the strategic environmental assessment that the implementation of the Strategy will probably have a significant cross-border environmental impact. **In accordance with Directive 2001/42/EC**, the Ministry of the Environment and Spatial Planning started in June 2014 with the procedure of cross-border consultations under the Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context.

Procedures of individual phases of the strategic environmental assessment, including a timetable, are shown in Table 2.

**Table 2 Planned timetable for the strategic environmental assessment (SEA)**

No.	SEA phase for the Transport Development Strategy	Period of implementation of an individual phase
1	Examining plans and programmes	November 2013 - January 2014
<b>2.</b>	<b>Starting points for drafting the Environmental Report for the programme of transport infrastructure development in the Republic of Slovenia</b>	<b>June 2014</b>
2.1	Reviewing environmental objectives, standards and external impacts on programme implementation	December 2013 - January 2014
2.2	Determining environmental objectives of assessment and indicators for attaining these objectives	December 2013 – June 2014
2.2	Involving the ministry responsible for the environment and relevant spatial planning authorities in the scoping phase	March – July 2014
2.3	Start of the cross-border assessment procedure	June 2014
<b>3.</b>	<b>Environmental report</b>	<b>July 2014</b>
3.1	Review of data on the environment or parts of the environment impacted by the programme	December 2013 – June 2014
3.2	Analysis of environmental impacts	December 2013 – July 2014
3.3	Evaluation of environmental impacts	June – July 2014
3.4	Proposal for mitigating measures and monitoring of the situation	June – July 2014
<b>4.</b>	<b>Amending and publicly displaying the Environmental Report, acquiring a decision</b>	<b>December 2014</b>
4.1	Acquiring an opinion from the ministry responsible for the environment and relevant spatial planning authorities	September – October 2014
4.2	Supplementing the Environmental Report	September – October 2014
4.3	Public display and public presentation	November - December 2014
4.4	Cross-border consultation	December 2014
4.5	Supplementing the Environmental Report and its submission to the ministry responsible for the environment	December 2014

### **3. PRESENTATION OF THE TRANSPORT DEVELOPMENT STRATEGY IN THE RS**

#### **3.1 Reasons for drafting the Transport Development Strategy in the RS**

The initiative for drafting the Strategy came from the Government of the Republic of Slovenia at its 37<sup>th</sup> regular session on 15 November 2012, as part of a discussion of information in relation to the Regulation proposal on guidelines on the development of the trans-European transport network and the Regulation proposal on establishing a Connecting Europe Facility, with Decision no. 54948-24/2012/4, thus ordering the Ministry of Infrastructure (MZI) to prepare a harmonised plan of

investments in transport infrastructure up to 2020, including a vision until 2030. For this purpose, a task force was appointed at the MZI in April 2013 to draft the Strategy on the national programme for the development of transport infrastructure in the Republic of Slovenia up to 2020, including a vision until 2030.

The purpose of the drafting of the Strategy is to:

- determine the comprehensive development of transport and transport infrastructure up to 2030 (and beyond if this is necessary for the integrity of the task),
- facilitate regular and proportionate financing of transport infrastructure,
- facilitate the basis for drawing EU funds in the financial perspective: 2014-2020 (so-called ex-ante conditionalities).

### **3.2 Key Facts about the Strategy**

The Strategy relates to the territory of the Republic of Slovenia. With a total area of 20,273 km<sup>2</sup>, Slovenia is one of the smallest European countries. It borders Austria in the north (border length 324 km), Italy in the west (border length 235 km), Hungary in the north-east (border length 102 km) and Croatia in the south and south-east (border length 546 km), which is also an external border of the European Union. the Slovenian coast on the Adriatic sea is 47 km long.



**Figure 2 A map of Slovenia and neighbouring countries**

**Table 3** Key facts about the assessed programme

Responsibility: Ministry of Infrastructure
<b>Programme name:</b> Transport development strategy in the Republic of Slovenia
Production date: October 2014 (version 9.5)
<b>Decision-making procedure:</b> Proposal is adopted by the Government
<b>Purpose of the programme:</b> Determines the strategic vision of the development of transport infrastructure in the RS
<b>Reason for the preparation:</b> Integrity of implementation of transport policy
<b>Subject:</b> Implementation of European transport policy measures
<b>Planning period:</b> 2014 to 2020 with a vision until 2030
<b>Area:</b> Republic of Slovenia

### **3.3 Description of the Strategy**

#### **3.3.1 Cooperation with the relevant spatial planning stakeholder**

A number of meetings for the purpose of drafting the Strategy were held with some of the most important stakeholders in the field of transport in the RS (representatives of the railway operator, Slovenske železnice, representatives of DARS (motorways) and the Roads Agency (state roads), with representatives of the airport operators Aerodrom Ljubljana, Aerodrom Maribor and Aerodrom Portorož and representatives of Air Traffic Control, with representatives of the port operator of the port of Koper, representatives of the MZI – Transport Directorate, which is responsible for public passenger transport). In addition to presenting their visions of the development of transport and transport infrastructure, they also presented their opinion about investments that need to be realised in the RS.

#### **3.3.2 A description of the transport model and results of the analysis of the existing state**

The Slovenian national transport model is a tool for a fairly objective evaluation of the effects of strategies for future transport arrangement at the national level. The transport model consists of the CETRA and PRIMOS models. Both models were developed in the 2004 – 2013 period by the company PNZ svetovanje projektiranje d.o.o. for the needs of drafting the Strategy.

The results of forecasts based on this model are the basis for transport, environmental and economic evaluations of versions. International experts find this model to be one of the most up-to-date and most suitable models for strategic evaluation. The transport model consists of an internal and external transport model, and models of the impacts on the environment and traffic safety.

Passenger and goods transport were modelled. All models are combined into a whole and are strategic. The core of the national transport model consists of the traffic conditions in Slovenia. However, external factors also impact traffic conditions in the country. Therefore, the area discussed does not comprise only the territory of Slovenia, but a wider area. The model of impacts on the environment and traffic safety has been developed only for Slovenia. Passenger and goods transport were modelled.

An analysis of the existing state (a "0" analysis) was made with the transport model. It assumes that no activities will be carried out in the future in the field of transport except for maintaining the existing state and finalising ongoing investments.

The results of the model show that:

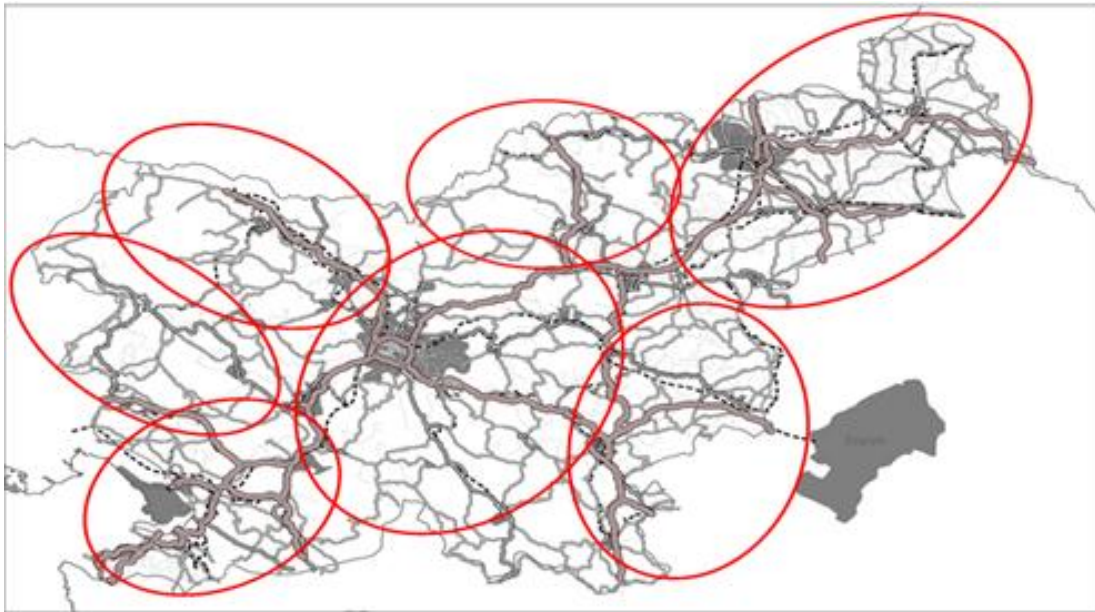
- transport by passenger vehicle will increase, while public passenger transport will decrease,
- road cargo transport will increase at the expense of railway transport,
- capacity of railway lines will be exceeded almost everywhere,
- road drivers will face constant congestions, primarily on roads entering the capital,
- there will be a significant shortage of parking locations for goods vehicles,
- railways will not meet the standards for the core TEN-T network for until 2030 as demanded by the EU regulation in this field,
- accessibility of regional centres would decrease,
- development of the Port of Koper will be disabled due to the lack of railway capacity,
- traffic safety will worsen in all areas of transport, in particular in road transport
- negative impact on the environment will increase over the limits adopted at the EU level and in Slovenia (pollutants of ambient air, greenhouse gas CO<sub>2</sub>, noise, ...),
- quality of life in cities and in rural areas will worsen due to external costs of transport (congestions, accidents, higher emissions of greenhouse gases and noise, increased fuel costs, reduced free time).

*General problems and proposals for measures are defined in the Strategy for each field in the "0" analysis. Special objectives, sub-objectives and measures were then defined on their basis.*

In order to tackle specific problems related to transport and transport infrastructure, measures in the Strategy are envisaged separately for seven traffic-gravitational areas, which cover the twelve statistical regions, while not presuming new administrative or other regions: Their purpose is especially to describe problems related to transport and transport infrastructure, and to determine measures. A description of traffic-gravitational areas (Figure 3):

1. North-eastern Slovenia comprises two statistical regions, i.e. Štajerska and Pomurje. With its motorway links, the area is well connected to the international (TEN-T) as well as the regional network. The Pragersko-Maribor-Šentilj and Pragersko-Hodoš railway corridors are part of the core TEN-T network, so it is important to provide sufficient capacity and compliance with the TEN-T standards. Suitable multimodal suburban and city connections have to be provided for the cohesion centre of Maribor.
2. South-eastern Slovenia covers the Spodnjesavska statistical region and part of the South-eastern Slovenia region (Bela Krajina). The main problem is the accessibility of the Bela Krajina area to the regional centre of Novo Mesto and the motorway network (third development axis).
3. North-western Slovenia encompasses the Gorenjska statistical region, whereby the area of Kranj and Škofja Loka is closely connected with the capital city of Ljubljana. The main problem is the Ljubljana-Jesenice single-track railway line, which represents a bottleneck for goods transport and impedes the improvement of the passenger transport services. Problems also occur in the suburban connection between Škofja Loka and Ljubljana, the tourist centres of Bohinj and Bled and the Cerklje area.
4. The Goriška area covers the Goriška statistical region, where the accessibility of the River Soča valley to the regional centre of Nova Gorica and central Slovenia is a great problem (fourth development axis).
5. The major problem of Koroška is its poor accessibility to the motorway network due to the limited traffic flow on some sections as well as less advantageous geographical features (third development axis).

6. In the area of Primorska the biggest problems are the traffic flow of the Koper-Ljubljana corridor for goods transport (especially the existing railway lines) and the connections to tourist centres and the Croatian border.
7. The area of central Slovenia is greater than the statistical region, since it also includes Notranjska, the area of Kocevje (3A development axis), Zasavje and Spodnja Štajerska (Celje) with their traffic flows mainly gravitating towards Ljubljana. Accessibility to Ljubljana (the Ljubljana motorway ring, suburban and regional connections) and the low level of public transport services are regarded as major issues.



**Figure 3 Traffic-gravitational areas (source: Strategy, 2014):**

### **3.3.3 Vision of transport development in the Republic of Slovenia**

The transport policy vision is defined as the provision of the sustainable mobility of the population and supply to the economy. The definition is derived from basic traffic and transport activity, which is the moving or transferring of people, goods and information in space and time. The word “provision” means that a country will ensure the sustainable mobility of the population and sustainable supply to economy through transport policy. The word “sustainable” relates to the efficient operation of a transport system which functions at the intersection of environmental, social and economic aspects. The measures at the intersection of environmental and economic aspect can be implemented, but not necessarily socially acceptable; measures at the intersection of social and economic aspect are just, but not necessarily environmentally acceptable; measures at the intersection of the environmental and social aspect are tolerable, but not necessarily economically acceptable. The vision of transport policy strives to implement such measures that provide the sustainable mobility of the population and sustainable supply to the economy. A schematic diagram of all three aspects with interactions is shown in the figure below.



Figure 4 Schematic diagram of the sustainable development aspects (source: Strategy, 2014)

### 3.3.4 General objectives and measures for developing transport and transport infrastructure in the Republic of Slovenia

The general objectives of transport policy which ensure that the vision is realised are determined on the basis of the vision. The general objectives of transport policy are:

- Improving mobility and accessibility;
- Improving supply to businesses;
- Improving traffic safety and protection;
- Reducing energy consumption;
- Reducing costs to users and operators;
- Reducing environmental burdens.

The last objective (the reduction of environmental burdens) is also crucially related to the objective of reducing the burden of diseases caused by inadequate transport which is pursued by the Ministry of Health. Therefore, the measures defined on the basis of this objective will also include health.

The objectives are harmonised with the objectives of the TEN-T regulation on the technical specification for interoperability relating to the 'infrastructure' sub-system of the trans-European conventional rail system (2011/275/EU).

Based on the aforementioned general objectives, individual basic measures at the first level which enable the attainment of individual objectives are determined. Certain measures guarantee the fulfilment of various objectives, some of which complement each other, others compete; however, at the same time they increase the level of fulfilment of each objective.

The basic measures are:

- o optimisation of the public passenger transport system;
- o raising awareness of the public and education;
- o modernisation of the existing transport infrastructure;
- o new construction of optimum transport infrastructure;
- o provision of appropriate connections of the port with the hinterland;
- o expansion and technological modernisation of the port;



- o expansion and technological modernisation of airports,
- o development of logistics centres;
- o introduction of modern transport means;
- o provision of technical applicability of transport means.

The interaction between the objectives and measures is shown in figure 5. The figure clearly shows which individual measures pursue the general objective. Thus, e.g. the measure “New construction of the optimum transport infrastructure” pursues all six objectives.

MEASURES \ GENERAL OBJECTIVES	1 Improvement of mobility and accessibility	2 Improvement of supply to businesses	3 Improvement of traffic safety and protection	4 Reduction of energy consumption	5 Reduction of costs to users and operators	6 Reduction of environmental burdens
1 optimisation of the public passenger transport system						
2 raising awareness of the public and education						
3 modernisation of the existing transport infrastructure						
4 new construction of optimum transport infrastructure						
5 provision of appropriate connections of the port with the hinterland						
6 expansion and technological modernisation of the port						
7 expansion and technological modernisation of airports						
8 development of logistics centres						
9 introduction of modern transport means						
10 provision of technical applicability of transport means						

Figure 5 Objectives and measures matrix (source: Strategy, 2014)

### 3.3.5 Determining special objectives of the Strategy, sub-objectives and measures

The strategy pursues six general objectives. Four specific objectives are assigned to these six objectives, which more specifically determine measures for eliminating the established problems. Sub-objectives, which are specified aspects and/or areas where specific problems need to be solved are determined for all of the specific objectives. The Strategy has 21 sub-objectives.

The specific objectives and sub-objectives of the Strategy are:

- Specific objective no. 1: Improving transport connections and harmonisation with neighbouring countries:
  - Sub-objective 1a: Eliminating congestions at borders
  - Sub-objective 1b: Improving the accessibility of international interurban passenger transport (including transit traffic)
  - Sub-objective 1c: Improving the accessibility of international interurban goods transport (including transit traffic)

- Specific objective no. 2: Improving national and regional connections within Slovenia:
  - Sub-objective 2a: North-east
  - Sub-objective 2b: South-east
  - Sub-objective 2c: North-west
  - Sub-objective 2d: Goriška
  - Sub-objective 2e: Koroška
  - Sub-objective 2f: Primorska
  - Sub-objective 2g: Central Slovenia
  - Sub-objective 2h: Accessibility within regions (to regional centres)
  
- Specific objective no. 3: Improving the accessibility of passengers to the main cities of agglomerations and within them:
  - Sub-objective 3a: Ljubljana
  - Sub-objective 3b: Maribor
  - Sub-objective 3c: Koper
  
- Specific objective no. 4: Improving the organisational and operational structure of the transport system to ensure efficiency and system sustainability:
  - Sub-objective 4a: Harmonisation of legislation, rules and standards with European requirements and best practice
  - Sub-objective 4b: Improving the organisational system structure and cooperation between respective stakeholders
  - Sub-objective 4c: Improving the operational system structure
  - Sub-objective 4d: Improving the transport system safety
  - Sub-objective 4e: Environmental impact reduction/mitigation
  - Sub-objective 4f: Improving energy efficiency
  - Sub-objective 4g: Financial sustainability of the transport system

Table 4 describes the environmental objectives and their sub-objectives in detail.

Groups of measures, divided into general measures and measures related to the railway, road, public passenger transport, air and maritime transport and urban centres, are determined for each of the twenty-one sub-objectives. A description and the reason is given for each measure. The measures are not represented at the level of concrete projects, but at the level of established needs (at the strategic level).

The measures are described in Appendix 1.1 (Tables 1 - 5). The left column of the tables indicates to which means of transport or area a specific measure relates. 'R' denotes railway, 'Ro' denotes road, 'A' denotes air traffic, 'M' denotes maritime transport and 'U' denotes urban centres. Green cells mean that the measure definitively attains the specific sub-objective, whereas yellow indicates the attainment of the objective is not completely certain. The measures are numbered according to the principle that the measures from 1 to 10 relate to network elements, measures from 11 to 30 relate to the network and 30 -> are organisational measures.

Tables showing sub-objectives and transport measures for attaining individual objectives are given in Appendix 1.2.

Table 4 Table describing specific objectives and their sub-objectives (source: Strategy, 2014)

OBJECTIVE (general and specific)	DESCRIPTION
<p><b>GENERAL PURPOSE AND OBJECTIVES OF THE STRATEGY</b></p> <p><b>SPECIFIC OBJECTIVES</b></p>	<p>The general purpose of the plan is to achieve an efficient and sustainable system for passenger and goods transport in the territory of the Republic of Slovenia.</p> <p>The following general objectives, which are pursuant to the rules, standards and decrees of the European Union, will be taken into account in all the measures proposed in the plan to fulfil this purpose: <b>improving mobility and accessibility, improving supply to the economy, improving traffic safety, reducing energy consumption, reducing the costs incurred by users, reducing environmental burden.</b></p>
<p><b>1 Improvement of transport connections to and harmonisation with neighbouring countries;</b></p>	<p>Slovenia is an important transit country for passenger and goods transport and a country of the origin and destination (for all transport modes concerned). The main objective is to provide sufficient network capacity which will also meet the TEN-T standards (speed, axis load, length of trains) and eliminate serious congestion at state borders.</p>
<p>1a Elimination of congestions at borders</p>	<p>The congestion at the state borders during the tourist season (roads towards Croatia, Austria) and single-track railway lines (Austria, Hungary) and operational issues (Italy) (railway line).</p>
<p>1b Improvement of the accessibility of international passenger transport (including transit traffic)</p>	<p>Capacity issues (the area of Ljubljana for transit transport, airport terminals), and issues related to the level of services (intercity passenger trains) for transit transport. Multimodal accessibility to the main network.</p>
<p>1c Improvement of the accessibility of international goods transport (including transit traffic)</p>	<p>Capacity issues (the Port of Koper, Koper-Ljubljana railway line, Ljubljana railway hub), compliance with TEN-T standards (where they are appropriate and economically viable). Issues remain, especially with the increasing importance of the NAPA ports (increase of transshipment). Multimodal accessibility to the main network.</p>
<p><b>2 Improvement of national and regional connection within Slovenia</b></p>	<p><b>Ljubljana, Maribor and Koper are the main economic, political and administrative centres. Regional centres provide basic services in a particular region. Thus, better connections of all regions with these three major national centres is to be ensured (shorter travel time, level of services for public transport, better conditions of roads, where this is necessary), as well as proper services and accessibility within the scope of the region with its regional centre.</b></p>

OBJECTIVE (general and specific)	DESCRIPTION
2a North-east	The objective of the plan is to improve the connection of Pomurje with Maribor. North-eastern Slovenia comprises two statistical regions, i.e. Štajerska and Pomurje. With its motorway links, the area is well connected to the international (TEN-T) as well as the regional network. The Pragersko-Maribor-Šentilj and Pragersko-Hodoš railway corridors are part of the core TEN-T network, so it is important to provide sufficient capacity and compliance with the TEN-T standards. Suitable multimodal suburban and city connections have to be provided for the cohesion centre of Maribor.
2b South-east	The objective of the plan is to improve the connection of Bela Krajina (Črnomelj, Metlika) with Novo Mesto and Ljubljana. South-eastern Slovenia covers the Spodnjesavska statistical region and part of the South-eastern Slovenia region (Bela Krajina). The main problem is the accessibility of the Bela Krajina area to the regional centre of Novo Mesto and the motorway network (third development axis).
2c North-west	The objective of the plan is to improve the connection of Bled and Bohinj with Ljubljana. North-western Slovenia encompasses the Gorenjska statistical region, whereby the area of Kranj and Škofja Loka is also closely connected to the capital Ljubljana. The main problem is primarily the Ljubljana-Jesenice single-track railway line, which represents a bottleneck for goods transport, while passenger transport services also have to be improved. Problems also occur in the suburban connection between Škofja Loka and Ljubljana, the tourist centres of Bohinj and Bled and the area of Cerkno.
2d Goriška	The objective of the plan is to improve the connection of Bovec, Tolmin and Cerkno with Nova Gorica and Ljubljana. The Goriška area covers the Goriška statistical region, where the accessibility of the River Soča valley to the regional centre of Nova Gorica and central Slovenia is a great problem (fourth development axis).
2e Koroška	The objective of the plan is to improve the connection of Koroška with Celje and Ljubljana. The major problem of Koroška is its poor accessibility to the motorway network due to the limited traffic flow as well as less advantageous geographical features (third development axis).
2f Primorska	The objective of the plan is to improve the connection of Ilirska Bistrica (the border with Croatia) with Postojna and Ljubljana. In the area of Primorska, the biggest problems are the traffic flow of the Koper-Ljubljana corridor for goods transport (especially the existing railway lines) and the connections to tourist centres and the Croatian border.
2g Central Slovenia	The objective of the plan is to improve the connections within the Osrednjeslovenska region with Ljubljana. The area of central Slovenia extends beyond the statistical region, since it also includes Notranjska, the area of Kočevje (3A development axis), Zasavje and Spodnja Štajerska (Celje) with their traffic flows mainly gravitating towards Ljubljana. Accessibility to Ljubljana (the Ljubljana motorway ring, suburban and regional connections) and the low level of public transport services are regarded as major issues.

OBJECTIVE (general and specific)	DESCRIPTION
2h Accessibility within regions (to regional centres)	The objective is to increase (especially through general measures) accessibility to regional centres. According to the objectives of the spatial development of the Republic of Slovenia, everyone should be able to reach one of the urban centres in Slovenia in 45 minutes by PPT or at least by passenger vehicle.
<b>3 Improvement of accessibility of passengers to the main city agglomerations and within them</b>	<b>Ljubljana, Maribor and Koper are the main economic, political and administrative centres. Thus, better connections between all Slovenian regions and these three major national centres (shorter travel time, level of services for public transport, better conditions of roads, where this is necessary) is to be ensured on the one hand, while on the other hand these are the centres of three important Slovenian regions and thus proper connections also need to be provided also within them. Ljubljana is also a hub of two Pan-European or TEN-T corridors (northwest-southeast and -northeast or east-west and north-south) and Maribor is a hub in the comprehensive TEN-T network in the EU, whereas Koper is the only Slovenian port which is an important logistics centre or the origin of goods for Slovenia and Central Europe.</b>
3a Ljubljana	The smooth flow of transit railway and road transport needs to be ensured in a manner which reduces negative impacts on the environment to the minimum. Also in need of improvement is the multimodal accessibility to the point of international, intercity and suburban passenger and goods transport, with a focus on sustainable development. A sustainable city transport system has to be developed. The system of points of transit between means of transport is to be established to provide convenient and quick changing between different means of transport. The central point of change of means of transport will be a passenger terminal which will act as a meeting point of international, intercity, suburban and city transport and where changing between all means of transport will be provided. A logistics centre has to be established which provides transshipment between rail and road transport and also the development of supplementary activities.
3b Maribor	The smooth flow of transit, especially for rail transport, has to be enabled. Also in need of improvement is the multimodal accessibility to the point of international, intercity and suburban passenger and freight, transport with a focus on sustainable development. A sustainable city transport system has to be developed. The system of transit between means of means of transport is to be established to provide convenient and quick changing between different means of transport. A logistics centre has to be established to provide transshipment between rail and road transport and also the development of supplementary activities.
3c Koper	In the direction of the border with the Republic of Croatia, the smooth flow of transit transport, which is problematic especially during the tourist season, needs to be provided. The railway connection of Koper with its hinterland has to be significantly improved. A sustainable transport system which will also provide environmentally acceptable accessibility has to be ensured in the area of the coastal region and within the city. The further development of the port and logistics centre has to be ensured where the transshipment between ship, railway and road transports is possible and where the further development of supplementary activities will be provided.
<b>4 Improvement of organisational and operational structure of the transport system for ensuring the system efficiency and sustainability</b>	<b>One of the necessary steps for improving the efficiency and sustainability of the transport system is the improvement of the organisational and operational structure. An inadequately organised and inadequately implemented and maintained transport system will not be successful, regardless of the amount of financial means allocated for its development. A more sustainable system means not only better utilisation of financial means, but also a system which</b>

OBJECTIVE (general and specific)	DESCRIPTION
	<b>is safer, more energy-efficient and has less impact on the environment and society.</b>
<p>4a Harmonisation of legislation, rules and standards to European requirements and the best practice</p>	<p>To fully attain the objectives of the new policy of the Pan-European transport network, uniform requirements regarding the infrastructure have to be laid down, and clear standards for the infrastructure of Pan-European transport network established. This will also include the application of smart mobility systems such as the future air traffic management system (SESAR), the European Railway Traffic Management System (ERTMS) and railway information systems, systems of maritime control (SafeSeaNet) and vessel traffic management information systems (VTMIS), intelligent transport systems (ITS) and interoperable, interrelated solutions for the next generations of management systems of multimodal transport and information systems (also for charging fees). The more efficient, transparent and financially sustainable planning, management and implementation of public transport on the basis of the Public Service Contract pursuant to Decree No. 1370/2007 also falls under this aspect/vision. To release the potential of private funding, the regulative framework also needs to be improved and an innovative financial instrument introduced. The evaluation and approval of projects have to be efficient and transparent to limit time, costs and uncertainties.</p>
<p>4b Improvement of the organisational system structure and cooperation between respective stakeholders</p>	<p>Countries are still the most important entities obliged to form and maintain transport infrastructure. However, other entities, including partners from the private sector, also play an important part in implementing the multimodal Pan-European transport network and related investments, including regional and local bodies, infrastructure operators, concessionaires, managers, operators, etc. of ports and airports, navigation air transport services, etc. Better quality and better efficiency/performance will be attained through their better mutual cooperation. Through better cooperation with the public, the integration of society and development of the transport system, fulfilling the needs of users, will also be improved and provided.</p> <p>The improvement of the organisational structure of transport system and reorganisation of the structure of respective stakeholders to optimise their means are necessary to improve the sustainability and quality of transport systems.</p> <p>To improve the monitoring of maritime transport and strengthen maritime supervision, it is necessary to consolidate cooperation and the exchange of information between bodies involved in operational maritime supervision. The implementation of measures to consolidate this cooperation and establish the common environment for the exchange of information (e.g. data on the locations of ships, data on freight, sensor data, maps and charts, meteorological and ocean data, etc.) will reduce the managerial and operational costs of maritime transport activity, while stakeholders will be equipped with more up-to-date and available information about conditions at sea. The improved coordination will enable the better exploitation of technical means and exchange of information and data between individual bodies and sectors, as well as internationally. Thus, the duplication of data collection will be avoided and the more efficient operation of competent authorities at sea provided.</p>

OBJECTIVE (general and specific)	DESCRIPTION
4c Improvement of the operational system structure	<p>The quality, accessibility and reliability of public transport services will gain in importance in the coming years, due to, inter alia, the ageing of population and the need to stimulate public transport. The proper frequency, convenience, easy access, reliability of services and intermodal integration are the main characteristics of the quality of the service. The reliability of information about travel time and possible routes is equally important for the smooth door-to-door mobility for passengers and goods. Human resources are a key component of every high-quality transport system. It is also generally known that deficiencies in work force and qualification of workers will become a serious transport issue in the future. On the other hand, the improvement of operational measures and the with the more efficient application of transport and infrastructure of advanced systems for managing transport and information systems (e.g. ITS, SESAR, ERTMS, SafeSeaNet) are the main objectives for ensuring the sustainability of the sector. The proper maintenance of the existing transport network, capacities and vehicle fleet is very important for the sustainability and quality of the transport system. In this regard, the priority objective is to establish a system for proper maintenance.</p>
4d Improvement of the transport system safety.	<p>One of the main objectives of the plan is to improve the safety of the transport system/network by implementing measures throughout the entire network, such as checking/evaluating road traffic safety, ITS/TMS, traffic calming measures, measures to encourage the use of public transport, etc.</p> <p>A centre for control and management of vessel transport (VTS centre) has to be established in the field of maritime transport safety due to the outdated existing control system and unsatisfactory availability of radio communications. The basis for establishing the VTS centre with proper technical equipment and control service organisation is also supported by the requirements of Directive 2002/59/EC on the establishment of a system of monitoring and information for vessel traffic.</p>
4e Reduction/mitigation of Environmental impact	<p>Preventing, reducing or mitigating impacts on the environment due to transport-related activities is one of the main objectives of the plan. The strategy is mainly aimed at reducing greenhouse gas emissions related to transport (the transport sector is one of the main sources) and air pollution. This will be attained through a set of measures in the field of habits related to mobility (modal shift to public transport and environmental-friendly transport modes, e.g. walking and cycling) and through the improvement of vehicle technology (more efficient and green). Preventing, reducing and mitigating (potential) impacts on the environment are important for the existing as well as new infrastructure. The protection of natural and constructed environments and landscapes, preservation of biotic diversity and ecosystem services, protection of heritage and ensuring a healthy environment (reducing the number of people affected by transport impacts, such as noise and emissions) are necessary conditions for developing a sustainable transport network.</p>
4f Improvement of energy efficiency	<p>Better and more energy-efficient habits in regard to mobility are one of the priorities of the European guidelines and plan. To attain this objective, the more efficient utilisation of the transport network has to be promoted; users should especially be encouraged to use public transport and environment-friendly transport modes. Also, the use of modern, more efficient and greener vehicles has to be encouraged by observing the application of alternative fuels and providing economical handling of worn out vehicles.</p>

<b>OBJECTIVE (general and specific)</b>	<b>DESCRIPTION</b>
4g Financial sustainability of the transport system	One of the priority tasks of the European Union is to increase the financial sustainability of the transport system and reduce the needs for subsidies, which currently account for an important share of national budgets. The increase in financial sustainability will be attained through measures in the field of organisation and operation, i.e. with more efficient network management (attained by better planning - which will attract more users - and management - e.g. with a public service contract which would also allow a possible offer of service in the future, whereby the transition to market economies is provided). New financial instruments, e.g. the initiative for project bonds of the European Union, may provide financial support for public-private partnerships to a greater extent.



### 3.3.6 Relation of the Strategy to other plans and programmes

#### **Resolution on the Transport Policy (Official Gazette of the RS, No. 35/02 and 60/04).**

The implementation of the Resolution on Transport Policy is effective only in connection with the implementation of the Environmental Development Strategy of Slovenia in the sense of rational and efficient spatial development. The dispersal of settlements and the economy (production) has a key effect on causing traffic flows, their management and, consequently, joint transport costs.

The resolution on Transport Policy first analyses the current development of transport infrastructure, where Slovenia, in the period following its independence, has built only the direct connection with Hungary in the field of railway infrastructure. This project has proven exceptionally important since both countries entered the EU, since this railway route has become more competitive. Furthermore, 20 years ago, we witnessed the redirection of traffic flows to the fifth railway corridor, while traffic on the tenth corridor is slowly coming to life, mostly due to the fact that railway managements in this area are not coordinated. The current situation and trafficability were preserved on other parts of the railway infrastructure.

The construction and maintenance of railway infrastructure, along with organisational and technological aspects, are also key success factors in a more open, marketable and competitive space, where railways, which acquire almost 60 per cent of the cargo via the Port of Koper, can now be found. The Port of Koper has constantly increased transshipment in decades, and it also presents the key traffic hub of European importance.

In the field of state roads in the past twenty years, Slovenia has prioritised the construction of roads for long-distance traffic, i.e. motorways in the trans-European road network, and expressways. The remaining network of state roads, including main and regional roads, was mostly maintained and preserved; by primarily eliminating bottlenecks, the goal was to increase traffic capacity and safety. This development of the national road infrastructure enabled the accelerated development of areas along the motorway network, while the connectivity and access of other areas to the motorway system did not improve in this period. The general situation of the existing national road network, main and regional roads categories even worsened in this period. This situation limits the harmonious regional development of areas which are not situated near the motorway network. Due to poor access and higher transport costs, these areas are becoming non-competitive in terms of location, even if they have other resources needed for development (cheaper land, qualified workforce etc.).

We must not forget Slovenian airports, which contribute significantly to the development of mostly passenger as well as cargo transport.

By providing appropriate transport infrastructure and incentives in entering new markets we will enable local logistics companies and carriers more competitive entry to the EU's transport market and also significantly contribute to creating the single European transport area, which is the basic purpose of European transport policy.

The Resolution on Transport Policy of the Republic of Slovenia determines the following measures to help attain objectives in transport infrastructure:

1. effective spatial planning that ensures long-term efficient infrastructural connections between places;
2. the development of public railway infrastructure that enables the implementation of quality, reliable and price-effective services;
3. the transport of passengers in suburban and intercity as well as international passenger transport, as well as classic and multimodal cargo transport services;

4. the maintenance of the motorway system and other state roads as developmental axes, which will enable connections between Slovenian centres of development and will be connected to the motorway system;
5. the construction and maintenance of airport infrastructure and supporting buildings for the requirements of accompanying activities;
6. the construction and maintenance of appropriate port infrastructure;
7. appropriate maintenance and renovation of existing transport infrastructure and the development of new traffic connections;
8. stimulation of revitalisation of industrial railway lines where this is justified by economic and public interests;
9. investments in transport infrastructure which ensure equal conditions of accessibility for temporarily or permanently physically and sensory disable persons (the disabled, the elderly, mothers with children, pregnant women etc.);
10. the construction and maintenance of transport infrastructure for sustainable transport, where the use of bicycles and walking is promoted;
11. ensuring permanent systemic sources for financing public transport infrastructure whose construction is not deemed viable from the commercial aspect;
12. ensuring the desired operations and modern development (railway infrastructure, state roads etc.).

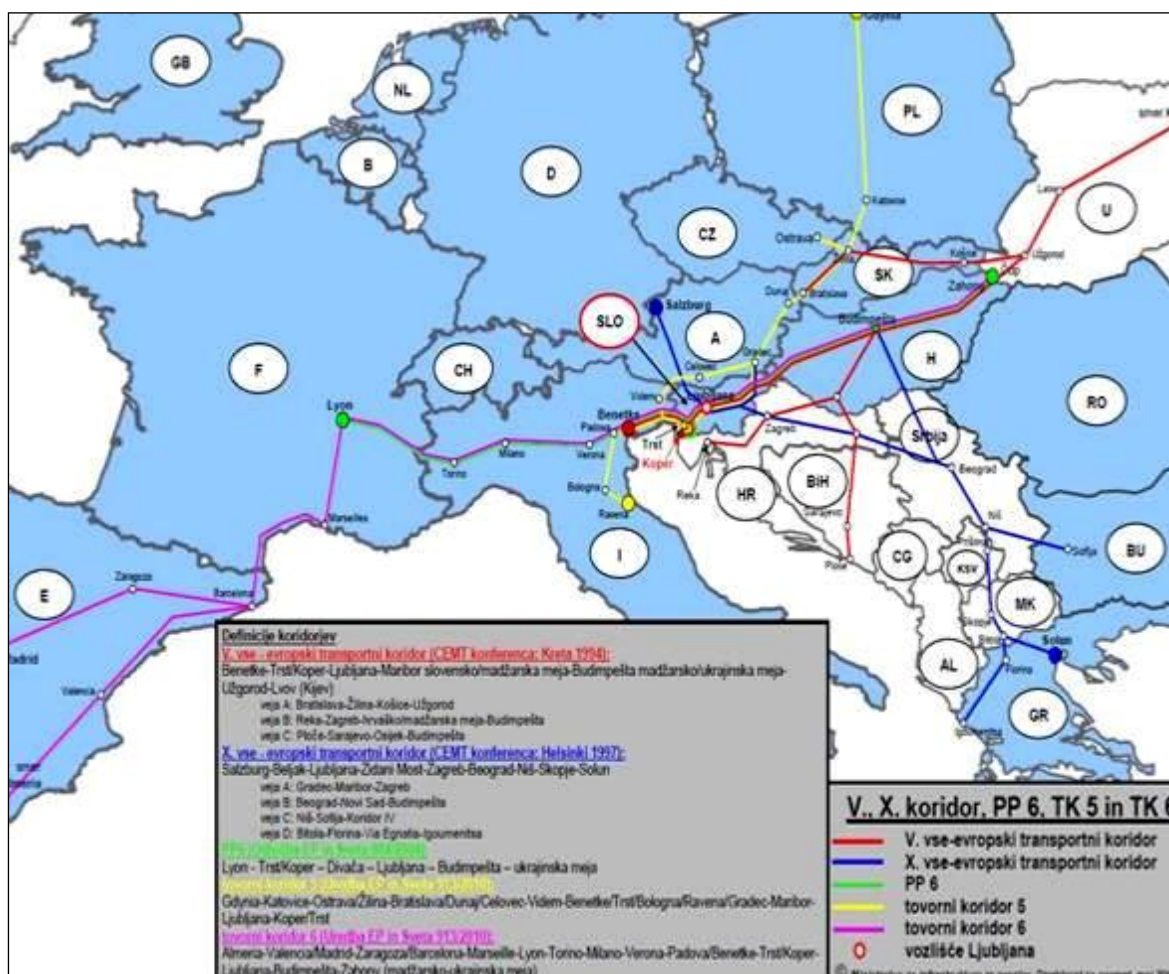


Figure 6 Routes of the pan-European Corridors V and X (Source: Strategy, 2014)

One of the key guidelines in the Resolution on Transport Policy of the Republic of Slovenia is the transition to environmentally friendly forms of transport, especially rail. This transition must be appropriately considered, i.e. it should be stimulated at locations where road transport has already reached the limit capacities.

### Spatial Development Strategy of Slovenia (Official Gazette of RS, no. 76/04)

Slovenia's spatial development is based on a polycentric urban system comprised of a two-level structured network of centres that are of national importance (Ljubljana, Maribor, Koper, Celje, Murska Sobota, Velenje, Novo mesto, Kranj, Nova Gorica, Postojna, Ptuj and conurbations Jesenice-Radovljica, Sevnica-Brežice-Krško, Dravograd-Ravne na Koroškem-Slovenj Gradec, Trbovlje-Zagorje-Hrastnik) and centres that are of regional importance and to which, with appropriate distributions of functions, the networks of other centres are connected (centres of intermunicipal and local importance). Ljubljana, Koper and Maribor are centres that are important at the international level, and this requires appropriate infrastructural connections with the international area. The existing spatial development model is determined by the Spatial Planning Strategy of Slovenia (Figure 7). Since its adoption in 2004, numerous questions have arisen regarding its actual role in development planning. A new umbrella strategy for special development is in preparation.

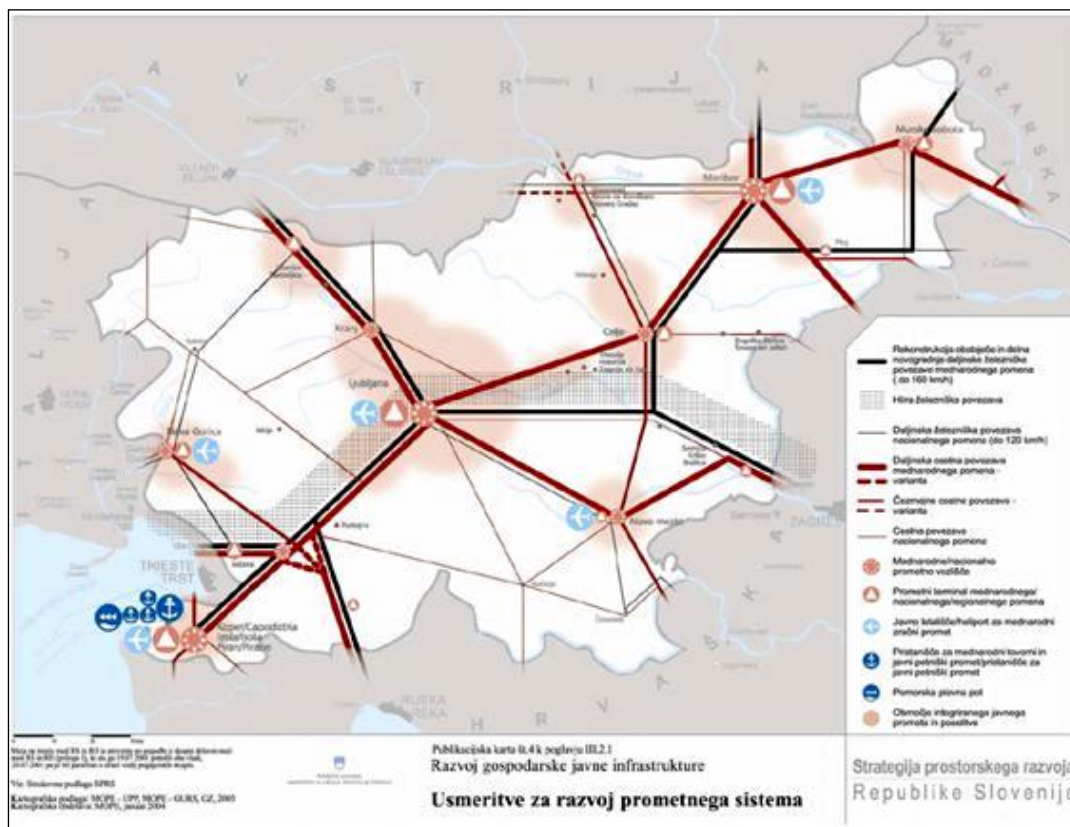
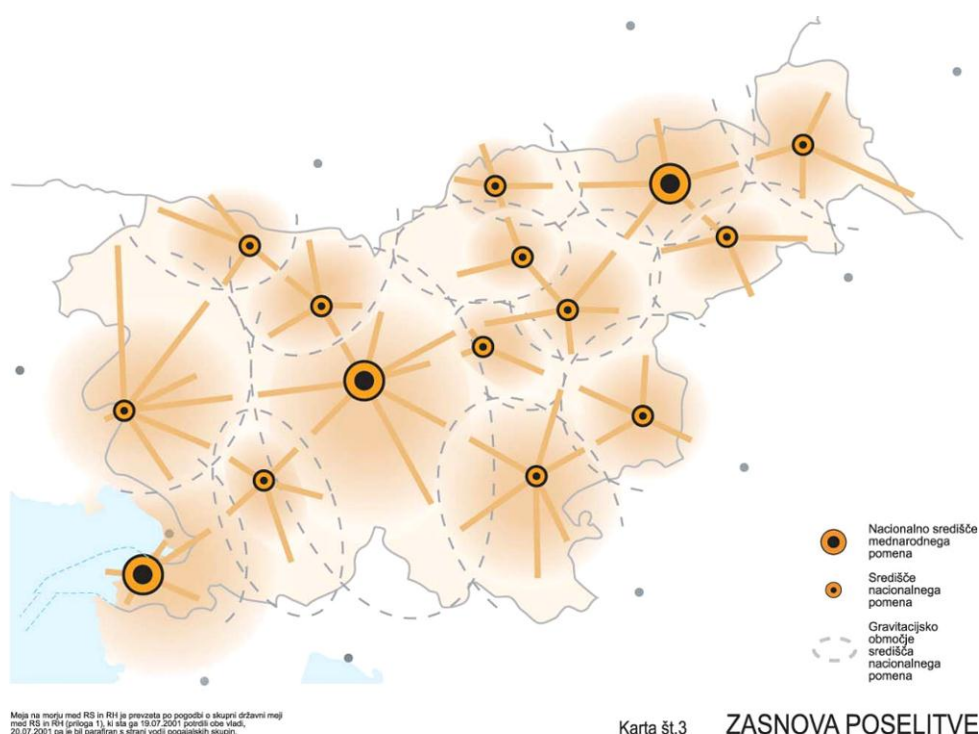


Figure 7 Spatial guidelines for developing intermodal transport network in relation to settlement (source: Spatial Development Strategy, Official Gazette of the RS, No 76/04)

From the developmental aspect of Slovenia, a comprehensive transport system has the key role in economic integration in international space for connecting urban centres and other settlements as well as regions and for ensuring accessibility to workplaces and services for the population and the economy in a sustainable way that is also rational from the spatial aspect. In this way, transport infrastructure supports and establishes the conditions for developing centres in the polycentric urban system. Workplaces and services of public importance are mainly concentrated in cities – economic centres, hence the necessity for planned infrastructure, by considering the role of a city/urban centre, its rank is determined. Further construction of infrastructure and establishment of appropriate services with the aim of connecting various transport subsystems (hubs or terminals for passenger transport,

transport terminals for combined traffic or logistics centres) to enable the efficient mobility of people and goods.

The development and further construction of transport infrastructure on European transport corridors V and X is important for economic integration in the international area, as well as the establishment of appropriate connections of international airports, especially Ljubljana, and the Port of Koper with other transport subsystems and the improvement of cross-border transport connections. The system of internal connections is also important for regional development, since these connections consist of border and peripheral transport connections, which contribute to improving accessibility to lower level centres (Figure 8). The target accessibility from gravitational areas to functions in urban centres of higher rank (centres of national importance) is 45 minutes, while the target accessibility of gravitational areas of lower rank centres (centres of regional importance) is 30 minutes. If delays due to traffic congestion are not considered, the target values have already been achieved, but only in the field of private motor vehicle traffic. In future, more attention will have to be dedicated to accessibility by public transport in order to reduce the load on the environment caused by emissions and dust in urban centres.



**Figure 8 Urban centres of national and international importance with gravitational areas (Source: Spatial Development Strategy, Official Gazette of the RS, No 76/64)**

### **Regulation (EU) on Union guidelines for the development of the trans-European transport network**

The Regulation (EU) on Union guidelines for the development of the trans-European transport network (Regulation No 1315/2013) repeals and substitutes Decision No 661/2010/EU of the European Parliament and of the Council of 7 July 2010 on Union guidelines for the development of the trans-European transport network.

The Regulation contains the following key elements of TEN-T development:

- the trans-European transport network will develop gradually on the basis of the implementation of a dual-layer approach consisting of a comprehensive network and a core network.
- the comprehensive network is to be in place by 31 December 2050; the core network is to be implemented as a priority task until 31 December 2030,

- the guidelines determine a framework for the definition of projects of common interest. These projects contribute to the development and construction of the trans-European transport network with construction, maintenance, rehabilitation and renovation of infrastructure, measures stimulating the economical use of infrastructure and enabling sustainable and efficient cargo transport services,
- cargo terminals, passenger stations, inland water ports, sea ports and airports will connect means of transport in order to enable multi-modal transport,
- urban hubs are key elements in the comprehensive network as linking points between different parts of transport infrastructure,
- along with the requirements for the comprehensive network, the guidelines for the core network also stipulate special requirements, such as the availability of alternative fuels,
- the core network corridors will be the instrument for implementing the core network; they are based on modal inclusion and interoperability and lead to harmonised
- development and management.

So far, the member states have been the main actors in the development and management of transport infrastructure; however, the development has shown that these conditions are gradually changing. Regional and local authorities, infrastructure managers, transport services providers as well as other public and private entities are becoming important in the development of infrastructure. Because several stakeholders are included in the planning, development and operations of the trans-European transport network along with member states, it is necessary to ensure that these guidelines are binding on everyone. Therefore, the Regulation has been selected as the legal instrument for the issuing of the act on guidelines.

### **Roadmap for a Single European Transport Area – Towards a competitive and resource-efficient transport system (hereinafter referred to as the White Paper on European Transport Policy)**

The White Paper on European Transport Policy is not binding on member states, but it is a time- and content-related overview of the most probable medium- and long-term legislative and budget development of the EU in the field of transport policy.

To achieve ten objectives for a competitive and resource efficient transport system, the White Paper on European Transport Policy sets the following milestones:

#### *1. By 2020:*

- to establish a framework for the European multi-modal transport system for notification, management and payment;
- to establish a modernised infrastructure for air transport management (SESAR) and complete the single European airspace; to establish land and water transport management systems (ERTMS, ITS, SafeSeaNet, LRIT and RIS).
- to establish the European global navigation satellite system (Galileo).

#### *2. By 2030:*

- to halve the use of "conventional fuel"-driven vehicles in urban transport and to introduce logistics without CO<sub>2</sub> emissions;
- to introduce other means of transport for 30 per cent of road haulage exceeding 300 km, such as rail or water transport;
- to comprehensively establish a functional and multi-modal core TEN-T network at the EU level and triple the length of the existing high-speed railway network;

#### *3. By 2050:*

- to eliminate "conventional fuel"-driven vehicles in cities;
- to introduce other means of transport for 50 per cent of road haulage exceeding 300 km: rail or water transport (achieved with efficient and green corridors for goods transport).; most medium-distance passenger transport should be by rail;



- to guarantee a 40% share of sustainable low-carbon fuels in air transport;
- to ensure a 40 per cent reduction in CO<sub>2</sub> emissions which occur due to fuels from ship tanks in the EU in maritime transport;
- to complete the high-quality and high-capacity TEN-T network at the EU level and to the European high speed railway network with an appropriate set of information services. All airports in the core network must be connected to the railway network, i.e. to the high-speed network if possible. All key ports must be sufficiently connected to the railway goods network and, if possible, with the inland waterway system;
- in the field of transport safety, to reduce the number of fatal accidents to almost zero;
- the transition to fully implement the "user pays" and "polluter pays" principles and the participation of the private sector in eliminating market distortions, including harmful subsidies;
- planned measures to stimulate investments in transport infrastructure and change transport patterns in the field of passenger and goods transport focus on strengthening economic competitiveness and employment.

In order to achieve a competitive and resource-efficient transport system, it is appropriate that at least the medium-term objectives from the White Paper on European Transport Policy (objectives until 2030) be appropriately transferred into instruments of national programmes for developing the public transport infrastructure of individual member states.

## 4. LEGAL PLATFORM FOR THE ENVIRONMENTAL ASSESSMENT

The strategic environmental assessment is implemented for plans in all member states of the European Union in accordance with Directive 2001/42/Ec of the European Parliament and of the Council. The Directive was incorporated into Slovenian legislation with the Decree laying down the content of environmental reports and on the detailed procedure for assessing the effects of certain plans and programmes on the environment (Official Gazette of the Republic of Slovenia, No. 73/05).

The existing environmental legislation and strategic documents, both at the national and the EU levels, have been taken into account in the drafting of the report. Certain national strategic documents important for the Environmental Report are being prepared. These documents and documents previously in force have been taken into account.

### 4.1 Legislative bases considered

#### *General*

- Environment Protection Act (Official Gazette of the RS, No. 41/04 – ZVO-1, 20/06-ZVO-1A, 39/06-ZVO-1-UPB1, 70/08-ZVO-1B, 108/09 – ZVO - 1C, 48/12 – ZVO-1D, 57/12 – ZVO-1E, 97/2012 Constitutional Court Decision:, U-I-88/10-11, 92/2013):
- Act ratifying the Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (Official Gazette of the RS, No 11/10).
- 7th General Union Environment Action Programme to 2020 "Living well, within the limits of our planet", decision of the Council of 15 November 2013.
- Decree laying down the content of environmental reports and on the detailed procedure for assessing the effects of certain plans and programmes on the environment (Official Gazette of the RS, No 73/05).
- Resolution on Transport Policy in the Republic of Slovenia (Intermodality: Time for synergy) (Official Gazette of the RS, No 58/06).
- Directive 2001/42/EC of the European Parliament and of the Council on the assessing the effects of certain plans and programmes on the environment.
- Ordinance on the Spatial Planning Strategy of Slovenia (Official Gazette of the RS, no. 76/04).
- Spatial planning strategy of Slovenia – in preparation.
- Europe 2020 – Strategy for smart, sustainable and inclusive growth COM(2010) 2020
- National management programme for mineral resources (Government, 2009).

#### *Soil and mineral resources*

- Energy Act (EZ-UPB1), Official Gazette of the Republic of Slovenia, Nos. 79/99, 51/04, 26/05, 27/07, 70/08, 22/10, 10/12, 94/12).
- Agriculture Act (Official Gazette of the Republic of Slovenia, No. 45/08 - ZKme-1, 57/12, 90/12, 26/14).
- Agricultural Land Act (Official Gazette of the RS, No., 59/96, 67/02, 36/03, 55/03, 43/11, 71/11, 58/12).
- Forest Act (Official Gazette of the RS, No 30/93, 110/02, 106/10, 63/13, 17/14).
- Decree on protective forests and forests with a special purpose (Official Gazette of the RS, Nos. 88/05, 56/07, 29/09, 91/10, 1/13).
- Agricultural Land Act (Official Gazette of the RS, No. 59/96, 67/02, 36/03, 55/03, 43/11, 71/11, 58/12)
- Resolution on National Forest Programme (ReNGP) (Official Gazette of the RS, No 111/07)
- Resolution on strategic guidelines for developing Slovenian agriculture and the food industry up to 2020 –“Securing food for tomorrow” (ReSURSKŽ) (Official Gazette of the RS, No 25/11)

- Operational programme for the implementation of the Resolution on the strategic guidelines for developing Slovenian agriculture and the food industry up to 2020 – ‘Securing food for tomorrow’ (ReSURSKŽ) (Proposal)
- Directive 2008/98/EC on waste.
- Operational programme for waste management in Slovenia 2006 - 2012.

#### ***Air***

- Decree on national emission ceilings for atmospheric pollutants (Official Gazette of the RS, No 24/05, 92/07).
- Directive 2001/81/EC on national emission ceilings for certain atmospheric pollutants.

#### ***Waters***

- Water Act (Official Gazette of the RS, No 67/02, 110/02 – ZGO-1, 2/04 – ZZdl-A, 41/04 – ZVO-1, 57/08, 57/12 – ZV-1B, 40/14).
- Decree on surface water status (Official Gazette of the RS, No 14/09, 98/10).
- Decree on groundwater status (Official Gazette of the RS, No 25/09, 68/12).
- Decree on conditions and limitations for construction and activities on flood risk areas (Official Gazette of the RS, No 89/08, 77/11 – Constitutional Court Decision)
- Rules on methodology to define areas at risk of flood and related erosion by inland waters and sea and on the classification of plots into risk classes (Official Gazette of the RS, No 60/07)
- Decree on the emission of substances in the discharge of meteoric water from public roads (Official Gazette of the RS, No 47/05).
- Decree on the emission of substances and heat in the discharge of wastewater into waters and public sewage system (Official Gazette of the RS, No 64/12).
- Decree on the discharge and treatment of urban waste water and meteoric water (Official Gazette of the RS, No 88/11, 8/12, 108/13)
- Decree on bathing water areas and the monitoring of bathing water quality (Official Gazette of the RS, No 70/03, 72/04 and 25/08)
- Decree on the detailed content of the marine environment management plan (Official Gazette of the RS, No 92/2010, 20/2013)
- Water Management Plan (Decree on the river basin management plan for the Danube Basin and the Adriatic Sea Basin (Official Gazette of the RS, No 61/11)
- Water Directive 2000/60/EC (OJ L No 327 of 22 December 2000)
- Directive 2008/56/EC on establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) (OJ L No 164 of 17 June 2008)
- Directive 2008/105/EC on environmental quality standards in the field of water policy (OJ L No 348 of 16 December 2008)
- Directive 2006/7/EC concerning the management of bathing water quality (OJ L No 64 of 15 February 2006)
- Council Directive 98/83/EC on the quality of water intended for human consumption (OJ L No 330 of 05 December 1998)
- Directive 2006/118/EC on the protection of groundwater against pollution and deterioration (OJ L No 372 of 12 December 2006)
- Directive 2000/59/EC on port reception facilities for ship-generated waste and cargo residues (OJ L No 332 of 28 December 2000)
- Directive 2007/60/EC on the assessment and management of flood risks (Flood Directive) (OJ L No 228 of 23 October 2007)

#### ***Nature and biodiversity***

- Convention Concerning the Protection of the World Cultural and Natural Heritage (UNESCO, 1972)
- Cave Protection Act (Official Gazette of the RS, No 2/04).



- Act on the Ratification of the Convention on the Conservation of European Wildlife and Natural Habitats – the Bern Convention (Official Gazette of the RS, No 55/99).
- Act Ratifying the Convention on Biological Diversity (Official Gazette of the RS, No 30/96).
- Nature Conservation Act (Official Gazette of the RS, No 96/04 –ZON-UPB2, 46/14- ZON-C)
- Decree on protected wild animal species (Official Gazette of the RS, No 46/04, 109/04, 84/05, 115/07, Constitutional Court decision 13/03/2008, 96/08, 36/09, 102/11):
- Decree on the protection of wild fungi (Official Gazette of the RS, No 58/11).
- Decree on protected wild plant species (Official Gazette of the RS, Nos 46/04, 110/04, 115/07, 36/09).
- Regulation on Special Protection Areas (Natura 2000 area) (Official Gazette of the RS, No 49/04, no. 110/04, 59/07, 43/08, 33/13, Constitutional Court decision - No 39/13, 3/14).
- Decree on habitat types (Official Gazette of the RS, No 112/03, 36/09, 33/13).
- Decree on ecologically important areas (Official Gazette of the RS, No 48/04, 33/13).
- Rules on the assessment of the acceptability of impacts caused by the execution of plans and activities affecting nature in protected areas (Official Gazette of the RS, No 130/2004, 53/06, 38/10, 03/11).
- Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds.
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.
- Rules on adding endangered plant and animal species to the Red List (Official Gazette of the RS, No 82/02, 42/10).
- Rules on the designation and protection of valuable natural features (Official Gazette of the RS, No 111/04, 70/06, 58/09, 93/10).
- EU Biodiversity Strategy to 2020 (COM(2011) 244).
- The Strategy for the Preservation of Biodiversity in Slovenia (2001).
- Resolution on the National Environmental Protection Programme 2005-2012 (ReNPVO) (Official Gazette of the RS, No 2/06).

#### ***Climate factors***

- Operational programme for limiting greenhouse gas emissions up to 2012, Government of the RS, No 35405-2/2009/9, 30 June 2009
- Operational programme for limiting greenhouse gas emissions (amendments in preparation),
- Decision No. 406/2009/EC **on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020**
- EU Strategy on adaptation to climate change (COM(2013) 216 final).
- Council Regulation (EC) no. 1315/2013 on Union guidelines for the development of the trans-European transport network, Provisions of Articles 5 and 41.

#### ***Cultural heritage***

- Cultural Heritage Protection Act (ZVKD-1, the Official Gazette of the RS, No 16/08, 123/08, 8/2011, 30/2011 - Constitutional Court Decision: U-I-297/06-19, 90/12, 111/13)
- Convention on the Protection of the Architectural Heritage of Europe – the Granada Convention (European Treaty Series No. 121, Council of Europe, 1985; Official Gazette of the SFRJ – International treaties, No 4-11/1991).
- Act notifying succession to conventions of the Council of Europe, Geneva conventions and additional protocols on the protection of war victims and international treaties on arms control, whose depositories are the three major nuclear powers, Official Gazette of the RS, No 14/1992).
- Act Ratifying the European Landscape Convention /MEKK/ (Official Gazette of the RS, No 19/03).
- European Convention on the Protection of the Archaeological Heritage (revised), the Malta Convention, European Treaty Series No. 143, Council of Europe, 1992; Act Ratifying the

European Convention on the Protection of the Archaeological Heritage (revised) (MEKVAD), Official Gazette of the RS, No. 24/1999).

- Act Ratifying the European Convention on the Protection of the Archaeological Heritage (MEKVAD) (Official Gazette of the RS, No 7/99).
- Resolution on the National Programme for Culture 2014 - 2017 (ReNPK 14-17) (Official Gazette of the RS, No. 99/13).
- Convention Concerning the Protection of the World Cultural and Natural Heritage (UNESCO, 1972)

### ***Landscape***

- European Landscape Convention, European Treaty series No 176, Council of Europe, 2000; Act Ratifying the European Landscape Convention (MEKK), Official Gazette of the RS, No 74/03).
- Act Ratifying the European Landscape Convention /MEKK/ (Official Gazette of the RS, No 19/03).
- Spatial Planning Act; ZPNačrt (Official Gazette of the RS, No 33/07, 108/09, 57/12, 109/12).

### ***Health***

The main environmental factors that could impact human health due to air quality and noise pollution due to the implementation of the Strategy:

- Directive 2002/49/EC relating to the assessment and management of environmental noise.
- Decree on the assessment and management of environmental noise, Official Gazette of the RS, No 121/2004).
- Decree on limit values for environment noise indicators (Official Gazette of the RS, No 105/2005, 34/2008, 109/2009, 62/2010).
- Ministry of Agriculture and the Environment 2012. Operational programme for protection from noise caused by traffic on major roads and major railways of the first phase outside the Municipality of Ljubljana, for the 2012–2017 period (No 35400-13/2011/2, December 2012).
- Rules on assessing ambient air quality (Official Gazette of the RS, No 55/11).
- Order on the establishment of zones and classification of zones, agglomerations and subzones in relation to ambient air pollution (Official Gazette of the RS, No 50/11).
- Ordinance on the air quality plan in Kranj Municipality (Official Gazette of the RS, No **108/13**).
- Ordinance on the air quality plan: **Celje Municipality (Official Gazette of the RS, No 108/13)**.
- Ordinance on the air quality plan in Novo Mesto Municipality (Official Gazette of the RS, No **108/13**).
- Ordinance on the air quality plan: **Maribor Municipality (Official Gazette of the RS, No 108/13)**.
- Ordinance on the air quality plan in the area of Zasavje (Official Gazette of the RS, No **108/13**).
- Ordinance on the air quality plan in Murska Sobota Municipality (Official Gazette of the RS, No **88/13**).
- Ordinance on the air quality plan in the area of Ljubljana Municipality (Official Gazette of the RS, No 24/14).
- Change in the wording of the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone from 1999 and Appendices II through IX to the Protocol and inclusion of new Appendices X and XI (COM (2013) 917 final).
- “Clean Air for Europe” Programme (COM(2013) 918 final).
- The Strategy of the Government of the RS to encourage physical (motion) activities to improve health between 2007 and 2012 (Government, 2007).

### ***Population and material assets***

- Resolution on the National Programme on Road Traffic Safety for the period from 2013 to 2022 (Together for greater safety) (ReNPVCP13-22) (Official Gazette of the RS, No 39/13).
- Europe 2020 – Strategy for smart, sustainable and inclusive growth COM(2010) 2020.
- Directive 2008/96/EC on road infrastructure safety management.

- The Strategy of the Government of the RS to encourage physical (motion) activities to improve health between 2007 and 2012.

#### **4.2 Assessment of impacts on protected areas**

An acceptability assessment of the impacts on protected areas must be made for every plan or programme that in itself or in combination with other plans or programmes exerts has impacts on the integrity and functionality of Natura 2000 sites or protected areas.

In accordance with the regulations governing the conservation of nature (Rules on the Assessment of Acceptability of Impacts Caused by the Execution of Plans and Activities Affecting Nature in Protected Areas (Official Gazette of the RS, No 130/04, 53/06, 38/10, 3/11), an acceptability assessment of the impacts of the Strategy on protected areas was made.

Natura 2000 sites encompass:

- special conservation areas determined in accordance with Directive 92/43/EEC on habitats,
- special conservation areas determined in accordance with Directive 79/409/EEC on birds,

Protected areas are state measures to conserve natural values and biodiversity. There is a classification of wider (national, regional, landscape park) and narrower (strict nature reserves, nature reserves and natural monuments) protected areas that are subject to regulated protection arrangements.

In accordance with the Rules on assessing the acceptability of impacts caused by the execution of plans and activities affecting nature in protected areas (Official Gazette of the RS, No 130/04, 53/06, 38/10, 03/11), the measures of the Strategy are placed in Chapter 7 – Transport infrastructure areas, Appendices 1 and 2 of the Rules. In accordance with the said Appendix of the Rules, areas of indirect and remote impact of transport infrastructure facilities extend to up to 2,000 metres. The measures of the Strategy are not defined in terms of space and time. Measures on which interventions which require an assessment in accordance with the SEA are based on will be re-assessed, some of them at the level of operational programmes, others at the planning level.

This Environmental Report assesses the Strategy, which is why the Appendix for the protected areas is drawn up in accordance with Article 25.a of the Rules on assessing the acceptability of impacts caused by the execution of plans and activities affecting nature in protected areas (Official Gazette of the RS, No 130/04, 53/06, 38/10, 3/11), which reads as follows: "For operational programmes and other plans or parts thereof, which are not plans in the area of spatial planning and the descriptions of which do not enable, even by way of inference, the determination of all of the planned interventions because the descriptions do not provide concrete locations of interventions or do not provide details as to the type of interventions, the matrix stipulated in Appendix 6 of these Rules shall not be completed within the scope of the acceptability assessment. In this case, expert assessments shall be provided for the individual content of these Rules, which are aimed at the preservation of a favourable status of species and habitat types in accordance with the provision stipulated in the previous article. The matrix stipulated in Appendix 6 of these Rules shall in these cases be completed within the scope of the acceptability assessment at the level of a detailed plan or intervention."

**An assessment of acceptability for protected areas will have to be made in the later phases of preparing documentation (at the level of detailed plans or interventions) for individual infrastructural measures that could have a significant impact on protected areas.**

## 5. DATA ON THE STATE OF THE ENVIRONMENT IN SLOVENIA

### 5.1 Data on the Baseline State of the Environment

In order to present the baseline state, all available information for the definition of the state of the environment has been reviewed. Descriptions of important characteristics of the existing state of the environment focus on those characteristics of the environment that are important for the strategic level, which encompasses the general characteristics of the treated area and the characteristics of the environment that are important at the international and national levels. Consequently, the existing state includes data on the relevant criteria for evaluation and indicators for monitoring the state. All relevant data from the registries of the environment information system and registries and other databases established by state bodies have been used in the Report.

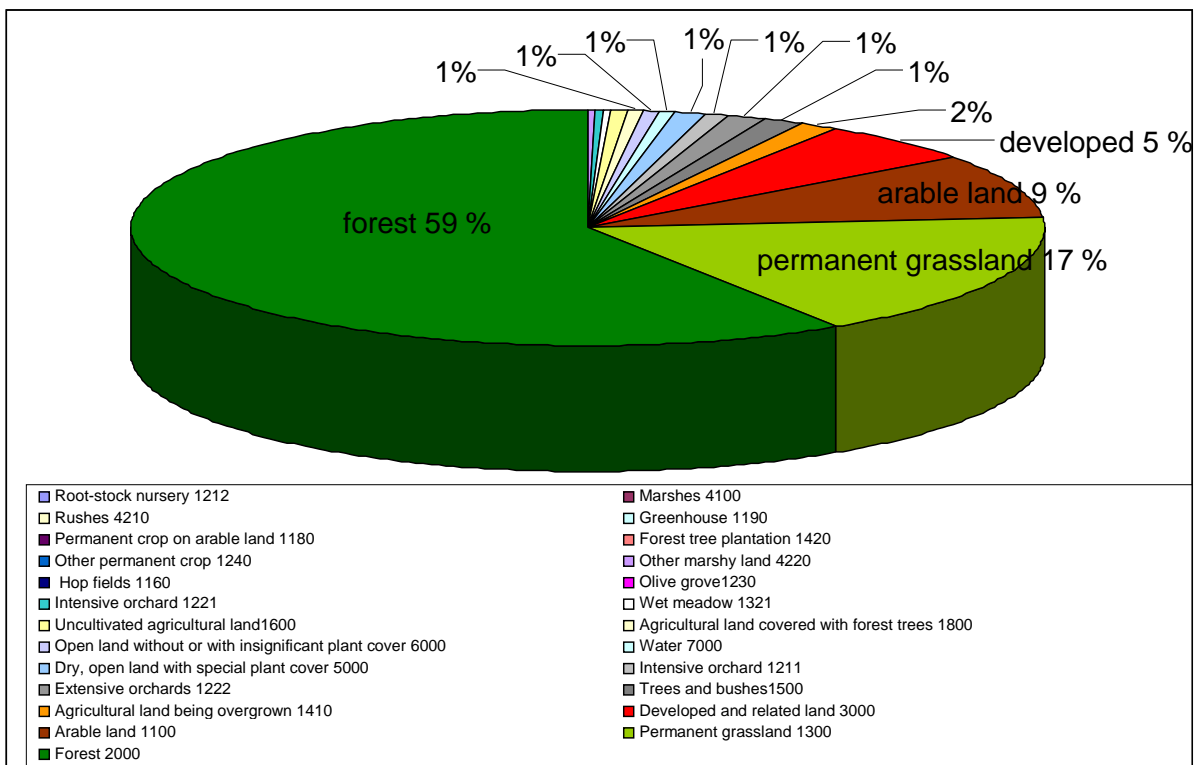
The existing burden on the environment is described and the state of the environment with a selected indicator is displayed below for each area on the basis of publicly available information. Most of the descriptions of indicators are taken from the website of the Environment Agency (ARSO): Environment indicators in Slovenia (source: <http://kazalci.arso.gov.si/?data=indicator&ind>), unless otherwise expressly specified.

#### 5.1.1 Soil and mineral resources

##### Current state

##### Actual use of land

Transport policy measures have an impact on the sustainable management of forest and agricultural land with the siting of transport infrastructure in space. Land use is changed in this process. The Ministry of Agriculture and the Environment, the Directorate for Agriculture, keeps a record on the actual use of land. Transport infrastructure is in the category Developed and related land, which cover an area of 108,977.76 ha in Slovenia. The actual use of land is shown in Figure 9.



**Figure 9 Actual use of land in Slovenia (source: Ministry of Agriculture and the Environment, 2014)**

Forests are the main category of actual use (59.2 per cent), but they are not equally distributed across the entire territory; the largest continuous forest areas cover the Dinaric-Alpine plateaus of southern and south-western Slovenia and the Alpine slopes in the north and west.

In terms of actual use, forests are followed by permanent grassland with 17 per cent of total area of Slovenia; arable land covers 9 per cent, while developed and related land covers more than 5 per cent of the territory; other land use categories cover less than 2 per cent.

In terms of development in statistical regions, the regions of Podravje and the central Slovenia region stand out - developed land covers more than 8 per cent of the region's area. The scarcely populated and wooded statistical region of Notranjsko-kraška has the lowest share of developed land (2.4 per cent). Developed land area intended for transport infrastructure increased the most between 1996 and 2006 (a Corine Landcover analysis, ARSO-KOS), while data for after 2006 is not available (the Corine Landcover project has concluded for Slovenia, but an analysis has not been made).

Among the 28 member states of the European Union, Slovenia is among those with the lowest shares of agricultural land in the structure of use. In terms of actual use, agricultural land covered 33 per cent of Slovenia's territory in 2014. The structure is dominated by permanent grassland (17 per cent) and arable land (9 per cent), while other agricultural land represents less than 2 per cent of territory. Most arable land and permanent grassland is located on the gravelly and loamy plains of eastern and north-eastern Slovenia. The share of vineyards is above average in the coastal region of Primorska and the hilly edge of the Pannonian plain. Orchards are represented most in the hills of Pannonian Slovenia, while there are also many orchards in the Ljubljana and Celje basins.

Soil potential index

The basic source of information about soil properties is the digital map of soil potential index, which is published on the website of the Ministry of Agriculture and the Environment, Directorate for Agriculture, and which was made at the Faculty of Biotechnology in 2006 (Figure 10). Soil potential index provides a qualitative assessment of the quality of land and is determined on the basis of pedological and certain relief characteristics of the country. Soil potential index points are based on an evaluation of the essential and universal indicators of soil quality. They define not only the fertility of soil, but also the ability of soil to perform essential environmental functions. A higher index number means the soil has better features or has greater productive potential.

In Slovenia, 905,932.2 ha (44.5 per cent) of land has moderate productive potential, 456,053.9 ha (22.4 per cent) has low potential, 262,957.6 ha (12.9 per cent) has high potential, and 60,720.0 ha (3.0 per cent) has very high potential. The remaining areas are in the category of very low potential.

Most development in recent years took place on soil of a good quality. Between 2000 and 2012, most of the arable land in areas with very high productive potential was turned into grassland or developed. The process was taking place and is still taking place primarily in valleys and along the main transport corridors as well as along the expansion of settlements for the requirements of industry and residential construction.

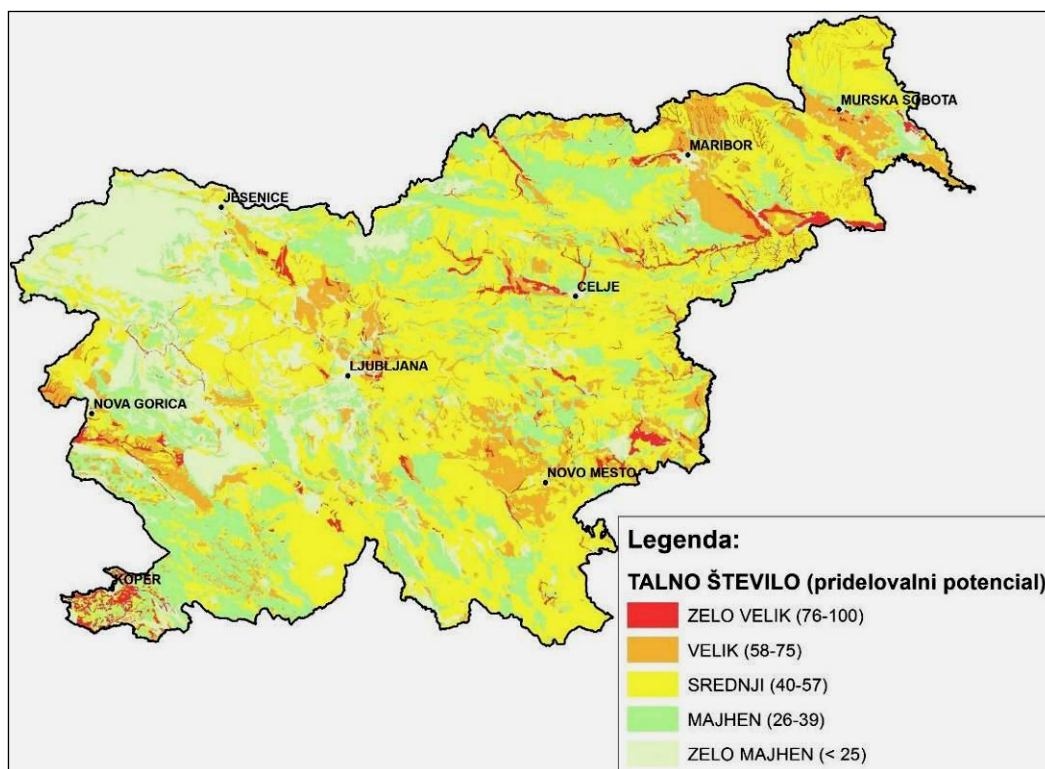
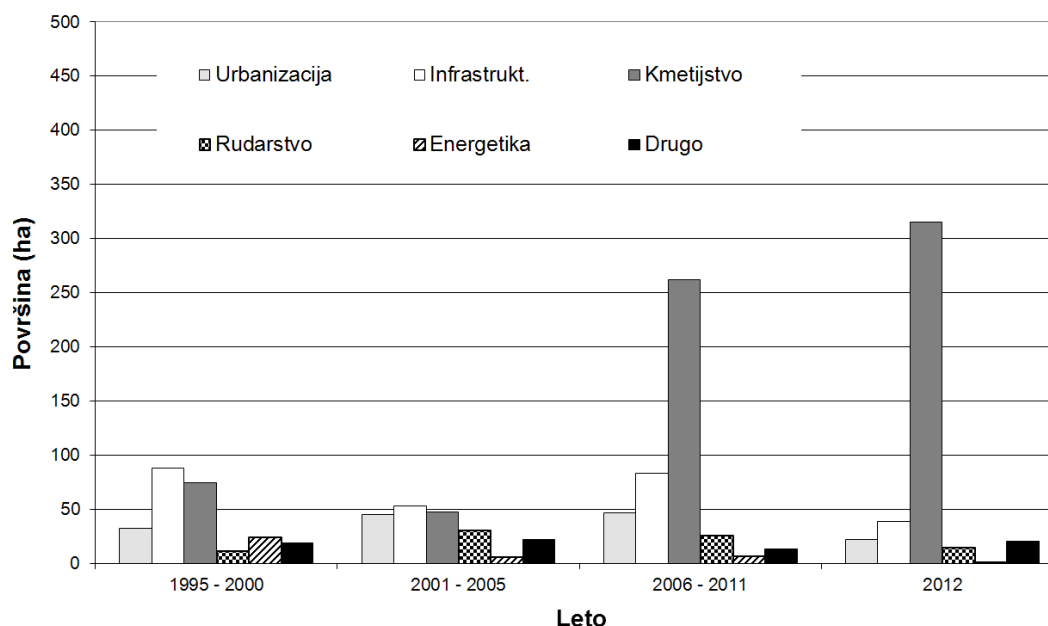


Figure 10 Soil potential index for Slovenia by category (Source: Faculty of Biotechnology, 2006)

#### Forest area and encroachment on forests

The data on forest area are taken from the Report of the Forest Service for 2012 (Forest Service , 2013). The increase in forest area or so-called overgrowing of abandoned agricultural land is ending in Slovenia after more than 130 years. Taking into account forest management plans of economic units made in recent years, forest area decreased two years in a row, to increase slightly again in 2012 by 157 ha to amount to 1,184,526 ha.. Some 58.4 per cent of Slovenia's territory is forested. The area of so-called commercial forests is 1,076,078 ha; protected forests comprise 98,947 ha and forest reserves 9,501 ha.

Contrary to the trend of overgrowing of remote land and land less appropriate for agriculture, strong pressure is being put on forest and forest land in suburban areas and areas of intensive farming. The structure of causes for encroaching on forests in 2012 is dominated by agriculture with 76%, followed by infrastructure (9 per cent) and urbanisation (5 per cent). Other categories were also relatively less important in 2012 in terms of area.



**Figure 11 Deforestation in 2012 and comparison with the average annual deforestation in previous periods (in ha) (source: Forest Service, 2013)**

#### Landslide hazard areas

A map of the probability of the occurrence of landslides shows areas with landslide potential for the whole of Slovenia in six categories of probability (Figure 12). There is no probability of landslides in the flat, central part of the municipality, which is primarily because of the small inclination of surfaces.

Less than 7 per cent of Slovenia accounts for areas where the probability of landslides is very high; 17 per cent of the country comprise areas where the probability of landslides is high and 10 per cent are areas with medium probability. All three categories combined make up a good third of Slovenia's territory where landslides are more likely to occur than in other areas. 28 per cent of Slovenia is covered by "flat" areas or areas with elevations below 5°. Due to the large scale of input data (1 : 250.000) a good 5 per cent of landslides occur in these areas, which were treated in analyses as errors. In smaller scales of analysis, the areas where these landslides occur would probably be detected as areas with landslide potential. 21 per cent of Slovenia is in areas where the probability of landslides is low and 17 per cent in areas where the probability of landslides is very low. The distribution of population by categories of probability of landslides implies a disregard for natural conditions in the selection of the living environment.



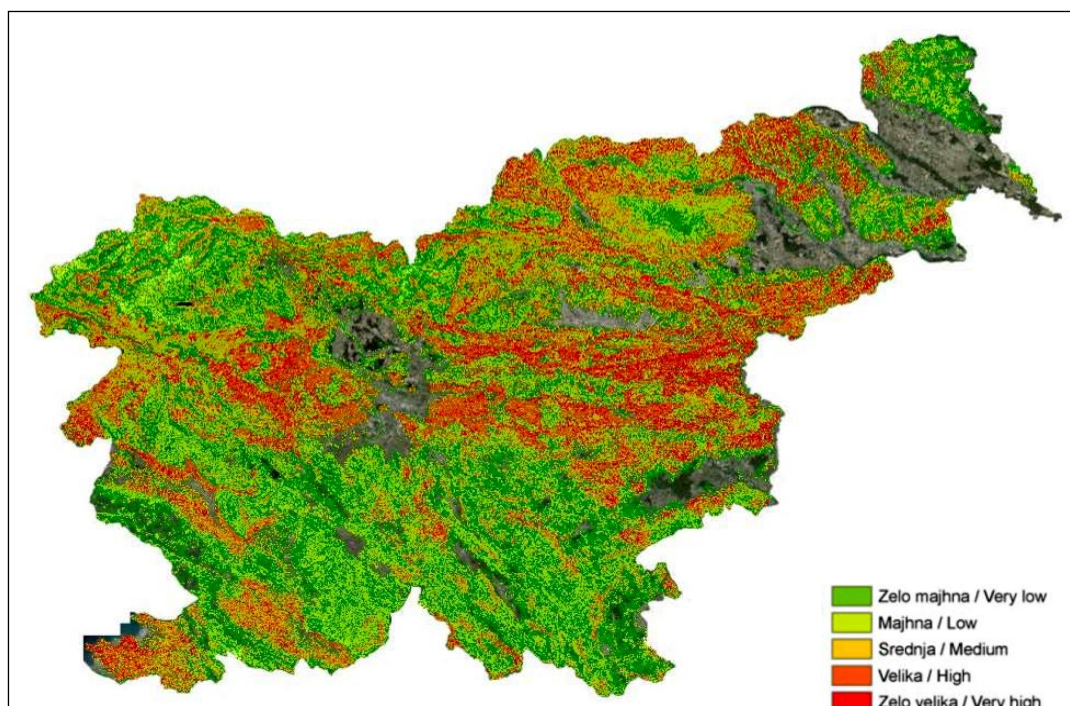


Figure 12 Map of probability of occurrence of landslides (Source: Geoportals ARSO, 2014)

#### Mineral resources

The construction, reconstruction and maintenance of transport infrastructure facilities generates large quantities of waste, primarily inorganic but also organic waste, which needs to be processed in an environmentally-friendly manner. Most waste in category 17 – “construction waste” – on the classification list of waste generated in the construction of new and upgrading of existing infrastructure is excavated earth, while the quantities of construction waste in a narrower sense in this sector are also exceptionally large.

Excavated earth is generated by development on soil and sub-soil, including developments on sea beds and river beds. The following excavated material is generated in the construction of new and upgrading of the existing transport infrastructure:

- soil and rocks, which usually contain less than 5 per cent of foreign matter with no natural origin (ballast substances),
- excavated material, which is usually construction filler, or excavated earth which contains construction filler to a large extent, and
- deposited debris, which is not relocated within the area of surface waters for the purposes of water management.

In 2012 in Slovenia around 576,000 tonnes of excavated earth were classified as waste, of which around 507,000 tonnes comprised freshly excavated earth and around 69,000 tonnes stored material excavated in previous years. Around 410,000 tonnes of this material were re-used, primarily to level terrain, as well as for the consolidation of ground on construction sites and for the construction of embankments. Only around 67,000 tonnes or around 7 per cent of excavated material, which was mainly not dangerously polluted material, was landfilled.

Data on excavated earth is uncertain, because excavated earth used on the construction site where it is generated is usually not classified as waste, which is especially the case in the construction of transport infrastructure. It has been assessed that a large share of all material excavated during the construction of facilities is used for special measures in construction engineering works and is not included in the specified quantities.



Around 10 machines for recycling rocks from excavated waste material were in use in Slovenia in 2012. Polluted excavated earth was not processed in 2012, while around 240 tonnes of excavated polluted material was deposited. More than 70 per cent of excavated earth in 2012 was re-used.

Construction waste (in a narrower sense) is waste material generated during the construction and reconstruction of transport infrastructure facilities and during demolition. A large share of construction waste originates from the demolition and reconstruction of building structures. Only around 10 per cent of such waste originates directly from the construction of new facilities. Construction waste includes primarily waste concrete and brick, which represent around 70 per cent to 90 per cent of the entire quantity of this waste. The remainder consists of wood, metal and various other types of construction site waste. Waste asphalt is also generated in the construction of roads.

The quantity of construction waste sent for processing in 2012 stood at around 461,000 tonnes. On average, almost all construction waste generated in the 2008-2012 period as well as a large share of excavated material was processed, where re-use as material or as a filler on construction sites is considered as processing.

### **Display of the state of the environment with selected indicators**

#### Land cover and land use [TPOI]

A description of indicator for 2008 is publicly available, while data for 2012 are being prepared. More recent data related to land use are provided in the chapter above.

More than half of the land territory of the country is covered by forests (56 per cent, or 58 per cent together with shrub forests), other natural vegetation (natural pastures, wetlands, aquatic areas and areas with little or no vegetation) accounts for 4 per cent, while 35 per cent of the surface is intended for farming, and slightly more than 3 per cent accounts for man-made areas. Such a picture of land cover and land use is shown by an interpretation of satellite images taken in 2006, under CORINE Land Cover (CLC2006) methodology.

The changes detected in Slovenia are relatively small and do not represent in any of the periods in question more than a good tenth of a percent of the entire territory (0.12 per cent between 1996 and 2000 and 0.13 per cent between 2000 and 2006). Meanwhile, built areas increased; areas intended for road infrastructure increased by a total of 603 ha between 1996 and 2006, while a predominant part of large construction sites (507 ha) opened after 2000 is also intended for the same purpose. Surfaces intended for industry and commerce increased by at least 86 ha. The biggest changes took place within the forest area category. Around two thirds of newly developed areas was previously covered by forest, and the remaining third was covered by agricultural land, of which 220 ha was continuous arable land, almost all of which was developed after 2000.

Forests are a predominant category in terms of land cover, but they are not equally distributed across the entire territory. Largest continuous forest areas cover the Dinaric-Alpine plateaus of southern and south-western Slovenia and the Alpine slopes in the north and west.

The land use categories "Agricultural land with small land holding structure" and "Predominantly agricultural land with large areas of natural vegetation" cover 14 per cent and 9 per cent of territory, respectively, which altogether amounts to almost a quarter of the entire territory of Slovenia. The category "Arable land" covers 112,237 ha, vineyards cover 15,723 ha and other permanent crop cover 3,627 ha, making a total of around 6.5 per cent of the entire territory of Slovenia. In the 1995–2000 period, the area of pastures increased, while the area of non-irrigated arable land, agricultural land with a small land holding structure and the category of predominantly agricultural land with large areas of natural vegetation slightly decreased. No major changes in area among agricultural land categories were recorded between 2000 and 2006.

There were no major encroachments on bodies of water or wetlands in Slovenia in this period, except for the natural transformation of intermittent lakes into pastures in the Planinsko polje field and into wetland on the Cerknica Lake.

*Extent of protective forest area (record on the extent is kept by the Forest Service)*

Protected forests are forests that protect the land from erosion and landslides, forests on steep slopes or water banks, forests exposed to strong winds, forests which in torrent areas withhold excessive outflows of water and protect land against erosion and landslides, strips of forest areas that protect forests and land against wind, water, snowdrifts and landslides, and forests near the upper tree line.

*Extent of the area of forests with wood production and protective functions as primary functions*

Data on the functions of forests in the entire territory of Slovenia is taken from the Summary of forest management plans and hunting management plans for the 2011-2020 period (Forest Service, 2012).

The functions of forests were re-evaluated during the updating of the sectoral plan for the 2011–2020 period in accordance with updated instructions. In comparison with the sectoral plan for the 2001–2010 period, the area with the biotope function and function of preservation of biodiversity changed the most. This area increased on the second level to 570,000 ha, which is a consequence of the inclusion of large parts of forest land in the Natura 2000 network in 2004.

On the first level, the area with the function of protection of forest land and stands (by 28,000 ha), the hydrological function (by 28,000 ha), protective function (by 13,000 ha) and tourism function (by 14,000 ha) increased the most. The increase in area is a consequence of an increase in forest area, supplemented expert criteria for eliminating functions from 2008 and new expert assessments. The area with the research function (by 7,000 ha) and the function of acquiring other forestry assets (by 7,500 ha) meanwhile decreased.

64 per cent of forests in Slovenia have a wood production function on the first level, while 15 per cent have the function of protection of forest land and stands on the first level (Table 5).

**Table 5 Forest areas with determined primary functions in Slovenia (in ha) (source; Forest Service, 2012)**

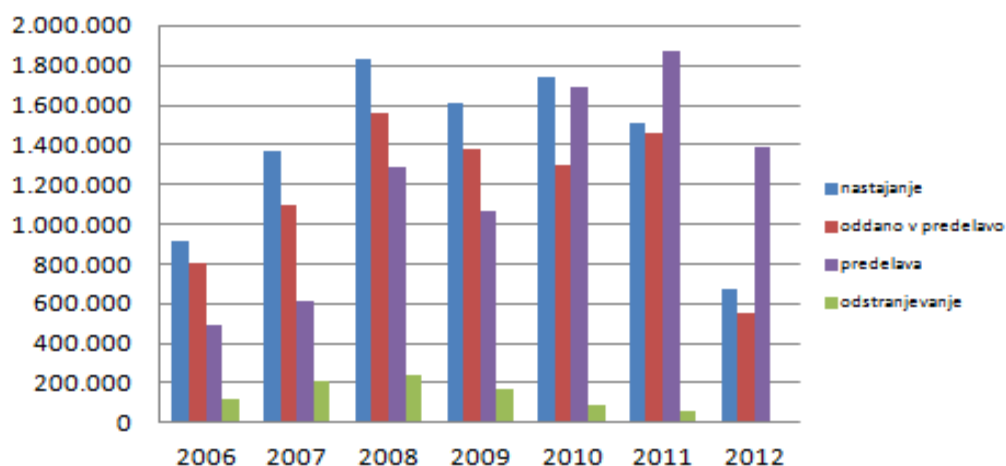
Funkcija	1. stopnja		2. stopnja		3. stopnja		Skupaj ha
	ha	%	ha	%	ha	%	
Varovanje gozdnih zemljišč in sestojev	190.941	15	309.039	25	737.873	60	1.237.853
Hidrološka	63.240	5	554.471	45	623.144	50	1.240.856
Biotopska	62.469	5	740.606	60	438.864	35	1.241.939
Klimatska	35.579	3	43.179	3	1.162.067	94	1.240.825
Zaščitna	27.105	83	5.390	17			32.496
Higiensko-zdravstvena	28.556	2	74.190	6	1.138.079	92	1.240.825
Rekreacijska	30.295	3	62.087	6	907.048	91	999.431
Turistična	30.800	2	30.208	2	1.178.758	95	1.239.766
Poučna	7.615	1	5.288	0	1.226.888	99	1.239.790
Raziskovalna	9.421	100	0	0	0	0	9.421
F. varovanja naravne dediščine	36.739	17	180.978	83	0	0	217.717
F. varovanja kulturne dediščine	5.376	3	165.241	97	0	0	170.617
Estetska	35.189	29	86.501	71	0	0	121.690
Obrambna	14.125	47	15.638	53	0	0	29.762
Lesnoproizvodna	740.328	64	302.934	26	112.609	10	1.155.871
F. pridobivanja drugih gozdnih dobrin	17.715	7	249.979	93	0	0	267.694
Lovnogospodarska	35.029	100	0	0	0	0	35.029

Construction waste [OD14]

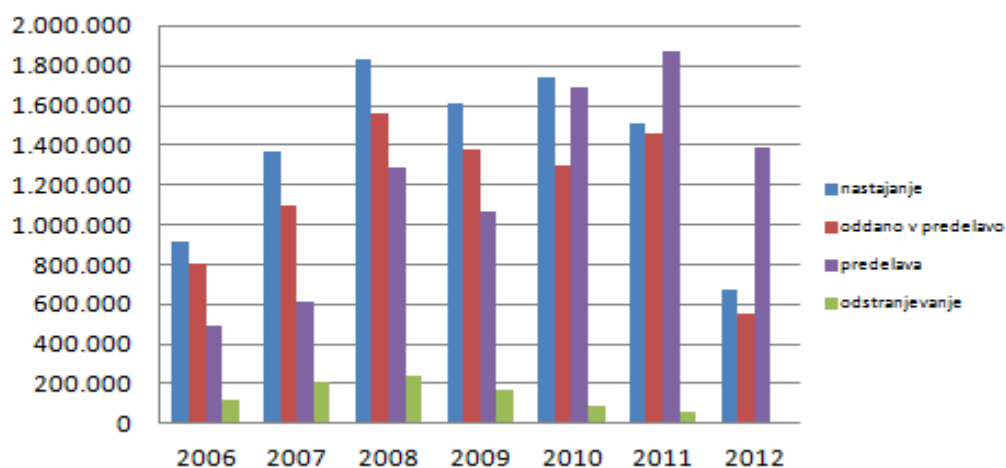
The processing of construction waste is monitored with the OD14 indicator, which shows annual quantities of construction waste, their management and their structure. The OD14 indicator has not been updated, and the most recent data on the processing of construction waste related to the period that ended in 2006. Instead of the OD14 indicator, which is the responsibility of the Environment Agency (ARSO), indicators of the Statistics Office of the Republic of Slovenia, evaluated and published as results of statistical research on waste, are used for the field of waste management. The Statistics Office carries out research in the field of waste in cooperation with the ministry responsible for the environment and with ARSO.

The figure below shows the management of construction waste (quantity of removed and quantity of processed waste) for the 2006 – 2012 period. (source: Statistics Office; statistical study on waste).

**vsi gradbeni odpadki - letna količina (t/leto)**



**vsi gradbeni odpadki - letna količina (t/leto)**



**gradbeni odpadki brez izkopov- letna količina (t/leto)**

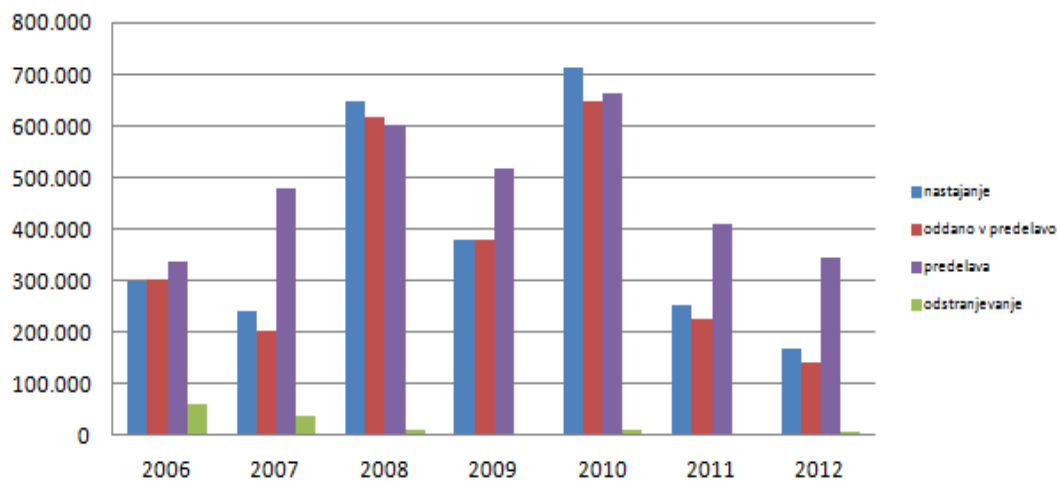


Figure 13 Management of construction waste for the 2006 – 2012 period (source: Statistics Office)

## 5.1.2 Air

### Current state

Road vehicles, ship engines, locomotives and aircraft are sources of air pollution in the form of gases and solid particles that impact air quality:

- nitrogen oxides (NO, NO<sub>2</sub>): emerge as by-products of incomplete combustion. They catalyze ozone, and are elements in acid rain and smog. They impact the natural cycle of nitrates, especially in water, where they impact algae formation.
- carbon monoxide: is a colourless and odourless gas that emerges from incomplete carbon monoxide combustion. It does not cause direct global effects, but as a catalyst it indirectly contributes to the greenhouse gas effect.
- sulphur dioxide: emerges as a consequence of the combustion of fossil fuels. It is the main ingredient of acid rain and also contributes to the greenhouse effect.
- particulates: are various solid particulates that can be found in the atmosphere: smoke, carbon black, dust and various aerosols. The emissions of primary particulates caused by transport emerge mostly due to the incomplete combustion of fossil fuels (carbon black) and friction (sweeping of dust particles from the road, and also due to tyre and brake disc use). Secondary particulates also emerge in large quantities due to transport emissions; these particles are formed in chemical reactions involving nitrogen oxides as nitrate aerosols or from sulphur dioxide as sulphate aerosols. Other toxic substances are also linked to air particles (e.g. HC and VOC). They mostly impact health (lungs, heart, cardiovascular system); deposits on leaves inhibit photosynthesis and plant growth.
- lead: is a toxic metal found in leaded fuel, especially in countries in development. Lead impacts the metabolism and accumulates in living tissues.
- hydrocarbons (HC) and vaporous organic compounds (VOC): occur as gases and emerge due to incomplete petrol combustion, during refuelling with petrol or evaporation from storage units. They can be found in smog; they catalyze ozone and are elements in acid rain.

The objectives for improving air quality are determined in the European legislation (Directive 2001/81/EC on national emission ceilings for certain atmospheric pollutants; the NEC Directive) and the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to the 1979 Convention on Long-range Transboundary Air Pollution. Managing and reducing emissions is also an objective of the National Environment Protection Programme, which contains several operational programmes with similar objectives. Its purpose is to ensure better ambient air by gradually reducing SO<sub>2</sub>, NO<sub>x</sub> and NH<sub>3</sub> emissions. Lower emissions would mean less ground-level ozone, acidification and eutrophication.

Slovenia has a relatively good regulation for pollutant emissions, for which ceilings have been determined on the basis of Directive 2001/81/E, which is shown in the table below.

**Table 6 Departures of pollutant emissions from national ceilings in the 2010 – 2012 period**

Departure of emissions from ceilings	NO <sub>x</sub>	NMVOG	SO <sub>2</sub>	NH <sub>3</sub>
<b>Emission ceilings for Slovenia</b>	45 kt	40 kt	27 kt	20 kt
<b>Departures in 2010</b>	- 1 %	- 14 %	- 64 %	- 13 %
<b>Departures in 2011</b>	+ 3 %	+ 2%	- 60 %	- 11 %
<b>Departures in 2012</b>	0 %	- 2%	- 62 %	- 12 %

Road traffic is one of the main sources of emissions of NO<sub>x</sub>, while emissions of PM<sub>2,5</sub> particulates in urban environments is a key factor in the pollution of ambient air in these areas.

Annual quantities of pollutant emissions from road traffic for the 2010-2012 period for which ceilings were determined are shown in the diagram below. The diagram shows emissions ceilings determined on the basis of Directive 2001/81/EC. (source: <http://www.eea.europa.eu/data-and-maps/data/data-viewers/air-emissions-viewer-lrtap>)

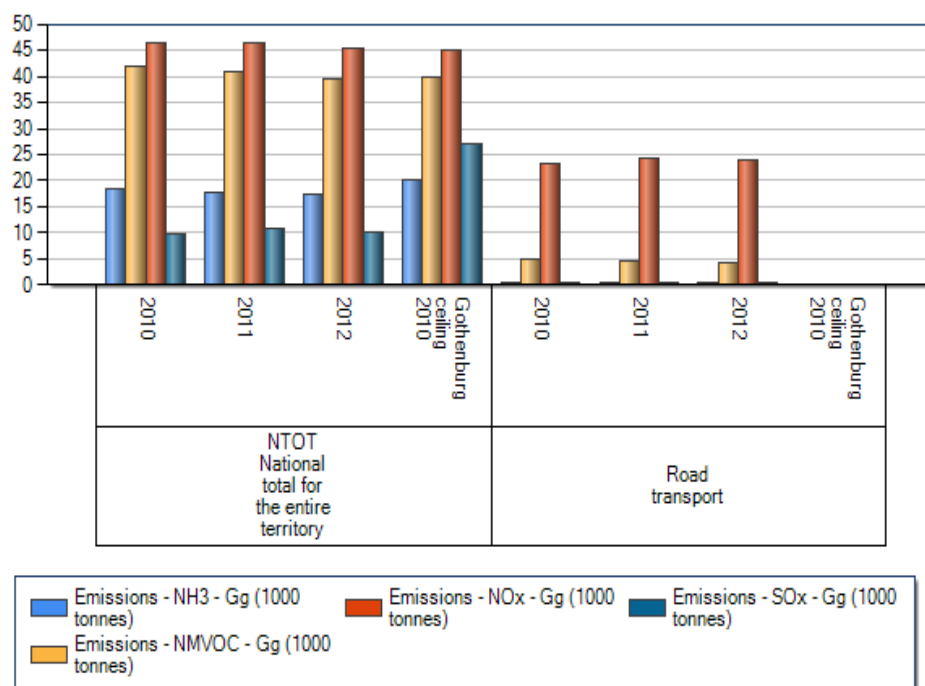


Figure 14 Total annual emissions of NOx and emissions of NOx from road traffic in Slovenia in the 2010 – 2012 period

### Display of the state of the environment with selected indicators

#### Emissions of gases that cause acidification [ZR09]

The indicator [ZR09] shows the movement of emissions of gases that cause acidification and eutrophication and the structure of emissions of individual gases in terms of the source of pollution in the 1990–2011 period. Substances causing acidification include sulphur oxides (SOx), nitrogen oxides (NOx) and ammonia (NH3). Nitrogen oxides and ammonia also contribute to eutrophication. Total emissions of substances that cause acidification and eutrophication are expressed as the sum of emissions of all three pollutants multiplied by the associated acidification factors. Emissions are shown as an acidification equivalent.

Emissions of substances that cause acidification in Slovenia in 2011 were 74 per cent lower than in 1990, primarily due to lower emissions of sulphur dioxide. Sulphur oxides are generated in the combustion of fuel which contains sulphur. These were reduced in the period in question by 95 per cent.

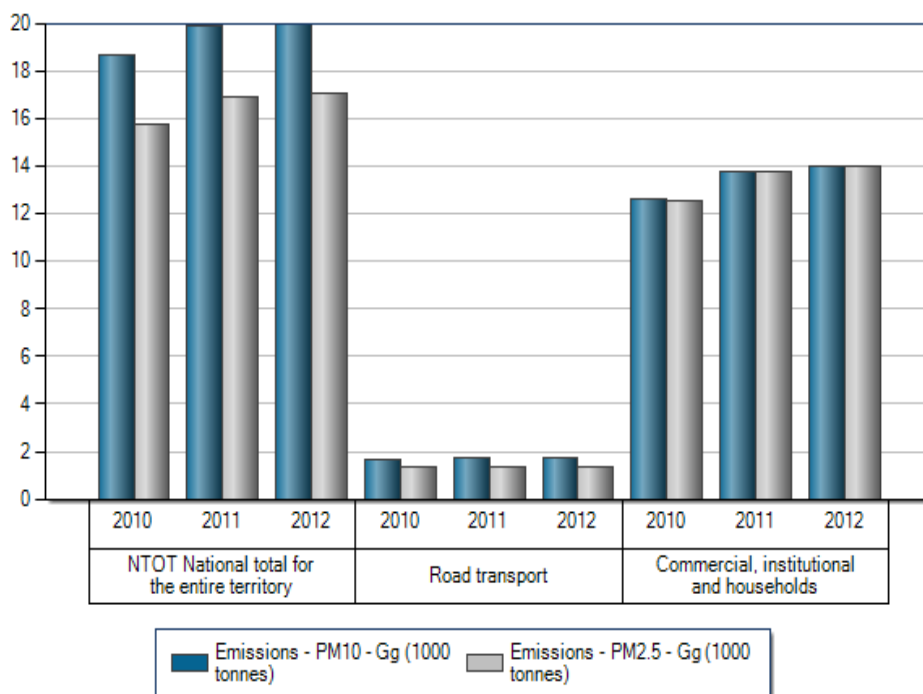
The biggest share of emitted substances that cause acidification and eutrophication in 2011 was represented by ammonia. The share of ammonia in total emissions was 43 per cent. The main source of ammonia is agriculture, which contributes as much as 93 per cent to total ammonia emissions in the country.

The share of nitrogen oxide emissions in total emissions of substances that cause acidification and eutrophication in 2011 was 42 per cent. The main source of nitrogen oxide emissions, according to data for 2011, was road traffic (54 per cent), followed by energy supply (24 per cent). Compared to 1990, NOx emissions were reduced by 25 per cent, mainly in traffic due to stricter emission standards for motor vehicles, the implementation of measures in thermal power-plants and heating plants, as well as the replacement of fuel and improvement of combustion processes in industry. Values of

emissions of nitrogen oxides for 2011 are only 1 per cent lower than the target value, which must not be exceeded from 2010 onwards. Emissions of nitrogen oxides do not depend only on nitrogen content in fuel, because they are primarily a product of the reaction between nitrogen and oxygen in the air during combustion at high temperatures.

Emissions of particulates in the air [ZR15]

The indicator shows the movement of emissions of total suspended particulates (TSP), primary particulates smaller than 10 µm (PM10) and primary particulates smaller than 2.5 µm (PM2.5) into the air in the 2000-2011 period, and the structure of particulates in terms of various sources of pollution. Traffic is not the main source of emissions of particulates, but its contribution to the pollution of ambient air in the urban environment is almost equal to the share of emissions of particulates from heating units in residential and other buildings. A comparison of emissions of particulates from traffic with emissions of particulates from the general sector and households is shown in the diagram below for the 2010 – 2012 period (source: <http://www.eea.europa.eu/data-and-maps/data/data-viewers/air-emissions-viewer-lrtap>)



**Figure 15 Annual emissions of particulates from traffic and from the general sector and households in Slovenia in the 2010 – 2012 period**

Emissions of ozone precursors [ZR10]

The indicator shows the movement of emissions of gases that cause the production of ground-level ozone in the 1990–2011 period and the structure of emissions of individual gases in terms of the source of pollution. An ozone precursor is a substance that contributes to the production of ground-level (tropospheric) ozone. Among the ozone precursors are: nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), methane (CH<sub>4</sub>) and non-methane volatile organic compounds (NMVOC).

The main source of total emissions of ozone precursors in 2011 was traffic (43 per cent), followed by the consumption of fuel in households and the commercial sector (24 per cent) and the use of solvents and other products (11 per cent). The contribution from industrial processes, agriculture and waste management is small.

The main source of emissions of nitrogen oxides in 2011 was traffic (63 per cent). Contributing the most to emissions of nitrogen oxide was the consumption of fuel in households and the commercial sector (63 per cent). The main source of methane emissions was agriculture (54 per cent). Emissions of non-methane volatile organic compounds are mainly a consequence of the use of solvents (34 per cent) and the consumption of fuel in households and the commercial sector (34 per cent).

### 5.1.3 Climate factors

#### Current state

##### 5.1.3.1 Adaptation to climate change

As part of the project "Climate changeability in Slovenia", which has been implemented by the Environment Agency since 2009 for the purpose of examining the quality and validity of all climatologic measurements and establishing and eliminating major influences of changes to measuring points in time series, climate changes in Slovenia in the past sixty years have been analysed. Certain intermediate results are already known, which already give an impression of how the climate in Slovenia is changing:

- an increase in air temperature is characteristic of all areas of Slovenia,
- the increase in temperature is higher in urban areas than in rural areas,
- the increase in temperature is mainly a consequence of global climate change,
- the number of warm days has increased and the number of cold days has decreased,
- precipitation in autumn is higher and usually drops in other seasons,
- the height of new snow cover and duration of snow cover have decreased.

It is harder to prove a connection between the number, or intensity, of extreme precipitation events with the phenomenon of higher temperatures, because the period of measurement is frequently too short for an analysis of results to make an analysis of changes in frequency of such events statistically reliable. Despite the problems with analysis, it is characteristic of measuring points in Ljubljana, that contrary to the total amount of precipitation in past decades, precipitation during extreme events has been increasing (source: <http://meteo.arso.gov.si/uploads/probase/www/climate/text/sl/publications/spremenljivost%20podnebnja.pdf>).

The functioning of transport infrastructure is very sensitive to extreme climatic events. The transport network in Slovenia is especially sensitive to extreme precipitation events due to floods, snow on roads and problems in traffic caused by ice. Due to the consistent consideration of the geo-mechanical properties of land in the construction of roads, the transport network in Slovenia is less sensitive to landslides, which usually occur during extreme precipitation events.

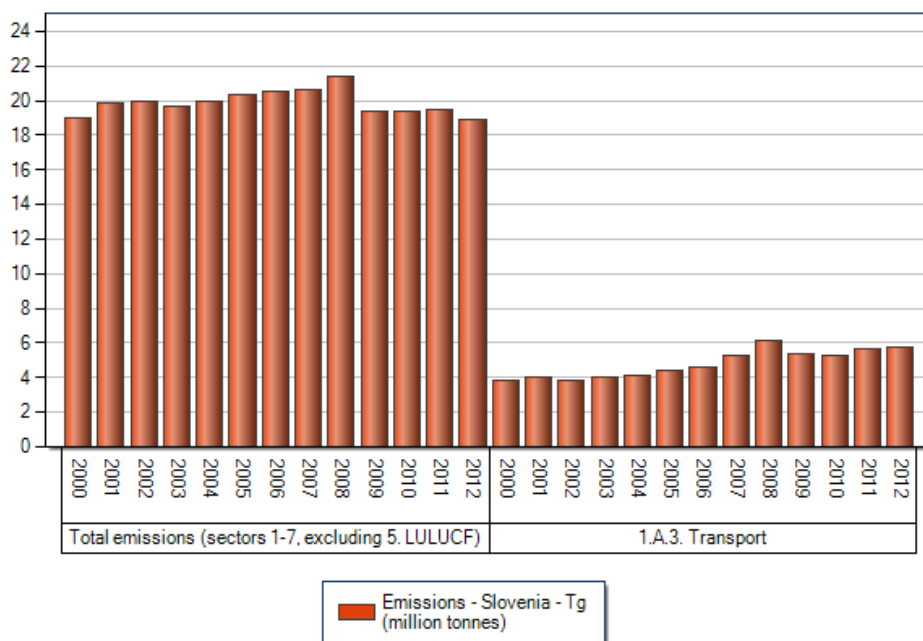
##### 5.3.3.2 Climate change mitigation

The available data show that Slovenia fulfilled its obligation arising from the Kyoto Protocol, and reduced GHG emissions in the 2008–2012 period by more than 8 per cent considering the starting emissions, whereas the increase in emission sinking due to forest management and the introduction of EU-ETS was considered. In Slovenia, GHG emissions in the base year 1986 were 20.35 million tonnes of CO<sub>2</sub> equivalent; an 8 per cent reduction means that emissions in Slovenia between 2008 and 2012 did not exceed an average of 18.73 million tonnes of CO<sub>2</sub> equivalent per year.

In the structure of greenhouse gas emissions for 2011, the greatest share is represented by CO<sub>2</sub> (82.9 per cent), with the main source being generation of electricity and heat, followed by transport. CH<sub>4</sub> represents 10.1 per cent, with agriculture and waste management being the main sources. N<sub>2</sub>O contributes 5.7 per cent, with agriculture being the main source. Emission of F-gases (HFC, PFC and SF<sub>6</sub>) represent 1.3 per cent of total emissions, with industrial processes being the main source.



The diagram of Figure 16 shows greenhouse gas emissions from traffic in comparison with total greenhouse gas emissions in Slovenia, i.e. emissions from sectors to which Decision 406/2009/EC applies, and sources of greenhouse gas emissions included in the emission allowance trading scheme in accordance with Directive 2009/29/EC. (source: <http://www.eea.europa.eu/data-and-maps/data/data-viewers/>)



**Figure 16 Greenhouse gas emissions from traffic compared to total greenhouse gas emissions in Slovenia in the 2000 – 2012 period**

Among the emissions from sectors subject to Decision 406/2009/EC on the effort of Member States to reduce their greenhouse gas emissions to meet the Community’s greenhouse gas emission reduction commitments up to 2020, the transport sector had the highest share in 2011 at slightly less than 50 per cent, followed by fuel consumption in households and service industries with 17.0 per cent and agriculture with 16.5 per cent. The structure of greenhouse gas emissions from these sectors for 2011 and their envisaged structure in 2020 relative to the rate of implementation of measures to reduce greenhouse gas emissions, as envisaged in the draft Operational Programme for Reducing Greenhouse Gas Emissions until 2020 with a vision until 2030, is shown in more detail in the diagram of Figure 17 (source: draft Operational Programme for Reducing Greenhouse Gas Emissions until 2020 with a vision until 2030, Energy Efficiency Centre of the Jožef Stefan Institute, Agricultural Institute).

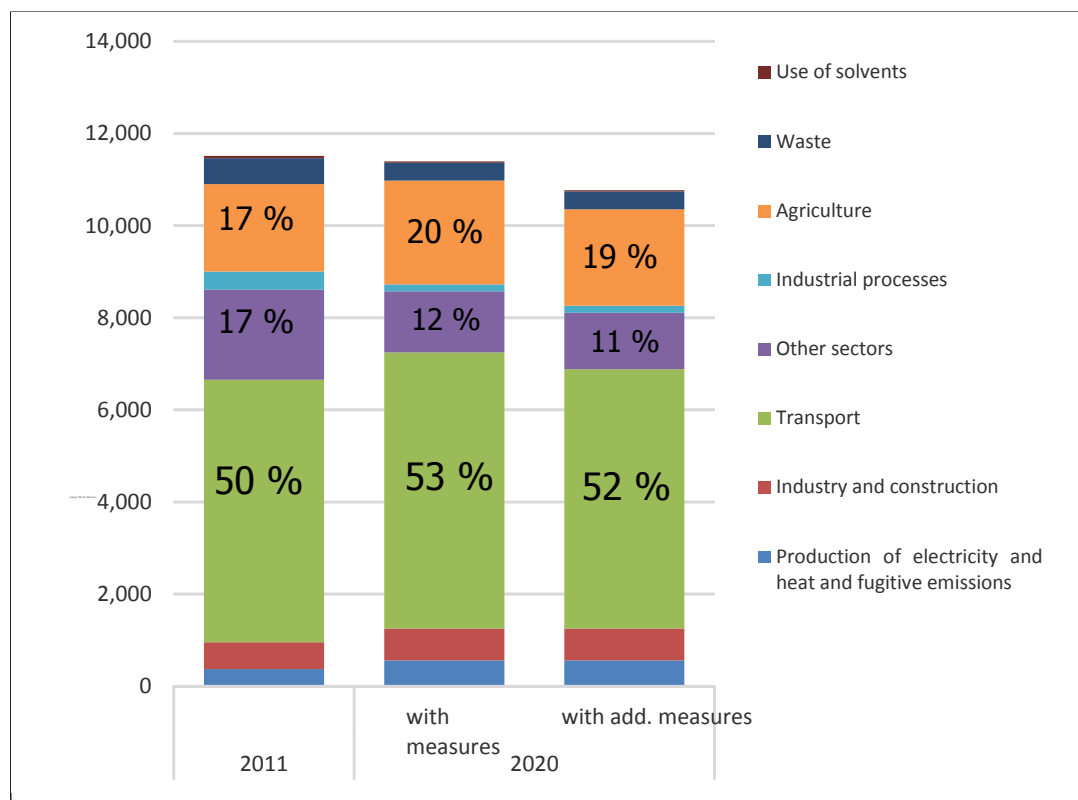


Figure 17 Structure of greenhouse gas emissions from sectors covered by Decision 406/2009/EC in 2011 and 2020 with two levels of the implementation of measures

## Display of the state of the environment with selected indicators

### Greenhouse gas emissions [PS03]

The indicator shows the movement of greenhouse gas emissions, main sources of emissions in Slovenia and a comparison with the European Union member states. Greenhouse gas emissions are calculated in accordance with IPCC methodology, which enables international comparisons of data. Emissions are calculated for sources such as traffic, energy sector, industrial processes, fuel in industry, fuel in households and commercial use, agriculture, waste. The use of, and changes in the use of, land and forestry form a special category.

### 5.1.4 Water

#### Current state

Four types of landscape meet on Slovenian territory: the Alps, the Dinaric Alps, the Pannonian Plain and the Mediterranean, which gives Slovenia landscape diversity, varied geological ground composition and diverse terrain. This diversity is also reflected in all forms of surface water, from torrents, small rivers, streams and rivers to subterranean rivers, springs, lakes and the sea.

There are two drainage basins in Slovenia: the Adriatic Sea basin and the Danube River basin. The Danube River basin covers 81 per cent of Slovenian territory, while almost a fifth of the territory belongs to the Adriatic Sea basin. Basic hydrogeographic units are separated by the main rivers into the Mura River basin (Pomurje), the Drava River basin (Podravje) and the Sava River basin (Posavje) with the Kolpa River (Pokolpje), and the catchment areas of the Soča River (Posočje) and other Adriatic rivers.

Surface water: Although Slovenia is a small country; it abounds in various types of watercourses which are the result of diverse geological ground composition and diverse terrain. The hydrographic

network is relatively dense; in some place regular or occasional flooding occurs, while certain parts face a lack of water and drought, which is mainly the consequence of the large difference in the quantity of precipitation between the western and eastern areas of Slovenia.

Ecological status of surface waters – watercourses

The first assessment of the ecological status of watercourses pursuant to the Water Framework Directive was prepared within the scope of the Water Management Plan preparation. The assessment was prepared for the period between 2006 and 2008. To summarise the data for the entire territory of Slovenia for the aforementioned period: 59 (38 per cent) surface waters do not achieve a good ecological status or good ecological potential. Two bodies of water (1 per cent) were classified as very poor (the Kamniška Bistrica River between Študa and Dol and the Cerknjščica Stream), seven (5 per cent) as poor (the Pivka River between Prestranek and Postojna Cave, the Sotla River between Dobovec and Podčetrtek, the Rinža River, the Meža River between Črna na Koroškem and Dravograd, both bodies of water of the Kobiljanski potok Stream and the Koren Stream) and 50 (32 per cent) as having a moderate ecological status or moderate ecological potential. Environmental targets are achieved by 80 bodies of water (52 per cent), 11 (7 per cent) of which are classified as very good and 69 (45 per cent) as good (ARSO, 2010). The final assessments (the final status with level of confidence) on the ecological status of watercourses after 2008 have not been prepared yet.

Ecological status of surface waters – standing waters

In 2012, Lake Bohinj stood out in terms of quality and very good ecological status. On the other hand, eight lakes or retention basins did not meet the criteria for a good ecological status or good ecological potential in 2012, i.e. Lake Bled, and the Velenjsko and Družmirsko lakes, and retention basins of the Šmartinsko, Perniško and Slivniško lakes, and Mola and Vogršček. The most frequent reason for not achieving a good status was the lack of oxygen, which is the result of intensive eutrophication. The Velenjsko, Družmirsko and Perniško lakes were overburdened with special pollutants. The Ledavsko and Gajševsko lakes, which in addition to the Perniško lake are most burdened with nutrients, corresponded to the applicable criteria for good status (ARSO, 2013b) in 2012. More recent assessments have not yet been prepared.

Chemical status of surface waters – watercourses: the data from ARSO show that the chemical status of rivers was assessed at 85 monitoring points in 2009. A good chemical status was established for more than 95 per cent or 81 monitoring points on rivers, while a poor chemical status was established for 4 monitoring points (less than 5 per cent). A poor chemical status was established at the body of water of the Polskava Stream between Zgoranja Polskava and Tržec and the Sava River between Litija and Zidani Most due to their exceeding environmental standards regarding mercury. The sources of mercury in the Polskava Stream are emissions from industry. The increased concentration of mercury at the Boben Hrastnik monitoring point is the result of an old burden, i.e. the resuspension of mercury and sediment, and not the result of new emissions. The poor chemical status of the Krka River between Soteska and Otočec and the retention basin of Lake Ptuj was established due to their exceeding environmental standards for tributyltin compounds. Emissions of tributyltin compounds were recorded on the Drava River at the Maribor Wastewater Treatment Plant, while no emissions of tributyltin compounds were recorded on the Krka River. The latest data from ARSO show that the chemical status was assessed at 81 monitoring points on rivers in 2010, which included monitoring points with a poor status in 2009, with parameters which were the reason for the poor chemical status, except for Boben, an old burden. a good chemical status (ARSO, 2012) was established at all monitoring points.

Assessments of the chemical status of watercourses after 2010 have not been prepared yet.

Chemical status of surface waters – standing waters: in 2012, the chemical status was established in all retention basins in north-eastern Slovenia and the retention basin of Vogršček. The level of mercury and other heavy metals was established in the Šmartinsko and Perniško lakes at monthly intervals, while in other retention basins, the presence of organochlorine, triazine and other pollutants was analysed during the period of greatest use of plant protection products. In 2012, no concentrations of pollutants which determine the chemical status exceeding environmental standards stipulated by the Decree on surface water status (Official Gazette of the Republic of Slovenia, no. 14/2009) were

established, which indicated the good chemical status of all lakes and retention basins where measurements were carried out (ARSO, 2013b). Assessments of the chemical status of standing waters after 2012 have not been prepared yet.

Groundwater: according to the latest data from ARSO, a total of 21 bodies of water were included in the state monitoring of groundwater. The Savinja Basin (VTPodV\_1002), the Drava Basin (VTPodV\_3012) and the Mura Basin (VTPodV\_4016) had a poor chemical status (exceeded limit values for atrazine, destil atrazine, pesticides and nitrates) was established, while a good chemical status was established for other bodies of water (Source: ARSO, 2013a).

Groundwater in karst and fissured aquifers, which account for approximately 50 per cent of groundwater supply, is less burdened with pesticides and nitrates due to lower population density and less agricultural land. A good chemical status with high or medium level of confidence was established for these bodies of water. Water protection areas in Slovenia cover around 4,491 km<sup>2</sup>, which is approximately one fifth of Slovenian territory. An even larger area is covered by potential water sources. Special attention should also be paid to karst waters, due to their vulnerability or limited self-cleaning ability.

Sea: the Slovenian coast is the shortest coastline, measuring only 46.6 km in length. It borders the Italian coast to the north, and Croatia with the Dragonja River to the south. The territorial waters of the Republic of Slovenia measure slightly more than 300 km<sup>2</sup>. The greatest and most frequent potential pollutant from ships/tankers is oil, which is also one of the main energy sources (40 per cent of total global energy consumption). The greatest problems are sudden spills of large quantities of oil and oil derivatives over small limited areas such as the Gulf of Trieste and the Northern Adriatic.

Within the Initial assessment of marine waters in the responsibility of the Republic of Slovenia (MKOb, 2013) prepared during the preparation of the Marine Environment Management Plan, a status assessment was provided for eight biological elements. The status of phytoplankton was assessed as good with high reliability, while the good status of macroalgae, sea grass, invertebrates and fish of the coastal area was determined with medium reliability. The status of zooplankton was assessed on the basis of two elements: on the basis of the mesozooplankton biomass, the status was assessed as good, while on the basis of the occurrence of the moon jelly, the status was not assessed as good. Despite the generally good assessment, locally polluted or brownfield areas can still be found on the coast, which points to the poor status of certain biological elements.

Within the Study of the impact of spills into the sea on the quality of sea sediments (ERICo, 2014), the level of pollution of sea sediments from three port pools was defined. The results of the measured levels of parameters showed that none of the sediment samples from the port pools could not be characterised as hazardous waste.

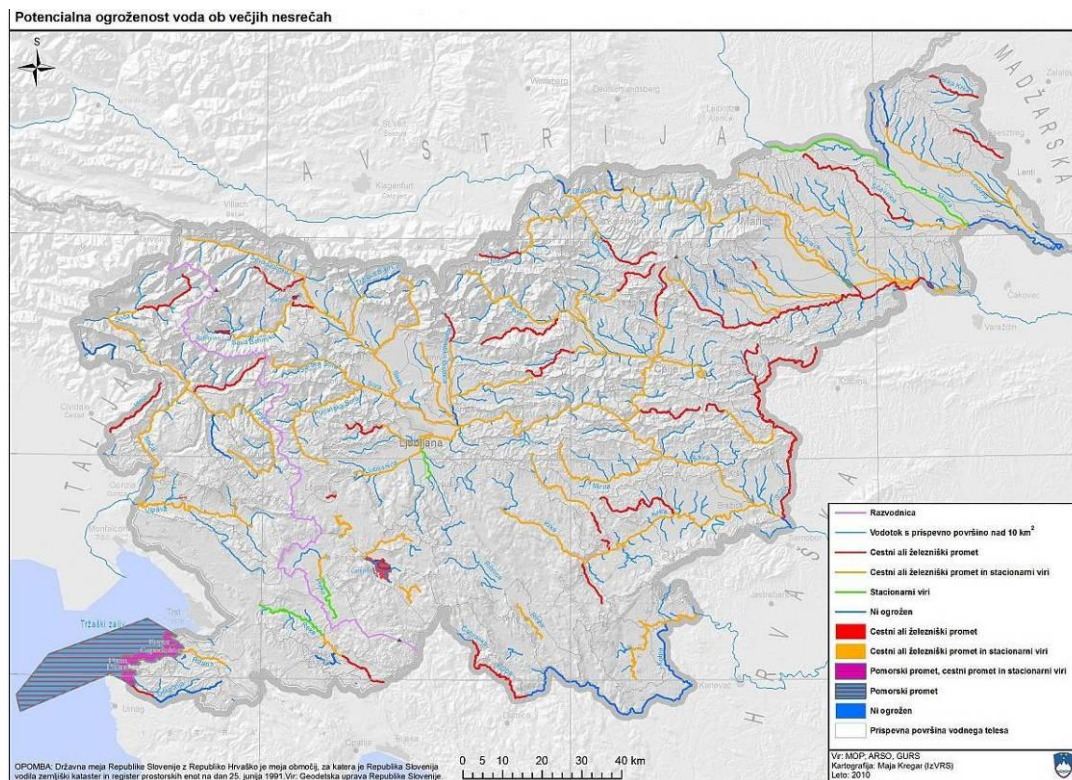
### **Display of the state of the environment with selected indicators**

#### Potential risk to waters in the event of accidents during the transport of hazardous substances

Transport of hazardous substances may be divided into road, rail, air and maritime transport. The potential for major accidents polluting bodies of water is assessed in view of the proximity of busy roads and railways, and the intensity of maritime transport. Potential risks to waters in the event of major accidents are shown on the map below. (Source: Water Management Plan, 2011)

- *Potential risk to waters in the event of accidents during the transport of hazardous substances in the Danube River basin:* The analysis of the Danube River basin shows that there are no busy routes in the surroundings of 14.9 per cent of surface waters. The areas of all other bodies of water are at risk of an incident spill due to accidents in road (63.6 per cent) or road and rail (21.5 per cent) transport.

- Potential risk to waters in the event of accidents during the transport of hazardous substances in the Adriatic Sea drainage basin:* The analysis of the Adriatic Sea basin shows that there are no busy routes in the surroundings of 38.2 per cent of surface waters. The areas of all other bodies of water are at risk of an incident spill due to accidents in road (29.4 per cent), road and rail (17.6 per cent), maritime (11.8 per cent) or maritime and road (2.9 per cent) transport.



Potential risk to water in the event of major accidents

- Watershed
- Watercourse with catchment area larger than 10 km<sup>2</sup>
- Road or rail transport
- Road or rail transport and stationary sources
- Stationary sources
- Not at risk
- Road or rail transport
- Road or rail transport and stationary sources
- Maritime transport
- Not at risk

Figure 18 Potential risk to waters in the event of major accidents (Source: WMP, 2011)

### Water protection areas

Water protection areas covering approximately 4,491 km<sup>2</sup> have been adopted or proposed as water sources for public use in Slovenia, which is approximately 22 per cent or one fifth of the territory. An even larger area is covered by potential water sources. The area with captured and potential water sources comprises over half of Slovenian territory. A map of water protection areas can be found in Chapter 5.2.

### Vulnerability of aquifers

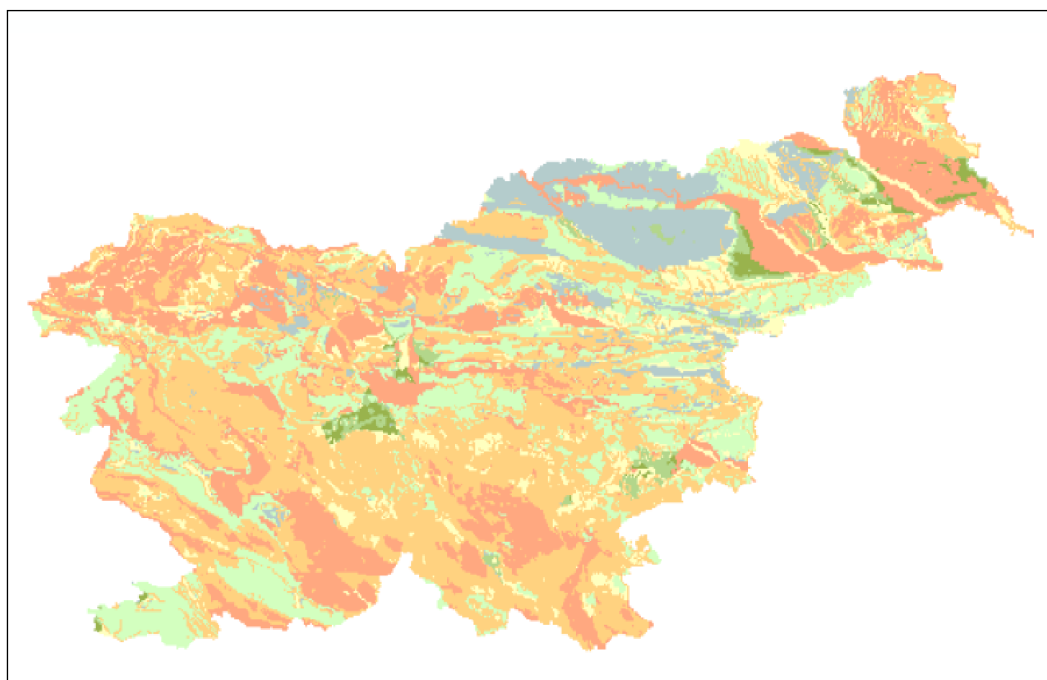
Significant quantities of groundwater occur in geological layers in the entire Danube River basin and the Adriatic Sea basin. Groundwater can be found in various aquifers:

- aquifers which are predominantly porous (predominant unconsolidated sediments);

- fissured aquifers, including karst aquifers (fissured and massive geological layers); and
- smaller porous or fissured aquifers or geological layers without significant groundwater sources. (Source: Water Management Plan, 2011)

In terms of vulnerability, aquifers are divided into six levels: from I, very low vulnerability, to VI, extremely high vulnerability. The vulnerability map prepared by the Geological Survey of Slovenia (Figure 19) shows the specific vulnerability of aquifers to the spread of pollution. The assessment was made on the basis of the expected speed of the groundwater current in cover geological layers. In geological layers with the highest vulnerability, pollution may be expected to reach the surface of groundwater and move towards the source of groundwater. In geological layers with low vulnerability, a slower transfer of pollution is expected, which reduces the impact on groundwater as the process of degradation is more or less effective. Aquifers with the highest vulnerability are found in larger numbers in the Karst and Gorenjska regions (fissured and karst aquifers), and in the alluvial plains of the Drava and Mura rivers (alluvial aquifers).

The basic purpose of the map is to assess the ratio between burdening and impact at the national level. The general map is intended for a regional review and planning as support for optimising the protection of existing and potential water sources against potential pollution. On the map below, aquifers with extremely high vulnerability levels are shown in red.



**Figure 19 Vulnerability map of aquifers in Slovenia (Source: Geological Survey of Slovenia, 2014)**

Accidents in which large quantities of hazardous substances are spilt, most frequently of oil or oil derivatives, occur quite frequently. According to the data from the Administration of for Civil Protection and Disaster Relief, there were 240 accidents involving hazardous substances in road transport, 7 in rail transport and 1 in maritime transport in 2003 and 2004; 2005 was marked by sea pollution. The Port of Koper witnessed two major accidents – a spill of phosphoric acid during transshipment and a spill of a large quantity of oil from a ship. The latter was assessed as the worst marine pollution in Slovenia in the last 20 years (Urbančič and associates, 2010).

#### Bathing waters

The list of bathing waters in the Danube River basin includes a total of 20 bathing waters, of which 30 per cent are located in the upper part of the Sava River basin (bathing waters in Lake Bled and Lake



Bohinj, and in the Šobec Pond) and 70 per cent in the lower part of the Sava River basin (bathing waters in the Krka and Kolpa rivers). The list of bathing waters in the Adriatic Sea basin includes a total of 28 bathing waters, of which 25 per cent are located in area of the Soča River basin (bathing waters in the Idrijca, Nadiža and SOča rivers) and 75 per cent in the sea basin (21 bathing waters in the sea) (Source: Water Management Plan, 2011). Bathing waters are displayed Chapter 5.2.

#### Flood areas

Floods threaten more than 3,000 km<sup>2</sup> or just under 15 per cent of the country's territory; half of the flood areas are located in the Sava River basin, 40 per cent in the Drava River basin and 4 per cent in the Soča River basin. Torrent ravines, valley floors and built alluvial plains are especially at risk. Floods that occur due to tidal and karst floods are less extensive. In some flood areas, meadows and pastures have been converted to cultivated land, while some locations were built up. In 1991, 7 per cent of Slovenia's population resided in an area of normal flooding, while one quarter of the population reside on so-called major flood areas (ARSO, 2014).

A rise in the sea level by 1 mm/year was also recorded. Between 1960 and 2006, the sea level reached flood point (300 cm) 306 times. Frequent sea flooding occurs in autumn and winter, and occasionally, in spring, and the number is rising. The most extensive flood area is in the Municipality of Piran. 2.5 per cent of the population of coastal municipalities is at risk in the event of extreme floods (ARSO, SOER. Report on the status of the environment in Europe 2010 – Slovenia's contributions). Flood areas are shown in Chapter 5.2.

### **5.1.5 Nature**

#### **Current state**

##### Biodiversity

Despite its modest size, Slovenia has an abundance of diverse species, with a large number in a small area. On a global scale, it has one of the most biodiversified underground systems, and with more than 58 per cent of forest cover (with well-preserved species), is one of the most forested countries in Europe.

Some 3,266 various indigenous taxa of tracheophytes and phanerogams have been described in Slovenia; their basic character is defined with Alpine and Central European floral elements, and Pannonian, Dinaric and Mediterranean species. There are many endemic plants (66 taxa, 22 are unique to Slovenia) that grow in a very small area and nowhere else in the world. Parts of western Slovenia (majority of the Alps and the Slovenian sub-Mediterranean area with Karst and parts of Istria) are significantly more diverse than the central and eastern parts. Western parts have approximately 140 km<sup>2</sup> of surface area in four quadrants that together form the basic field which is home to 800 or more taxa. Between 13,000 and 15,000 species are registered in Slovenia, of which 4000 are endemic (primarily underground animals) (Hlad and Skoberne, 2001). This is home to species with highly diverse areas of geographical distribution (eastern European, Eurasian, western European, Mediterranean and numerous endemic species of the western Dinarides). The abundance of species is particularly found in invertebrate groups; and among vertebrate groups, an important (vital) portion of the population of some European or the world's most endangered charismatic species is present in this area.

##### Protected areas

Slovenia encompasses 354 areas of Natura 2000, of which 323 areas are determined on the basis of the Habitats Directive (a total area of 6,639 km<sup>2</sup> or 32.1 per cent of Slovenia's territory); 31 areas (total area 5,077 km<sup>2</sup> or 24.6 per cent of Slovenia's territory) are determined on the basis of the Birds Directive. The number of species under the Habitats Directive is 114, and 118 under the Birds Directive, while the number of qualification habitat types is 60. The Natura 2000 network is fragmented, constituting a group of disconnected islands, which should be connected (in terms of the green infrastructure system) (Green Infrastructure, 2007).

Currently, Slovenia encompasses: 1 national park, 3 regional parks, 44 landscape parks, 1 strict nature reserve, 54 nature reserves, 1,162 natural monuments and 119 monuments of a designed nature (ARSO, 2013). 268,662 ha are protected, which is 13.3 per cent of Slovenian territory. In accordance with the objective of the Resolution on National Environmental Action Plan 2005–2012 (Official Gazette of the Republic of Slovenia, no. 2/06): ‘Increasing the share of different categories of protected areas by 10 per cent – to 22 per cent of the Slovenian territory by 2014’ which has not yet been attained, the area protected areas is expected to increase.

The areas in Slovenia designated as Ramsar wetlands are: Lake Cerknica and its surroundings (ID 1600), the Sečovlje Saltworks (from ID 586) and Škocjan Caves (ID 991). The main objective of the Ramsar Convention is to conserve wetlands, especially wetlands of international importance, through wise use, international cooperation and protection.

Due to their exceptional importance for natural world heritage, Škocjan Caves were added to UNESCO's list of natural and cultural world heritage sites (reference number 390). They are a unique natural monument in the area of the classic Karst, where the Reka River has formed an extraordinary mix of caves, collapsed dolines, sinks and one of the largest subterranean canyons in Europe at the contact point where flysch and limestone meet. Protected areas are shown in Chapter 5.2.

#### Valuable natural features

The Rules on the designation and protection of valuable natural features have designated 2,743 valuable natural features/areas, and 5,885 valuable natural features/sites, and 9,083 valuable natural features/caves. The total area of all polygons is 266,951.34 ha, 13.2 per cent of the country's territory. In terms of surface, the largest geomorphological valuable natural features are the Pokljuka and Jelovica plateaus, followed by the Nanos thrust-fold mountain and the Karst Rim. Valuable natural features are shown in Chapter 5.2.

#### Important ecological areas

Slovenia encompasses 275 important ecological areas and 32 caves designated as important ecological areas. Important ecological areas cover 1,372,261.53 ha or 67.7 per cent of Slovenian territory. The majority of important ecological areas is covered by the central part of the habitat of large carnivores, the Julian Alps and the Kočevsko region. This ecologically important area overlaps with the central habitat of brown bear. Important ecological areas are shown in Chapter 5.2.

#### Dense forest stands

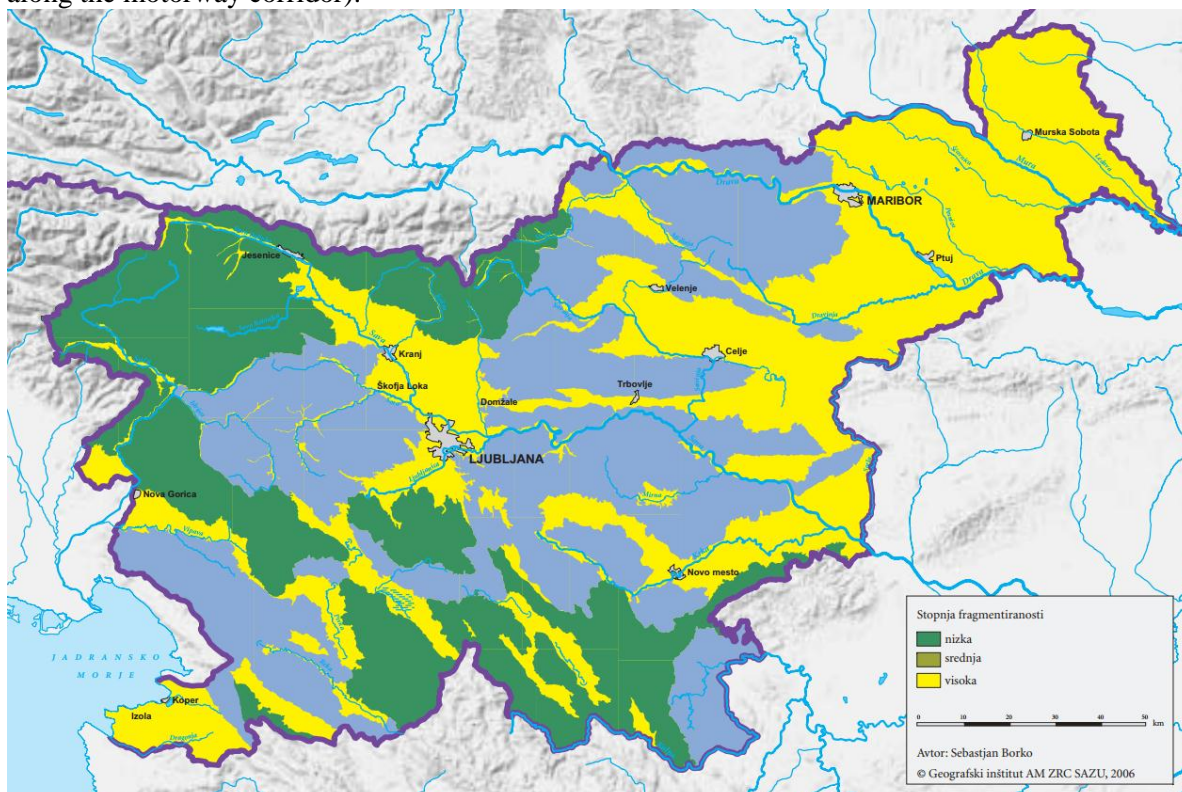
Slovenia encompasses large forest areas with exceptional value due to their rarity, complexity and role in the ecosystem. They are important in terms of the further development of life (evolution) in moderate climate environments, and the conservation of ecosystem functions that are linked to many surface events. To ensure the possibility of broad areas of movement for species (large carnivores and other large mammals) and the increased probability of their survival, movement is of key importance in these forests.

Pressure on dense forest stands and other related habitat spots is also great due to the construction of new infrastructure. In the existing situation, the greatest problems are transport corridors interrupting migration routes. Transport corridors frequently fragment habitats, and interrupt flight paths or prevent the migration of certain species (especially mammals and amphibians). Interruptions in migration corridors occur especially on older sections of motorways, where there are only a few underpasses for wild animals, and no green bridges. For example, the existing state of the Ljubljana–Postojna motorway is a serious threat to the uninterrupted movement of large carnivores (brown bear, wolf, lynx). Several studies have already been made of this topic (e.g. Harmel and associates, 2005; Zavod Symbiosis, 2012). The need to build an ecoduct on the Vrhnika–Postojna section of the Ljubljana–Koper motorway has already been expressed due to the fragmentation of lynx and bear habitats. On numerous sections of regional and local roads, the passages of amphibians remain unresolved, which leads to high mortality rates during their spring migrations to spawning sites .



The report entitled 'Landscape Fragmentation in Europe (EEA and FOEN, 2011) attests to the fact that the fragmentation and loss of precious habitats are becoming increasingly pressing problems also at the EU level. The report highlights that biodiversity is heavily affected by landscape fragmentation caused by transport infrastructure and construction. The fragmentation and isolation of populations significantly contribute to reducing populations of wild animals, and increasing their endangerment in Europe. Despite planning concepts which should conserve large dense areas of natural ecosystems, we have been witnessing extensive fragmentation in Europe in the past 20 years.

Forest fragmentation in Slovenia is shown in Figure 20 (high fragmentation is highlighted in yellow). The greatest fragmentation of forest areas occurs on the plains of Slovenia and on the motorway network (in the area of Prekmurje, Štajerska, eastern Dolenjska, Primorska, wider area of Gorenjska along the motorway corridor).



Fragmentation level

Low  
Medium  
High

Author: Sebastjan Borko

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Research Centre of the Slovenian Academy of  
Sciences and Arts, 2006

Figure 20 Forest fragmentation level in Slovenia (Borko, 2006)

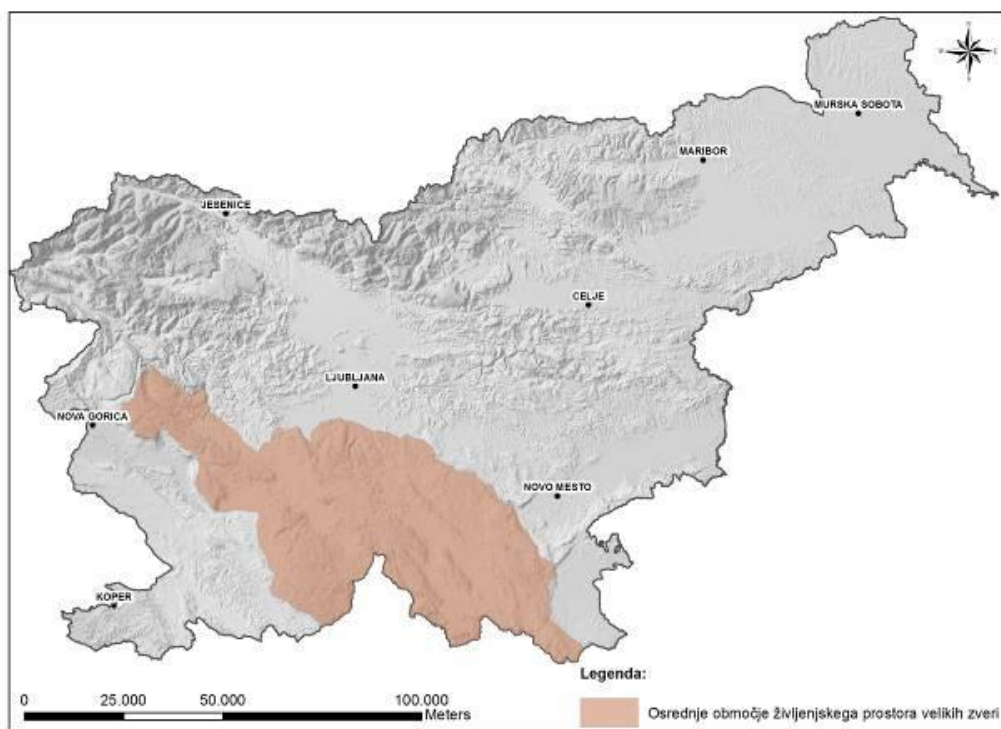
#### Central habitat area of large carnivores

Large forest areas in southern Slovenia are included in the central habitat area of large carnivores (ecologically important area). These are parts of the Snežnik Plateau in Notranjska and Mt Goteniški Snežnik, the Kočevski Rog Plateau and the Trnovski gozd Forest. These areas are especially vulnerable to the integration of infrastructure corridors.

Management strategies have been prepared for bear and wolf:

- Strategy for the management of brown bear (*Ursus arctos*) in Slovenia
- Strategy for the management of wolf (*Canis lupus*) in Slovenia and its sustainable management; Action Plan for Management of Population of Wolf (*Canis lupus*) in Slovenia for the period 2012–2017

There are two types of habitat in Slovenia, i.e. the central part of the habitat of large carnivores, which is defined as an ecologically important area, and the habitat of brown bear (central, peripheral, transitory areas and areas without the presence of brown bear) defined by the brown bear strategy. The ecologically important area overlaps with the central habitat of brown bear (Figure 21). Habitats of wolf and lynx have not been described in strategies in the same manner as in the brown bear strategy.



**Legend:**  
Central habitat of large carnivores

**Figure 21** Central habitat of large carnivores (Source: Geoportal ARSO, 2014)

### Display of the state of the environment with selected indicators

#### Collisions with wild animals

According to data from the Slovenia Forest Service, traffic (collisions) is among the main reasons for the loss of wild animals, especially deer, fox and European hare. Approximately 8,500 collisions were recorded in 2006, almost twice as many as in 1997 (Urbančič and associates, 2010).

Between 4,000 and 5,000 wild animals are reportedly killed annually in Slovenia; the most affected species is deer (approximately 90 per cent of all animals). Between 2000 and 2006, deer roadkill grew significantly; approximately 6,700 deer were reported killed. In recent years, roadkill has been stagnating (Izvidnica..., 2012).

**Table 7** Collisions with large mammals (Source: SFS, 2014)

	Road*	Railway*	TOTAL*
Wild boar	78	12	90
Chamois	5	2	6
Fox	811	9	819
Red deer	131	37	168
Deer	4438	103	4541
Brown bear	8	6	15

\* The table shows average values of the number of roadkill per year. The analysis was carried out for the period from 2000. Autochthonous species involved in over 10 collisions since 2000 were taken into account.

Table 7 shows data on collisions with large wild mammals (hares are excluded) since 2000 (average annual values by species). The data were acquired from the official SFS database (June 2014). The table shows data from hunting grounds managed by hunting clubs and special purpose hunting grounds.

Due to environmental fragmentation at the local level, collisions with amphibians occur very frequently on transport infrastructure. Over 1,500 black spots of roadkilled amphibians have been registered in Slovenia, of which over 100 black spots have a very high frequency of roadkill. Actions to carry amphibians across roads during spring migrations have been organised in Slovenia for several years. These actions are voluntary, and usually take place at the initiative of the Herpetological Society.

Transport infrastructure also interrupts the flight and migration routes of bats. Data show that the victims of traffic are not only low-flying bats (from the genus of *Rhinolophus* and *Myotis*), but also high-flying bats (*Pipistrellus* and *Nyctalus sp.*).

## Display of the state of the environment with selected indicators

### Habitat fragmentation [SEBI013]

The status of the indicator for the entire EU is monitored by the EEA. The indicator is based on modifications in the CLC (Corine land cover). The CLC is generally updated every six years. The latest CLC display was prepared in 2006, while the CLC for 2012 is being prepared. The EEA website shows the situation on the basis of the indicator between 1990 and 2000. The summary of the situation in Slovenia is given below (EEA, 2014):

- between 1990 and 2000, no extensive forest fragmentation was detected. Low intensity fragmentation was present in Central Slovenia, Pomurje, Spodnje Posavje and in south-eastern Slovenia;
- in this period, forest habitat connections in most of Slovenia were stable for species, with an average distribution distance of one kilometre; a decline in habitat connections was registered only the Savinjska region.

## 5.1.6 Human health

### 5.1.6.1 Air quality

#### Current state

The biggest problem in Slovenia related to air quality is pollution with particulates (PM<sub>10</sub>) and ozone in summer. In addition, higher concentrations of lead occasionally occur in the brownfield area of the Meža Valley. Measurements of PM<sub>10</sub> particulates show that the limit values are occasionally exceeded throughout Slovenia, especially in the interior, where long-lasting temperature inversions occur in winter. An analysis of the sources of PM<sub>10</sub> particulates has shown that the primary cause of pollution with PM<sub>10</sub> particulates is road transport, especially in urban centres with heavy traffic (Ljubljana Basin), while in valleys with little wind (Zasavje and Celje basins), heating devices and industrial

sources are an additional source of pollution. Remote transport from the Po Valley in Italy contributes significantly to ozone pollution, which is more pronounced in Primorska.

For areas of air pollution where daily limit values of PM<sub>10</sub> are exceeded, the Government adopted the following ordinances pursuant to the Environmental protection Act and the Decree on ambient air quality, which also define the need for greater use of public transport and reduced traffic density in problematic areas:

- Ordinance on the air quality plan in Kranj Municipality (Official Gazette of the Republic of Slovenia, no. 108/13)
- Ordinance on the air quality plan in Celje Municipality (Official Gazette of the Republic of Slovenia, no. 108/13)
- Ordinance on the air quality plan in Novo Mesto Municipality (Official Gazette of the Republic of Slovenia, no. 108/13)
- Ordinance on the air quality plan in Maribor Municipality (Official Gazette of the Republic of Slovenia, no. 108/13)
- Ordinance on the air quality plan in the Zasavje area (Official Gazette of the Republic of Slovenia, no. 108/13)
- Ordinance on the air quality plan in Murska Sobota Municipality (Official Gazette of the Republic of Slovenia, no. 88/13)
- Ordinance on the air quality plan in Ljubljana Municipality (Official Gazette of the Republic of Slovenia, no. 24/14).

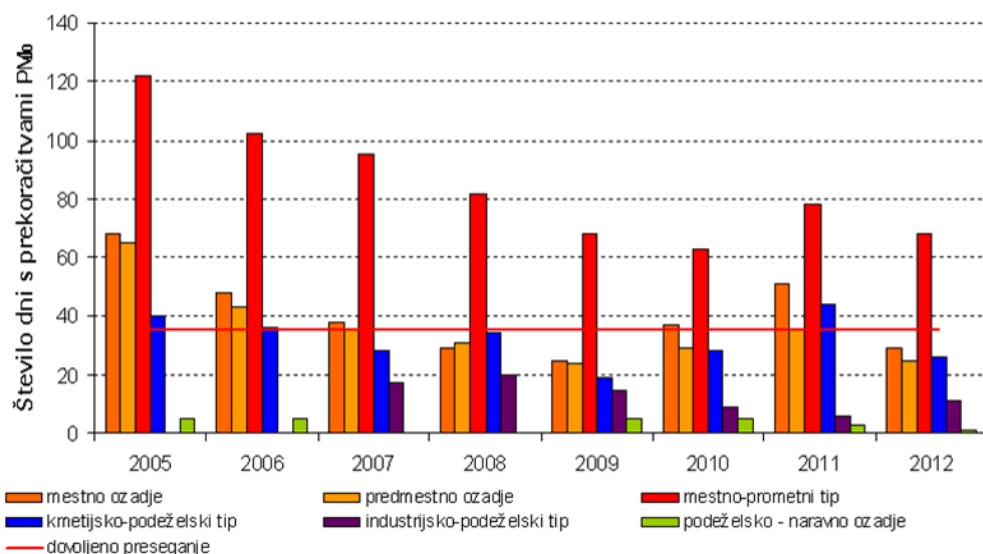
In accordance with the ordinances, a detailed programme of measures to reduce pollution with PM(10) particulates must be prepared for problematic areas.

#### **Display of the state of the environment with selected indicators**

##### Air pollution with PM<sub>10</sub> and PM<sub>2.5</sub> particulates [ZR08]

The indicator shows the number of days when the daily ceiling concentration of PM<sub>10</sub> particulates was exceeded, and the movement of the average annual concentration of PM<sub>10</sub> and PM<sub>2.5</sub> particulates at monitoring points in Slovenia.

The figure below shows the number of days when the daily ceiling concentration of PM<sub>10</sub> particulates of 50 µg/m<sup>3</sup> was exceeded; the graph was taken from the ARSO website ([http://kazalci.arso.gov.si/?data=indicator&ind\\_id=72](http://kazalci.arso.gov.si/?data=indicator&ind_id=72)).



Vir: Zbirka podatkov avtomatskih meritev državne mreže za spremljanje kakovosti zraka (DMKZ), ARSO in zbirka podatkov dopolnilnih avtomatskih merilnih mrež (TE Šoštanj, TE Trbovlje, TE-TO Ljubljana, EIS Anhovo), 2013.

### Number of days when PM<sub>10</sub> was exceeded

Urban background

Suburban background

Urban–transport type

Agricultural–rural type

Industrial–rural type

Rural–natural background

Permitted exceeded value

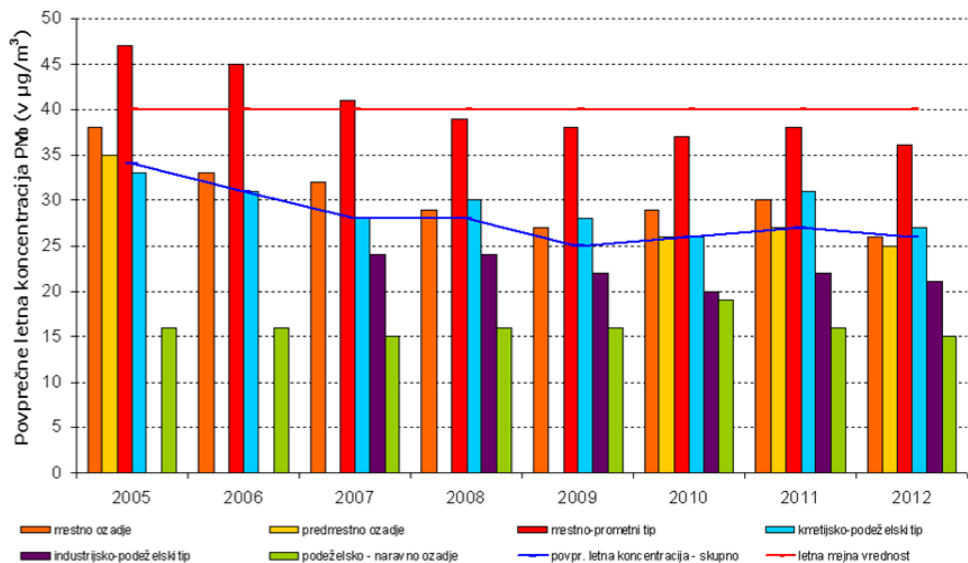
Source: Database from the National automatic measurement air quality network database (ANAS), ARSO and database from supplementary automatic measurement networks (Šoštanj Thermal Power Plant, Trbovlje Thermal Power Plant, Ljubljana Thermal Power Station, EIS Anhovo), 2013

**Figure 22** Number of days when the daily ceiling concentration of PM<sub>10</sub> particulates of 50 µg/m<sup>3</sup> was exceeded (it may be exceeded 35 times in a calendar year) (Source: ARSO, 2014)

The number of days when the daily ceiling concentration of PM<sub>10</sub> particulates was exceeded declined in 2012 compared to the preceding year, so that the permissible number of exceeded values was exceeded at fewer monitoring points around Slovenia. In 2012, values were exceeded only during winter. It must be emphasised that, in addition to traffic and industry, increased concentrations of particulates are affected by individual heating units.

Between 2005 and 2012, the highest average annual concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> particulates and the highest number of days when the ceiling concentration of PM<sub>10</sub> particulates was exceeded were recorded at monitoring points in towns which are affected by transport emissions. In rural areas, concentrations of PM<sub>10</sub> particulates are significantly lower. Background levels which mark the contribution of particulates that are constantly present in the environment are extremely low.

Figures 23 and 24 show the average annual concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> particulates; the graphs were taken from the ARSO website (Source: [http://kazalci.arslo.gov.si/?data=indicator&ind\\_id=72](http://kazalci.arslo.gov.si/?data=indicator&ind_id=72)).



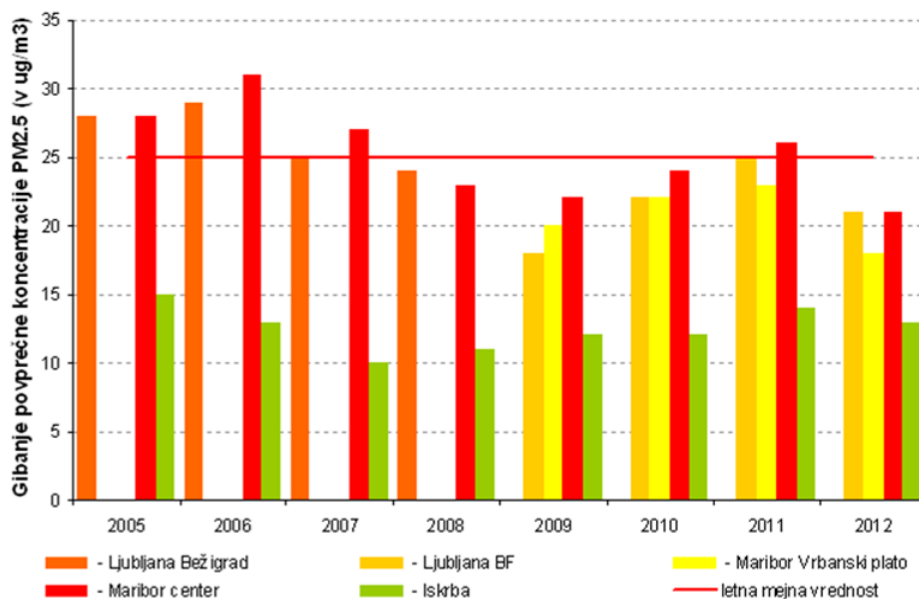
Vir: Zbirka podatkov avtomatskih meritev državne mreže za spremljanje kakovosti zraka (DMKZ), ARSO in zbirka podatkov dopolnilnih avtomatskih merilnih mrež (TE Šoštanj, TE Trbovlje, TE-TO Ljubljana, EIS Anhovo), 2013.

### Average annual concentration of PM<sub>2.5</sub> (in µg/m<sup>3</sup>)

Urban background                      Suburban background                      Urban–transport type                      Agricultural–rural type  
 Industrial–rural type                      Rural–natural background                      Average annual concentration                      Annual ceiling  
 – total

Source: Database from the National automatic measurement air quality network database (ANAS), ARSO and database from supplementary automatic measurement networks (Šoštanj Thermal Power Plant, Trbovlje Thermal Power Plant, Ljubljana Thermal Power Station, EIS Anhovo), 2013

Figure 23 Movement of average annual concentrations of PM<sub>10</sub> (annual ceiling is 40 µg/m<sup>3</sup>) (Source: ARSO, 2014)



Vir: Zbirka podatkov meritev državne mreže za spremljanje kakovosti zraka (DMKZ), ARSO, 2012.

### Movement of the average concentration of PM<sub>2.5</sub> (in µg/m<sup>3</sup>)



Ljubljana Bežigrad  
Maribor Centre

Ljubljana BF  
Iskrba

Maribor Vrbanški Plateau  
Annual ceiling

Source: Database from the National automatic measurement air quality network database (ANAS), ARSO, 2012

**Figure 24 Movement of average annual concentrations of PM<sub>2.5</sub> (annual ceiling is 25 µg/m<sup>3</sup>) (Source: ARSO, 2014)**

### 5.1.6.1 Noise pollution

#### Current state

Noise pollution in the environment has a significant effect on the quality of life in the natural and urban environment. Residents' health may be at risk in places where they are permanently exposed to high noise levels, and excessive exposure is a serious disturbance. From this aspect, areas with excessive noise pollution and natural and urban areas with little or no noise pollution are especially important.

Noise pollution is an important environmental issue, since there is more and more information available on the harmful consequences of permanent exposure to increased noise levels for human health and well being. The recent publication issued by the World Health Organisation (WHO, 2011) shows that the loss of more than one million of healthy years of life can be attributed every year to noise caused by transport in EU Member States and other western European countries. The Guidelines on Community Noise (WHO, 1999) also define the effects of noise, including sleep disorders, as a serious health issue. The European guidelines (WHO, 2009) propose two night-time noise indicator values to protect human health:

- long-term recommended value 40 dB(A),
- temporary recommended value 55 dB(A).

The temporary value is proposed for areas where the recommended value of 40 dB(A) cannot be achieved in the medium term for various reasons. In Slovenia, the ceiling of the night-time noise indicator for noise protection area III prescribed by law is harmonised with the temporary value recommended by the WHO. The recommended value of 40 dB(A) in areas immediately adjacent to most traffic routes is a virtually unattainable and unrealistic objective.

Long-term exposure to excessive noise causes great environmental risk that threatens human health, and exposure to noise in comparison with other causes of stress in Europe is increasing. Urbanisation, greater demand for motorised transport and inefficient urban planning are the main reasons for increased exposure. Noise pollution is also often increased in settled areas where the quality of ambient air is also problematic.

Exposure to noise can cause irritation, disturb sleep, impact schoolchildren's cognitive functions, trigger physiological responses to stress and trigger cardiovascular diseases in persons who are chronically exposed to noise. Stress can trigger the emergence of some hormones that can have numerous indirect effects, including high blood pressure. Due to these effects, the risk of cardiovascular diseases and mental disorders increases with long-term exposure.

It is assessed that approximately 20 per cent of people in Slovenia suffer due to noise which the expert public believes is unacceptable for health (ARSO, 2009). Noise pollution in the urban and natural environment is rising, primarily a consequence of more traffic in international and regional transport corridors and in urban centres. In general, noise pollution is greater in the urban than in the rural or natural environments. The biggest source of noise is road transport, while noise pollution is also higher on the railway network, but lower around airports.

The data on the exposure of residents to noise from road and rail transport in Slovenia were summarised from the Transport Development Strategy in the Republic of Slovenia (Table 8, Figure 25). Within the scope of expert groundwork for the Strategy, a simplified analysis of current noise pollution on the entire national road and railway network was carried out; the calculation also took into account important local roads in larger settlement areas.

The assessment took into account a total of 6,729 km of roads and 1,154 km of railway lines. The table below contains data on the exposure of residents to noise in the light of the recommended and temporary values of the night-time noise indicator set by the WHO by statistical regions.

**Table 8 Exposure of residents to noise from road and rail transport in 2011 in the light of the recommended value of the night-time noise indicator set by the WHO (Source: Strategy, 2014)**

Number of residents subject to excessive noise pollution		
Region	Long-term recommended value 40 dB(A)	Temporary recommended value 55 dB(A)*
Pomurje	39.696	5.017
Podravje	126.836	17.725
Koroška	24.011	4.129
Savinjska region	99.403	14.712
Zasavje	14.604	3.027
Spodnjeposavska region	22.275	3.089
SE Slovenia	39.917	5.259
Central Slovenia	233.191	39.236
Gorenjska	75.052	11.153
Notranjsko-kraška region	23.300	4.931
Goriška	30.475	3.009
Obalno-kraška region	32.971	3.304
<b>Total</b>	<b>761.731</b>	<b>114.591</b>

Note: \* - the temporary recommended value of 55 dB(A) of the night-time noise indicator equals the ceiling for infrastructural noise sources in noise protection area III

the exposure of residents to noise from road and rail transport in Slovenia in 2011 in the light of the recommended value of night-time noise indicator set by the WHO was as follows:

- in the light of the long-term recommended value set by the WHO, 761,731 residents or 38 per cent of the population were overexposed;
- in the light of the temporary value set by the WHO, 114,591 residents or 6 per cent of the population were overexposed.

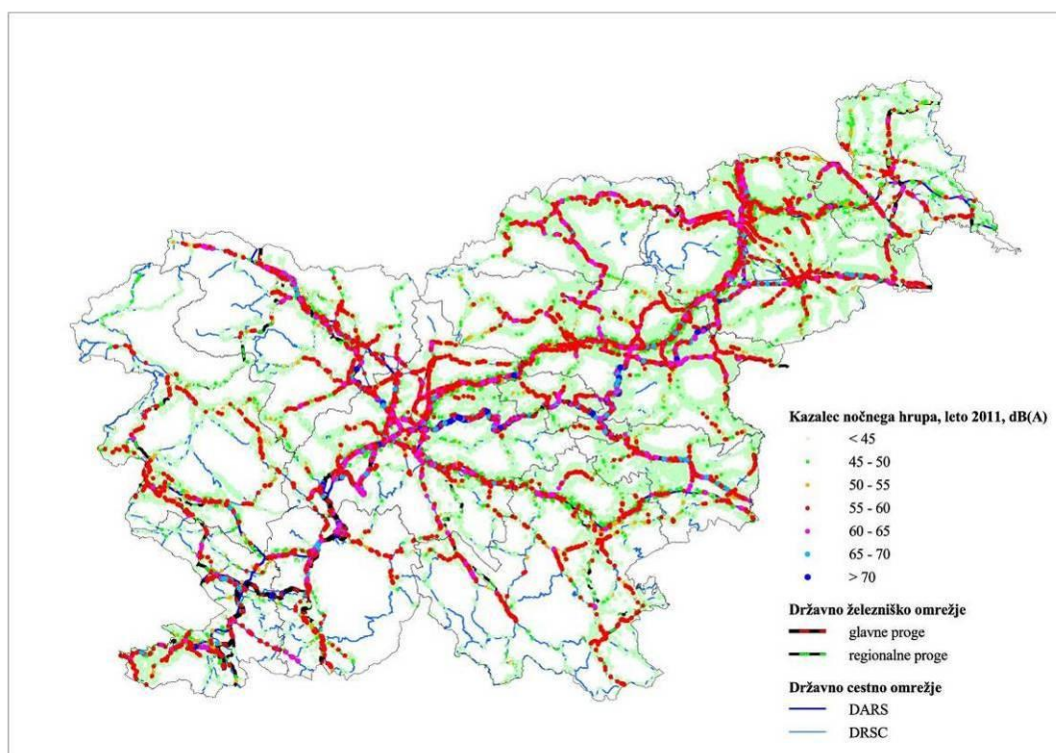
More precise data on the number of buildings and residents where the limit and critical values of noise on the infrastructure network are exceeded are summarised from the data from the operational monitoring of noise on the motorway, and national road and railway networks. In 2013 and 2014, operational monitoring of noise was implemented throughout the road network managed by DARS d. d. and on all important state roads managed by the DRSC. The operational monitoring of noise on state roads was carried out for a total of 637 km of roads, and the operational monitoring on the motorway network for 607 km of roads. In both cases, traffic assignment in 2011 was taken into account.

The results of the operational monitoring of noise are as follows:



- considering the limit values of noise indicators, a total of 2,882 buildings along the road network managed by DARS d. d. were overexposed; these house 17,454 permanent and 2,131 temporary residents; while considering the critical values, 979 buildings with 7,239 permanent and 1,322 temporary residents were overexposed. Most residents who experienced exceeded limit values live on the following road sections: H3/0090 Ljubljana (Celovška–Koseze), H3/0086 Ljubljana (Šmartinska–Tomačevo), A1/0052 Brezovica–Vrhnika, A1/0040 Celje–Arja vas and H3/0088 Ljubljana (Tomačevo–Dunajska);
- considering the limit values of noise indicators, a total of 9,032 buildings along the road network managed by the DRSC were overexposed; these house 62,5210 residents; while considering the critical values, 4,570 buildings with 29,270 residents were overexposed. The sections with the highest number of overexposed residents are in Maribor, Ljubljana, Celje, Velenje, Jesenice and Domžale.

Noise pollution in the environment along the main railway lines in the Republic of Slovenia was assessed in more detail in the expert document ‘Strategy for reducing excessive noise of railway transport in the Republic of Slovenia’ (Epi Spektrum d.o.o., 2010) where the status of 1,298 lines in 2008 was considered. Most buildings and residents along the main lines are overexposed at night, which is largely the consequence of goods transport and stricter limit values in that period. Considering the limit values of noise indicators, a total of 7,474 buildings which house 38,603 residents were overexposed, while considering the critical values of noise indicators, 4,501 buildings with 23,409 residents were overexposed. The municipalities with the most overexposed residents are Ljubljana, Jesenice and Litija, followed by Laško, Borovnica, Ptuj, Brezovica and Krško.



**Night-time noise indicator, 2011, dB(A)**

**National railway network**

Main lines

Regional lines

**National road network**

DARS

DRSC

**Figure 25 Pollution of the environment with noise from road and rail transport in 2011, night-time noise indicator (Source: Strategy, 2014)**

Strategic mapping of noise from air transport in Slovenia has not been carried out, as there are no important airports in Slovenia. Regular operational noise monitoring has been implemented in the vicinity of the Ljubljana Airport since 2008, which includes noise measurements in 4 locations (Šenčur, Lokarje, Lahovče). The results of the operational monitoring of noise (ZVD d. d., 2013) in the vicinity of the Ljubljana Airport have shown that noise does not exceed the prescribed limit values, and due to the reduction in transport in recent years, noise pollution has been declining.

Pursuant to the Environmental Protection Act, the excessive noise polluter is obliged to take measures to reduce the level of noise pollution in the environment to legally permissible limits. Pursuant to point 4 of Article 11 of the Decree on limit values for environment noise indicators, noise reduction on the national infrastructure network is carried out on the basis of the operational programme for noise protection. The operational programme for areas adjacent to the national road and railway networks which are most exposed to noise was adopted in December 2012 and applies to the 2012–2017 period. In accordance with the operational programme, extensive anti-noise measures have already been taken on the motorway network in the wider areas of Celje, Vrhnika, Brezovica, Postojna, Unec and Malence, and also the Celje–Maribor railway line. Noise reduction measures have also been envisaged for the most exposed areas on the national road network.

Extensive anti-noise measures were implemented for the road and railway networks in the past. Most of the measures were carried out on the motorway network, and to a lesser extent state roads; in recent years, measures have also been carried out for the national railway network.

Anti-noise measures on the road network managed by DARS d. d. generally stem from environmental protection requirements, which were taken into account when planning motorways. Following the adoption of the National Motorway Construction Programme in the Republic of Slovenia in 1995, intensive construction of the motorway network commenced, which included the implementation of measures to reduce the spread of noise into the environment, and of special measures to improve living conditions in buildings. On older motorway sections, almost no anti-noise measures were implemented in limited areas. Since 2012, measures have been taken in accordance with the operational programme.

A total of 454 of noise barriers, with a total length of 133,0 km, and 181 of noise protection embankments, with a total length of 46.8 km had been set up by 2013 on the road network managed by DARS d. d.. DARS d. d. has also carried out passive noise protection in a total of 113 buildings, and implementation documents have been prepared for another 456 buildings.

Since the main and regional roads pass through densely populated settlements and cross areas with dispersed buildings located immediately by the road, noise barriers along such roads can be installed only to a limited extent. Therefore, the most common measure for noise reduction along main and regional roads is passive noise protection for buildings with protected spaces. A total of 11 km of noise barriers were installed along state roads by 2013, while passive protection was carried out in 320 buildings with protected spaces and is anticipated for another 203 buildings.

Most anti-noise measures on the railway network were implemented on section no. 30 of the line between Celje and Maribor, on lines nos. 40 Pragersko–Ormož and 41 Ormož–Hodoš during electrification and construction, and in certain locally-limited areas. Primary measures along railway lines are passive protection and the installation of noise barriers in densely populated areas. A total of 24.6 km of noise barriers were installed along the national railway network, while passive protection was carried out in approximately 685 buildings with protected spaces and is anticipated for another 190 buildings.

## Display of the state of the environment with selected indicators

### Exposure to, and disturbance by, noise from traffic [PR18] (TERM 05)

The following indicators have been selected to display exposure:

- $L_{DEN}$  (day-evening-night noise indicator) is the noise indicator for overall annoyance, since it indicates residents' total exposure;
- $L_{NIGHT}$  (night-time noise indicator) is the noise indicator for sleep disturbance, since it indicates exposure at night.

A publicly accessible indicator shows the exposure of residents to noise along important roads where 6 million vehicles passed and railway lines where 60,000 train passed in Slovenia in 2006. The exposure of residents to noise in the municipalities of Ljubljana and Maribor (in the latter, in the area of the urban design concept for the city of Maribor) is shown separately; it takes into account overexposure to noise on all roads and railway lines.

An analysis of noise exposure along important roads in Slovenia has shown that over 136,000 residents lived in areas where the value of the  $L_{DEN}$  indicator exceeded 55 dB(A), 30,000 residents in areas where  $L_{DEN}$  exceeded 65 dB(A), and 686 residents in areas where  $L_{DEN}$  exceeded 75 dB(A). The most exposed road sections were the Brezovica–Vrhnika section of the A1 motorway, the Miklavž–Hajdina section of the G1-1 main road, and a section of the G1-1 main road through Maribor. Almost 86,000 residents were exposed to night-time noise of over 50 dB(A). A total of 7 per cent of residents along important roads were exposed to  $L_{DEN}$  noise levels which exceeded 55 dB(A), while 4 per cent of Slovenia's residents were exposed to night-time noise levels which exceeded 50 dB(A).

Noise pollution on the railway network has been determined for a section of the Celje–Maribor line. An analysis of noise exposure along important railway lines has shown that a total of 10,051 residents lived in areas where the value of the  $L_{DEN}$  indicator exceeded 55 dB(A), 1,864 residents in areas where  $L_{DEN}$  exceeded 65 dB(A), and 317 residents in areas where  $L_{DEN}$  exceeded 75 dB(A). Almost 8,691 residents were exposed to night-time noise of over 50 dB(A). A total of 0.5 per cent of residents along important railway lines were exposed to  $L_{DEN}$  noise which exceeded 55 dB(A), while 0.4 per cent of Slovenia's residents were exposed to night-time noise levels which exceeded 50 dB(A).

The main source of noise in the Municipality of Ljubljana is road transport. Most residents of the Municipality of Ljubljana are exposed to high levels of noise from road transport, of which almost 63 per cent are exposed to  $L_{DEN}$  noise levels which exceed 55 dB(A). Even at night, as many as 43 per cent of residents are exposed to noise levels which exceed 50 dB(A). Noise from rail transport is also significant in the Municipality of Ljubljana; 4.25 per cent of residents are exposed to  $L_{DEN}$  noise levels which exceed 55 dB(A). At night, 3.3 per cent of residents are exposed to noise levels which exceed 50 dB(A).

The data on noise pollution from road transport in Maribor show that two third of its residents are exposed to noise throughout the day of over 55 dB(A), while 13 per cent of residents are exposed to noise over 75 dB(A). During the night, 54 per cent of residents are exposed to noise levels which exceed 50 dB(A). The share of noise from rail transport in the area of Maribor is less significant in the total noise exposure.

### **5.1.7 Population and material assets**

#### **Current state**

On 1 January 2014, Slovenia had 2,061,085 residents. According to the data from the Statistical Office of the Republic of Slovenia, the number of residents in Slovenia grew by 2,264 in 2013, the number of Slovenian citizens declined by almost 3,000 (0.2 per cent), and the number of foreign citizens grew by approximately 5,200 (5.7 per cent). On 1 January, 96,608 foreigners comprised 4.7 per cent of the population in Slovenia. In 2013, the number of Slovenian citizens declined for a second year in a row.

#### Accessibility

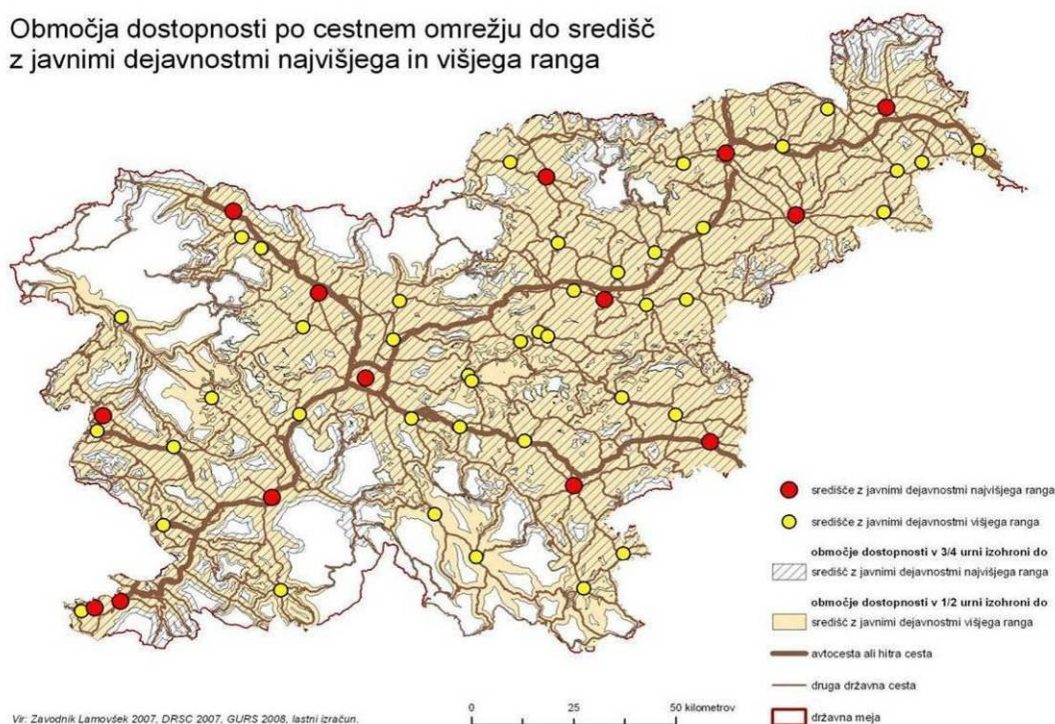
Due to geographic features, diverse transport accessibility and diverse economic growth, the differences between weak and developed areas in Slovenia have been increasing. Despite a strategically appropriate transport position, there are no modern terminals for combined goods transport. Transport supply to the economy, and the connection between centres and their hinterlands are also insufficient.

In addition to good road and transport connection with neighbouring countries, the construction of the motorway and expressway network has significantly improved the connections among regions and accessibility by private vehicles within Slovenia. General activities (education, health care, administration) are concentrated in major urban centres which are classified as centres of the highest and high level in terms of their functional application (Figure 26). These centres are quite accessible to the majority of the population in Slovenia (this does not apply to accessibility by public transport), which is the consequence of efficient infrastructure, including such functions, in addition to a developed road network and the high level of population motorisation. Poorer accessibility is noted mostly in less densely populated areas, such as Posočje, Cerkljansko, Kočevsko and Bela krajina.

The delayed renovation of railway transport network and constantly increasing road transport required the construction of new infrastructure. The public passenger transport network in Slovenia is poorly interconnected and underdeveloped, especially with regard to intermodality and logistics. Public passenger transport comprises a small share of the joint transport system and does not facilitate fast, comfortable and cost-efficient mobility at the regional level.

The transport model shows that access to regional or major employment centres by private motor vehicle along the main urbanisation corridors is possible in 30 to 45 minutes, which is a very good accessibility time. The majority of the population also has 30-minute access to a connection to the motorway, which means 45 to 60 minutes to a major regional centre; the exceptions where the time is longer than 30 minutes are: the Kočevje region, the Kolpa River Valley, Kozjansko, the Ribniško and Lovrenško Pohorje Range, the central part of the Kozjak Range, Goričko, the southern part of Prlekija, the upper Soča River region to Kanal, Cerkljansko, Baška grapa, the western part of the Škofja Loka Hills, the Bloke Plateau, the Lož Valley (access will improve for Haloze after the construction of the Draženci–Gruškovje motorway section).

Območja dostopnosti po cestnem omrežju do središč z javnimi dejavnostmi najvišjega in višjega ranga





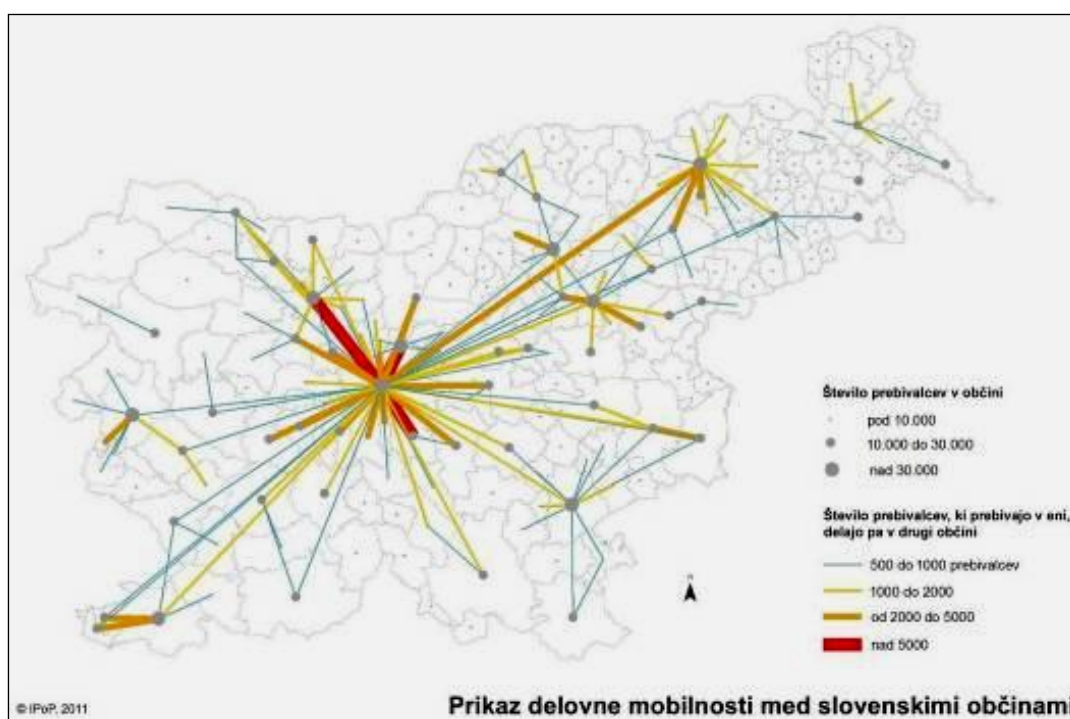
Accessibility areas on the road network to centres with public activities of the highest and high level

- Centre with public activities of the highest level
- Centre with public activities of a high level
- Accessibility areas from where centres with public activities of the highest level may be reached in 45 minutes
- Accessibility areas from where centres with public activities of a high level may be reached in 30 minutes
- Motorway or expressway
- Other state road
- State border

Source. Zavodnik Lamovšek 2007, DRSC 2007, GURS 2008, own calculations

**Figure 26 Accessibility areas on the road network to centres with public activities of the highest and high level (Source: Strategy, 2014)**

The Slovenian population is becoming more dense in the vicinity of some large centres, which is shown by the commuting statistics (Figure 27). Due to commuting, the significance of municipalities in the functional region of Ljubljana, the coastal conurbation and some Karst municipalities, municipalities in the vicinity of Maribor and Novo mesto is increasing. In economic terms, regions with better accessibility are frequently more successful and competitive.



**Number of residents in a municipality**

- Under 10,000
- 10,000 to 30,000
- Over 30,000

**Number of residents residing in one municipality and working in another**

- 500 to 1,000 residents
- 1,000 to 2,000
- 2,000 to 5,000

Over 5,000

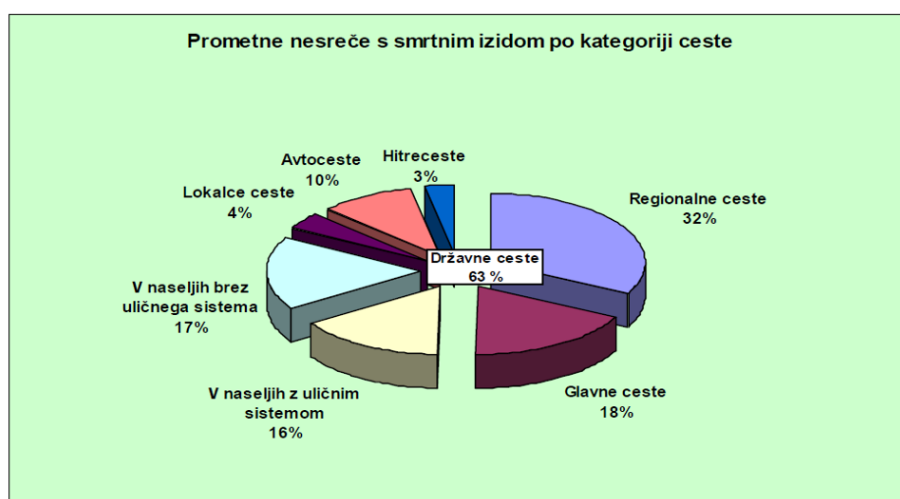
### Display of labour mobility between Slovenian municipalities

Figure 27 Display of daily commuting (Source: Program ESPON, 2013)

The data show that Ljubljana and Maribor are best accessible from areas with the most transport infrastructure and densely populated areas. They also show that both towns are accessible in 1.5 hours by private vehicle from areas that are twice as wide than by public passenger transport.

#### Traffic safety

Several factors affect the occurrence of road accidents, with the major causes being road users, road infrastructure, motor vehicles and transport environment. People play the most important role in these factors, i.e. as drivers, occur in the role of vehicle and road users, and as planners, are a very important link in road construction. There were 141 fatalities (Figure 28) in Slovenian in 2011, while 9,673 persons were injured, which is 0.8 per cent of the total number of deaths and 0.8 per cent of the total number of injured persons. The estimated costs to society arising from road accident was EUR 636 million in 2011 (registered accidents and damage assessment arising from accidents), which is 1.75 per cent of gross domestic product. (Source: ReNPVCP13-22)



#### Road accidents with fatalities by road categories

- In settlements with streets 16%
- In settlements without streets 17%
- Local roads 4%
- Motorways 10%
- Expressways 3%
- Regional roads 32%
- Main roads 18%

Figure 28 Number of all fatalities in road transport in 2011 by road categories (Source: ReNPVCP13-22)

In 2012, 22,035 accidents happened in Slovenia, of which 130 caused fatalities; 32 road accidents happened at level crossings, of which 5 were fatal. More than 1,000 road accidents involving cyclists happen on Slovenian roads each year. (Source: Strategy).

#### Sustainable mobility

In the last two years, the construction of the road network in Slovenia has provided a relatively high level of mobility, with visible effects regarding travel speed and accessibility to the European road network. However, no structural changes in how the Slovenian transport system functions have been

detected, despite high investments in transport infrastructure. Current transport policy could not change the present neglect of public transport, which is one of the main reasons for non-sustainable movements, which are also a problem in the European transport system: increasing greenhouse gas emissions, persistent dependence on oil and increasing congestion.

The public passenger transport system in Slovenia is fragmented and not managed comprehensively. It is divided into three sub-systems:

1. interurban line bus passenger transport carried out by concessionaires as a public utility service;
2. rail passenger transport carried out by Slovenske železnice as a public utility service;
3. urban line passenger transport.

Each sub-system is organised differently, and there is no uniform public passenger transport manager to manage or direct the entire field of public passenger transport by managing all the transport needs of passengers and adjusting public passenger transport options to them, as well managing the entire financial and technical field (uniform electronic ticket, financial flows and settlements between carriers, and supervision of the implementation of the system). 88.142 million passengers were transported by all carriers in 2013.

Only some 8 per cent of journeys in Slovenia are carried out by public transport. One reason for the relatively low utilisation of public passenger transport is the relatively poor and uncompetitive level of the service. The main shortcomings of public transport are as follows:

- uncoordinated timetables;
- no annual ticket for the use of various means of transport of various operators;
- travel time is uncompetitive compared to private vehicles;
- the frequency of services, especially rail services, is too low and not arranged according to the principle of a clock-face timetable;
- several transfer points, stations and stops do not provide safe and comfortable havens, sufficient information, comfortable and safe access and transfer, including Ljubljana bus and train stations;
- outdated vehicle fleet;
- the P+R system has not been widely established;
- unsuitable PPT arrangement – rigid and not adjusted to the changed needs of various areas.

Bicycle traffic is classified among the most suitable means of transport in terms of the environment and health. It is also the quickest means of transport for short distances (up to three kilometres). Approximately 50 km of national cycling routes were or are being constructed in Slovenia. Cycling routes spontaneously also follow surfaces with mixed traffic. However, in some places, the problem is the unadjusted speed of motorised transport. Slovenia does not have a document categorising national cycling routes, or determining where and how they should be arranged. The system of national cycling routes has not been completed, due to which bicycle traffic cannot properly develop. Cycling routes spontaneously also follow surfaces with mixed traffic. However, in some places, the problem is the unadjusted speed of motorised transport.

## **Display of the state of the environment with selected indicators**

### Investments in transport infrastructure [PR03] (TERM 019)

A publicly accessible indicator shows the extent of investments in the infrastructure of road, rail, air and maritime transport in Slovenia between 1992 and 2011. Investments include all investments in infrastructure, except the costs of regular maintenance.

In recent years, changes can be noticed in investments of state funds in individual transport sub-systems. In 2000, funds for the motorway network amounted to 80 per cent, for state roads, to 13 per cent, and for the railway network, to a mere 5 per cent. With the completion of the motorway network, investments shifted to the construction and modernisation of the railway network. Therefore, investments in the motorway network have been declining since 2005 (87 per cent). In 2011,

investments in the motorway network fell to 23 per cent, while funds for railway infrastructure rose to 54 per cent (growth in investments was noticed since 2007).

#### Volume and structure of passenger transport and traffic [PR01]

The volume and structure of passenger transport and traffic is an important indicator of the functioning of the transport system, as it shows how much, and how, residents of a certain country, region, town, etc. travel.

According to an assessment of transport by private vehicle prepared each year by the Slovene Roads Agency, almost 11 billion travel kilometres were covered by private vehicle on Slovenian state roads in 2011, which is slightly more than the year before and almost a third (31 per cent) more than in 2000. This assessment is based on a calculation of the length of the national road network and the average volume of private vehicles.

Other means of land transport lag behind car transport in terms of volume and growth. Most alarming is the situation in public passenger road transport, which includes public interurban line bus transport by Slovenian carriers. It produced 702 million passenger kilometres in 2011, which is 89 per cent less than in 1990 and 55 per cent less than in 2000.

Following a considerable decline in 1990s, internal passenger rail transport has slowly grown in the last decade, but has been declining again for the last two years. 641 million passenger kilometres were covered in 2011, which is 45 per cent less than in 1990, but 8 per cent more than in 2000.

In the last decade, the number of passengers in interurban bus transport declined by 53 per cent, and by 36 per cent in urban buses. 32.4 million passengers rode travelled by interurban bus and 46 million by urban bus in 2011. In the same year, internal rail passenger transport was used by 14.8 million passengers. Due to Slovenia's accession to the EU and the Schengen area, and the offer of low-budget airlines, the number of air passengers has grown rapidly in recent years, peaking in the period of our Presidency of the EU in 2008 (1.7 million). In 2011, rapid growth in the number of passengers was recorded in port transport, i.e. from 71,000 in 2010 to 133,000 in 2011. A decline in the number of passengers in all types of transport has been recorded since 2008 and 2009, which is probably due to the global economic crisis that commenced at that time.

#### Number of accidents, fatalities and injured persons in road and rail transport [PR10]:

The indicator defines the number of accidents, fatalities and severely injured persons in road and rail transport in Slovenia between 1991 and 2010. Despite the measures taken, traffic safety is still unsatisfactory, and significantly reduces the quality of life in our society and of all its members. 137 road users per million inhabitants died in road transport in EU Member States in 1995. In that same year, 208 people died in Slovenia, exceeding the European average by 52 per cent. According to this criterion, Slovenia was among the most dangerous European countries regarding transport in 1995. In 2009, there were 84 fatalities per million inhabitants in Slovenia, which was still 20 per cent more than the EU average, where 69 road users died per million inhabitants in road traffic. 303 accidents happened in rail transport between 2004 and 2010, in which 77 people died and 168 people were seriously injured.

### **5.1.8 Cultural heritage**

#### **Current state**

Cultural heritage protection in the integration of transport infrastructure is provided for in the drafting and adopting of the plan by taking into account acts of declaration of immovable monuments registered archaeological sites and acts on the conservation of heritage sites, and by assessing impacts on heritage in the CEIA and EIA procedures. Pursuant to the Cultural Heritage Protection Act, the existing protection regimes, and other criteria and conditions apply to the implementation of activities in units of cultural heritage included in expert protection designs prepared by the ZVKDS according to the previously applicable legislation until protected areas of heritage have been determined.



The number of registered units of cultural heritage has been increasing recently, in particular the number of registered archaeological sites. The integration of new infrastructure facilities may degrade archaeological remains in the ground.

The impact of the integration of transport infrastructure is especially noticeable in the following areas of cultural heritage: cultural landscapes, historic landscapes, urban heritage, garden architectural heritage, archaeological sites and influence areas of architectural heritage. The integrity of these areas must be preserved by the suitable use of their space.

### **Display of the state of the environment with selected indicators**

#### Cultural heritage units

32,035 units of heritage are recorded in the Cultural Heritage Register at the Ministry of Culture (September 2013), i.e.:

- 22,475 units of architectural heritage, which can be secular (14,374 units), religious (7,916 units) and religious/secular (185 units);
- 1,360 units of urban heritage,
- 3,386 units of archaeological heritage;
- 4,156 units of memorial heritage;
- 234 units of cultural landscape;
- 247 units of garden architecture heritage;
- 39 units of historic landscape;
- 129 units of other heritage (for example, technical heritage, areas of abandoned villages, locations of castles).

Units of cultural heritage in Slovenia are shown in Chapter 5.2.

The number of registered units of cultural heritage has been increasing recently, in particular the number of registered archaeological sites. The integration of new infrastructure facilities presents the possibility of degrading archaeological remains in the ground.

Three monuments (the Plečnik Žale Cemetery, the Franja Partisan Hospital, the Memorial Church of the Holy Spirit in Javorca) have a European Heritage Label, and another two (pre-historic pile dwellings in Ig and the Ljubljana Marshes, mercury mining tradition in Idrija) are on the UNESCO World Heritage list in the cultural heritage category.

#### Consents issued for activities in units of cultural heritage by types of activity

In 2013, the Institute for the Protection of Cultural Heritage of Slovenia issued approximately 6,500 consents for activities in units of cultural heritage (Business Report for 2013, ZVKDS, 2014). The number of consents has been falling, a consequence of the recession. The number of major investments has reduced, while the number of minor activities in heritage facilities has grown.

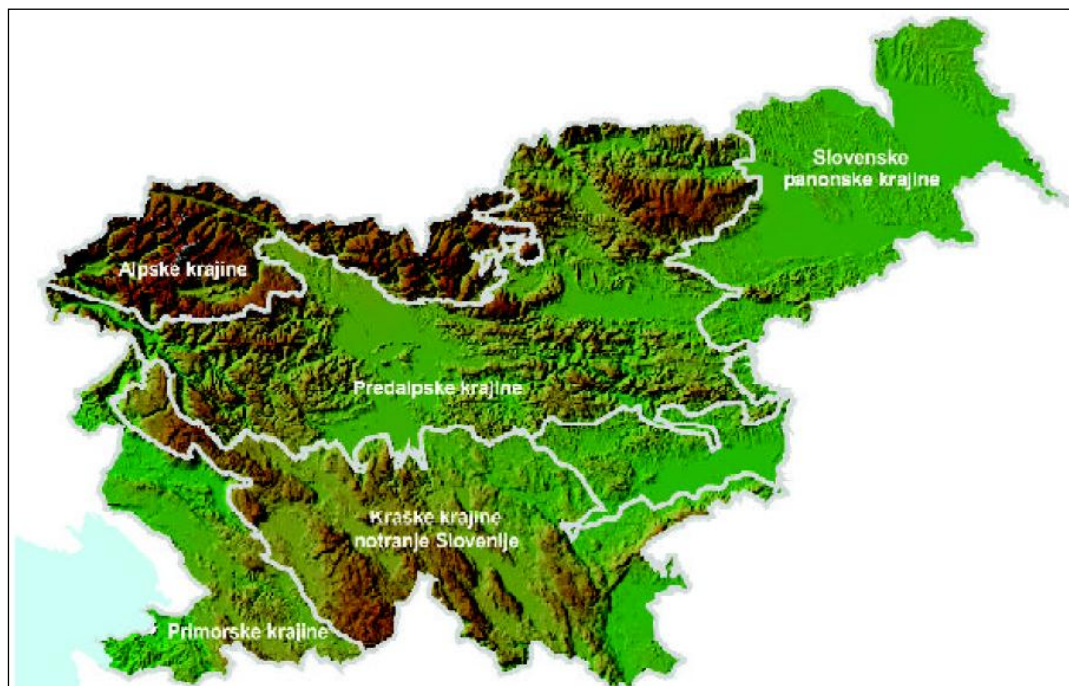
#### Number/scope of preliminary archaeological research carried out

The data is collected by the Centre for Preventive Archaeology. The data include information on the number of preliminary archaeological studies and their locations.

## **5.1.9 Landscape**

### **Current state**

Landscapes in Slovenia are very diverse in terms of morphological features, which is the result of natural conditions, especially variegated geomorphology and various climate zones, the use of space, historical development and the variety of cultural milieus. Thus landscapes in Slovenia show great diversity and richness of landscape patterns. Slovenia has five basic landscape areas that are primarily defined by climate, i.e.: Alpine landscapes, landscapes of the sub-Alpine world, landscapes of the Pannonian world, landscapes of the karst world of inland Slovenia and the littoral world.



Landscapes of the Pannonian world

Alpine landscapes

Landscapes of the sub-Alpine world

Landscapes of the karst world of inner Slovenia

Littoral landscapes

**Figure 29 Basic landscape areas in Slovenia (Source: BF, 2002)**

Exceptional landscapes and landscape areas with distinctive features at the national level have a special status. They are defined by the Spatial Planning Strategy of Slovenia – there are 93 areas of exceptional landscapes and 60 landscape areas with distinctive features. Landscape areas with distinctive features at the national level are areas that include recognisable and representative parts of the Slovenian landscape, with well-preserved landscape elements; in particular, these are areas of outstanding landscape with rare or unique patterns of landscape structure and a spatially underlined cultural heritage of high testimonial and memorial value, in combination with exceptional forms of natural elements, and with valuable natural features. Areas of exceptional landscapes and landscape areas with distinctive features are displayed in Chapter 5.2.

The state of Slovenian landscapes is characterised in certain areas by diversity, a high level of preservation of natural resources and preservation of cultural elements of the landscape. Many forms of degradation are noticeable in other areas, such as non-restored or poorly arranged quarries, gravel pits and clay pits, overly regulated watercourses, inadequate construction activities in the form of large cuts and embankments, inadequate levelling of terrain and fragmentation caused by transport infrastructure.

The transformation of the environment so far has been quite spontaneous and is also shown in trends of irrationally dispersed construction outside settlements and in the degradation of exceptional landscape areas. The construction of transport and energy infrastructure reflected in the fragmentation of the environment contributes significantly to the noticeable transformation. In addition to breaking up the environment, fragmentation also has morphological characteristics that are similar in all local landscape conditions. The development of transport infrastructure so far has focused on the construction of the motorway network and has reinforced the gravitational role of major urban centres,

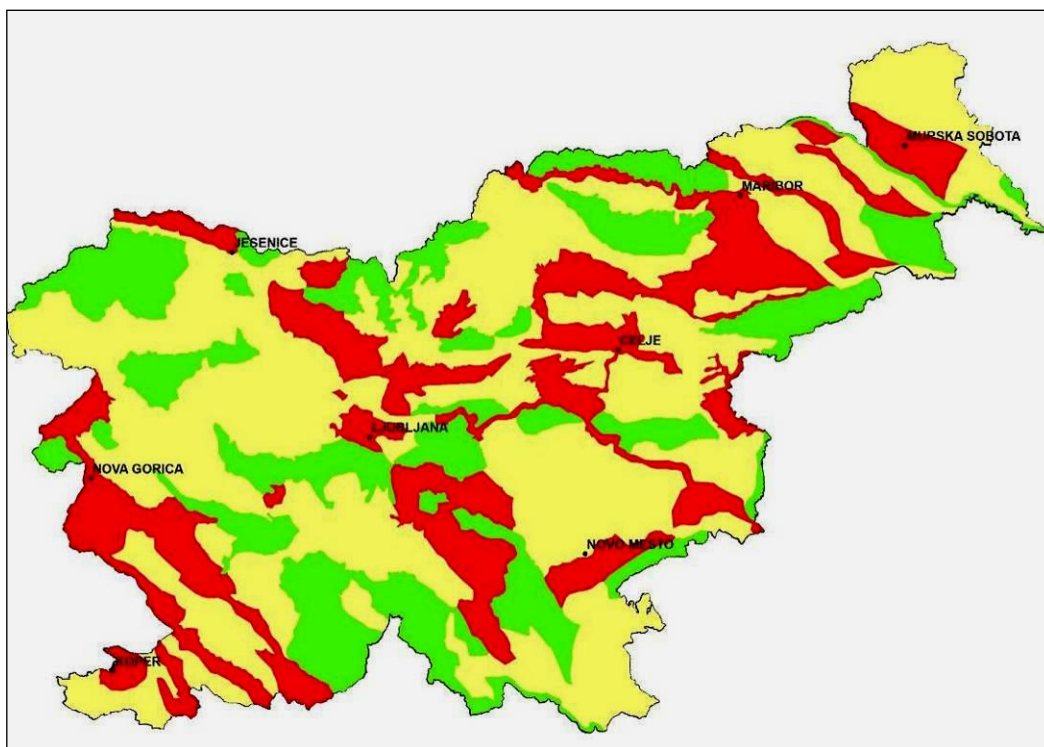
while neglecting certain regional development centres. The result of such development is more dense population in transport network corridors and dispersed buildings in settlements in the wider areas of towns, and the emptying of extensive areas which will not be reached by the gravitational impact of regional centres even after the construction of the motorway system.




#### Display of the state of the environment with selected indicators

The description of the indicator can be found in the study 'Evaluation of landscape subunits', which was carried out during the preparation of the landscape typology 'Characteristic landscape patterns in Slovenia (J. Marušič and associates, 1995). In the last decade, no comprehensive evaluations have been carried out, and no data and complex information on the state of landscape areas have been collected.

The study divided landscapes in Slovenia into four levels. Grades from 1 to 5 were given to landscape sub-units at level 4. Areas with conserved natural elements, exceptionally balanced cultural landscape or special symbolic meaning were assessed with 1–2. Well-conserved natural areas and cultural landscape without dominant features or attractiveness were assessed with 2–3. Major degradations were assessed with 3–4: dispersed settlements, vast industrial areas, damaged landscape structures and dense infrastructure (Figure 30). Most grades were between 2 and 4, while no unit was assessed with 5, which is the result of particular forms of degradation which did not affect the value of the whole unit. Relatively high grades for landscape point to the fact that the landscape is still well conserved, especially in rural areas.

No mechanisms for monitoring the situation in the environment or records have been established for the purpose of maintaining and conserving landscape areas at the national level. These areas are conserved within the scope of nature conservation/protected areas, the promotion of rural development (agriculture)/subsidies or protection regimes, the conservation of cultural heritage/landscape cultural heritage, and within the scope of water management/limitations on activities in riparian areas.



Legenda:	
	1-2 = območja z ohranjenimi naravnimi prvini, izjemno uravnoteženo kulturno krajino ali z posebnimi simbolnimi pomeni
	2-3 = dobro ohranjena naravna območja in kulturna krajina brez izstopajočih posebnosti ali privlačnosti
	3-4 = območja večjega razvrednotenja (razpršena poselitve, industrija, gosta infrastruktura, poškodovane krajinske strukture)

Legend:

1–2 = areas with conserved natural elements, exceptionally balanced cultural landscape or special symbolic meaning

2–3 = well-conserved natural areas and cultural landscape without dominant features or attractiveness

3–4 = areas of major degradations (dispersed settlements, industry, dense infrastructure, damaged landscape structures)

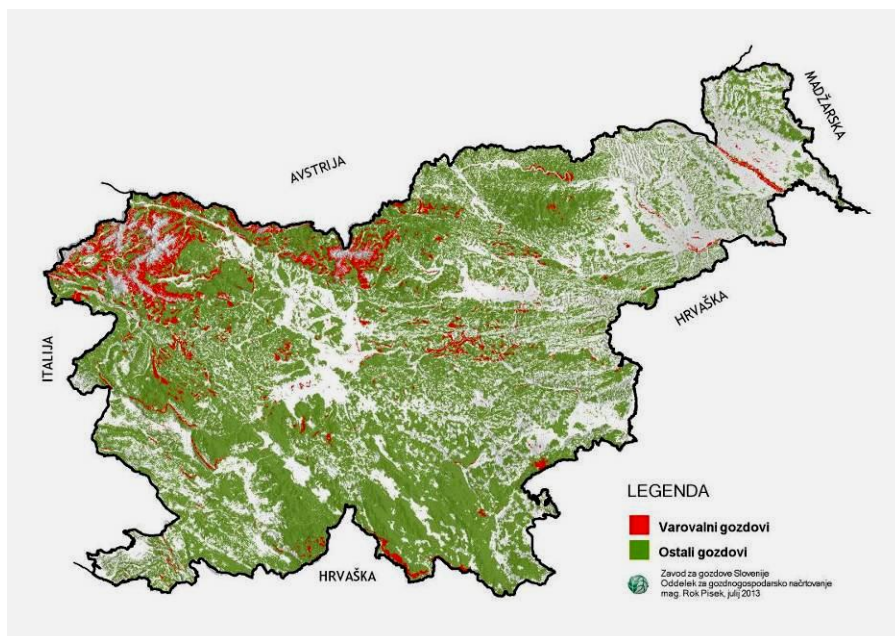
Figure 30 Evaluation of landscape subunits (J. Marušič and associates, 1995)

## 5.2 Display of conservation, protected, brownfield and other areas, and a summary of existing legal regimes

### Soil and mineral resources

Protection regimes concerning agricultural land and forest protection in Slovenia are defined in the following regulations:

- Articles from 3.č to 3.f of the Agricultural Land Act (Official Gazette of the Republic of Slovenia, nos. 71/11 and 58/12) prescribe agricultural land protection;
- Article 9 of the Regulation on protective forests and forests with a special purpose (Official Gazette of the Republic of Slovenia, nos. 88/05, 56/07, 29/09, 91/10 and 1/13) defines the conditions for activities in protective forests. Protective forests are shown in Figure 31.



### LEGEND

Protective forests

Other forests

Slovenia Forest Service, Department of Forest Management Planning, Rok Pisek, MSc, July 2013

**Figure 31 Protective forests in Slovenia (Source: SFS, 2013)**

**Air**

Areas with air pollution are defined in the Order on the establishment of zones and the classification of zones, agglomerations and subzones in relation to ambient air pollution (Official Gazette of the Republic of Slovenia, no. 50/11). Pollutant levels in terms of the assessment threshold are shown in Table 9 and figure 32.

**Table 9 Pollutant levels in ambient air in individual areas and agglomeration in terms of the lower and upper assessment thresholds**

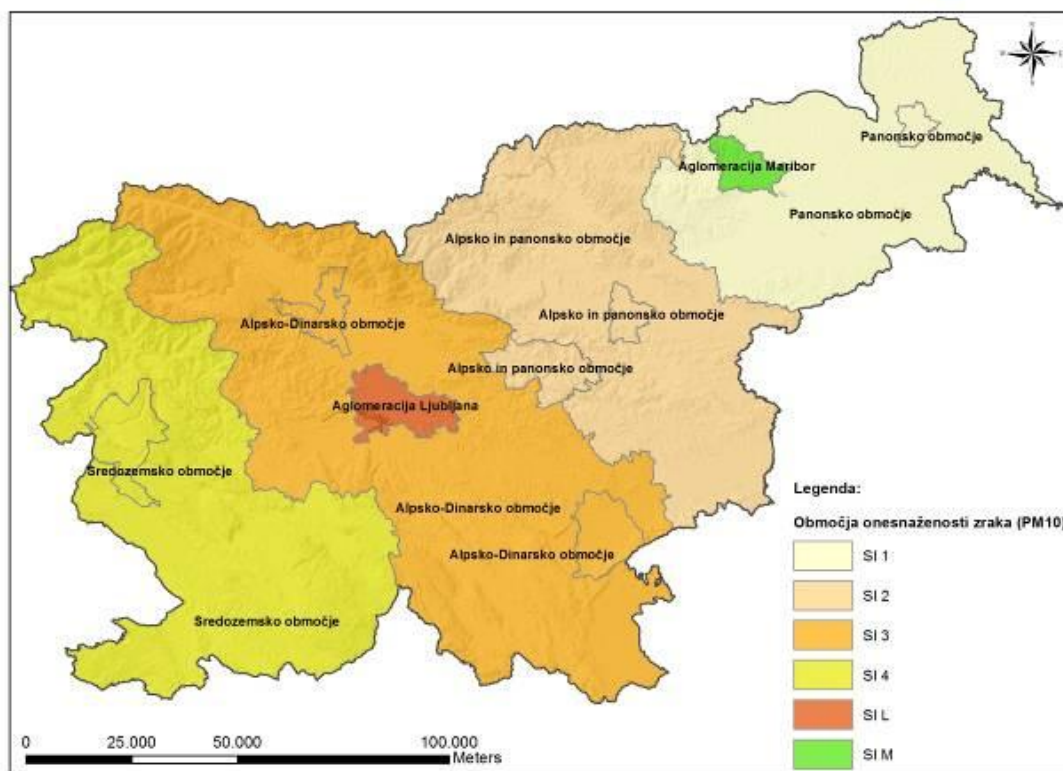
Oznaka območja ali aglomeracije	SO <sub>2</sub>	NO <sub>2</sub>	NO <sub>x</sub>	PM <sub>10</sub>	svinec	CO	benzen	ozon	arzen	kadmij	nikelj	benzo(a)piren
SI1	1	1	1	3	1	1	1	3	1	1	1	1
SI2	1	1	1	3	1	1	1	3	3	3	1	1
SI3	1	1	1	3	1	1	1	3	1	1	1	1
SI4	1	1	1	3	1	1	1	3	1	1	1	1
SIL	1	3	-	3	1	1	3	3	1	1	1	3
SIM	1	3	-	3	1	1	3	3	1	1	1	3

Legenda tabele B:	
Oznaka	Raven koncentracije
1	pod spodnjim ocenjevalnim pragom
2	med spodnjim in zgornjim ocenjevalnim pragom
3	nad zgornjim ocenjevalnim pragom
-	v aglomeraciji se ravni NO <sub>x</sub> za varstvo rastlin in ekosistemov ne ocenjuje

Area or agglomeration designation	SO <sub>2</sub>	NO <sub>2</sub>	NO <sub>x</sub>	PM <sub>10</sub>	Lead	CO	Benzen	Ozone	Arsenic	Cadmium	Nickel	Benzo(a)pyrene
SI1												
SI2												
SI3												
SI4												
SIL												
SIM												

Legend of Table B:	
Designation	Concentration level
	Below the lower assessment threshold
	Between the lower and upper assessment thresholds
	Above the upper assessment threshold
	In the agglomeration, the level of NO <sub>x</sub> for plant and ecosystem protection is not assessed.





Pannonian area  
 Maribor agglomeration  
 Pannonian area  
 Alpine and Pannonian area  
 Alpine and Dinaric area  
 Alpine and Pannonian area  
 Ljubljana agglomeration  
 Mediterranean area  
 Alpine and Dinaric area  
 Alpine and Dinaric area  
 Mediterranean area

**Legend**

**Areas of air pollution (PM<sub>10</sub>)**

**Figure 32 Areas of air pollution (PM<sub>10</sub>) in Slovenia (Source: Geoportal ARSO, 2014)**

**Noise pollution**

Limit, critical and peak values in Slovenia are laid down by the Decree on limit values for environment noise indicators (Official Gazette of the Republic of Slovenia, nos. 105/2005, 34/2008, 109/2009, 62/2010). The decree determines various limit values for areas with different intended use of space by taking into account their sensitivity to noise pollution. In view of sensitivity, areas with different intended uses of space are categorised into four levels of noise protection. The limit and critical values of noise indicators for individual noise protection areas are shown in Table 10.

**Table 10 Limit and critical values of noise indicators in dB(A)**

Area, limit indicators	L <sub>DAY</sub>	L <sub>EVENING</sub>	L <sub>NIGHT</sub>	L <sub>DEN</sub>
<i>Limit values of noise indicators for the area</i>				
<b>Area I</b>	-	-	<b>40</b>	<b>50</b>
<b>Area II</b>	-	-	<b>45</b>	<b>55</b>
<i>Area III</i>	-	-	50	60
<b>Area IV</b>	-	-	<b>65</b>	<b>75</b>
<i>Critical values of noise indicators for the area</i>				
<b>Area I</b>	-	-	<b>47</b>	<b>57</b>
<b>Area II</b>	-	-	<b>53</b>	<b>63</b>
<i>Area III</i>	-	-	59	69
<b>Area IV</b>	-	-	<b>80</b>	<b>80</b>
<i>Limit values of indicators of noise from the use of roads, railways or major airports</i>				
<b>Area I</b>	<b>55</b>	<b>50</b>	<b>45</b>	<b>55</b>
<b>Area II</b>	<b>60</b>	<b>55</b>	<b>50</b>	<b>60</b>
<i>Area III</i>	65	60	55	65
<b>Area IV</b>	<b>70</b>	<b>65</b>	<b>60</b>	<b>70</b>

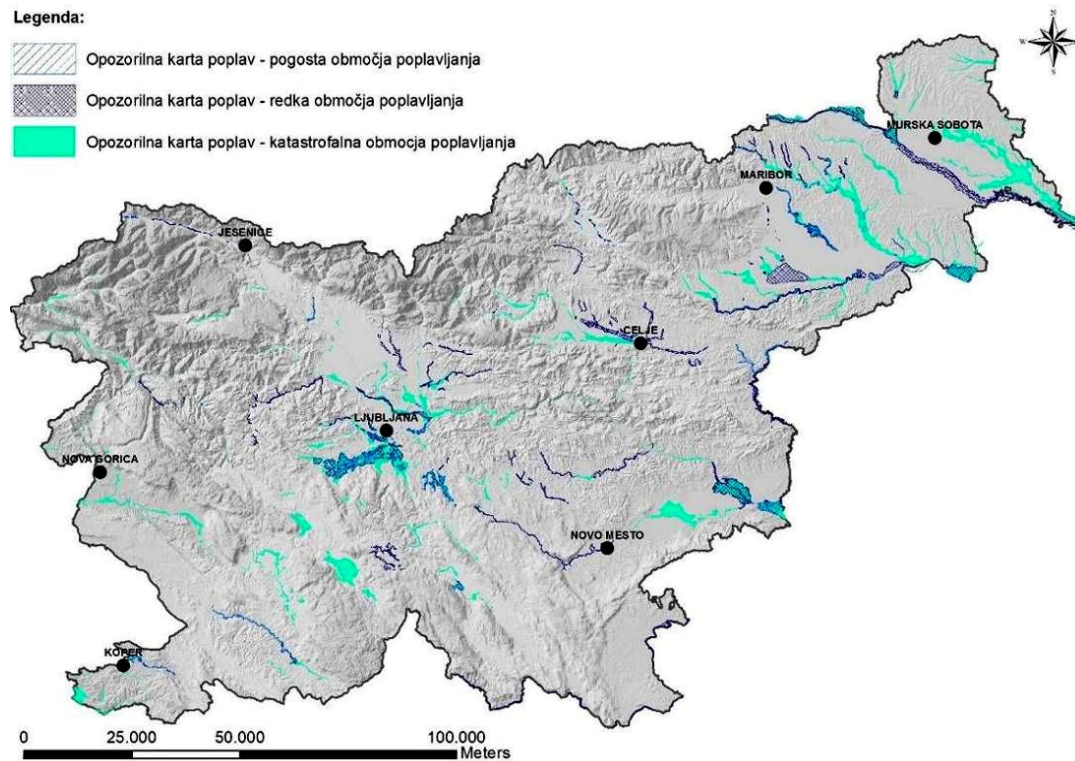
## Water

### Flood, erosion and landslide areas

Flood, erosion and landslide areas are determined by Articles 86, 87, 88 and 89 of the Waters Act. The largest flood areas are: the Ljubljana Marshes, the Dravinja River, the Krka River below Otočec, the Lower Savinja Valley, the Sava River between Krško and the state border, the Sotla River and the Cerknica Plain.

The flood warning map (Figure 33) provides information on the scope and frequency of floods in individual areas.





Legend:

Flood warning map – areas of frequent floods

Flood warning map – areas of rare floods

Flood warning map – areas of catastrophic floods

**Figure 33 Flood warning map (Source: Geoportal ARSO, 2014)**

Pursuant to the EU Floods Directive, areas where floods have a significant impact have been determined for Slovenian territory (Figure 34).

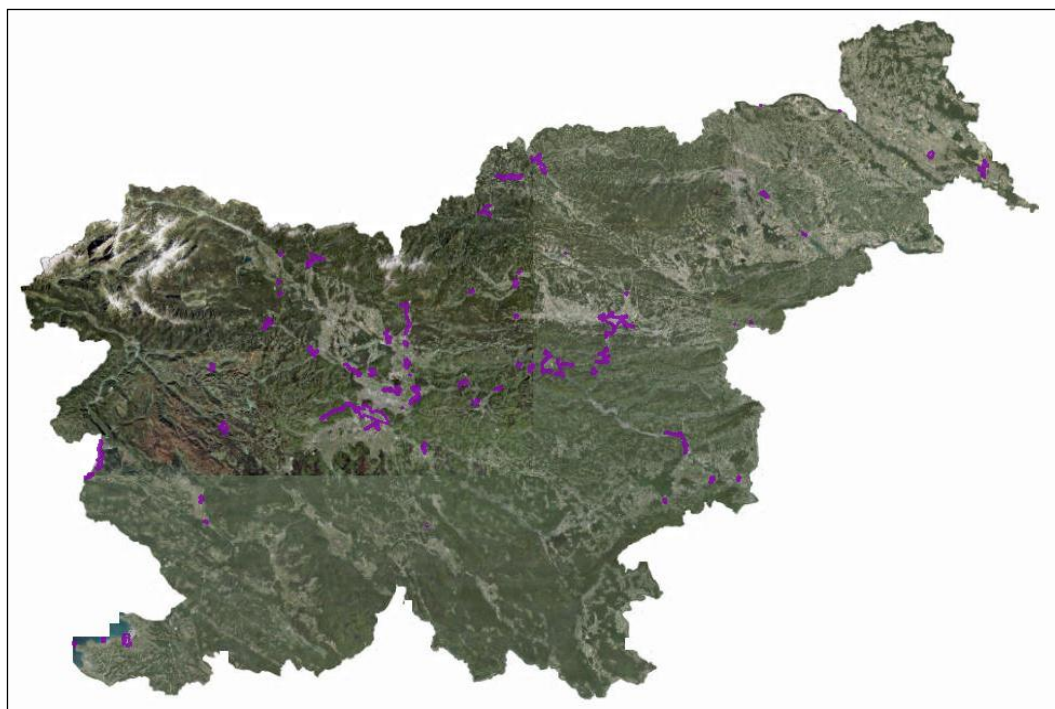
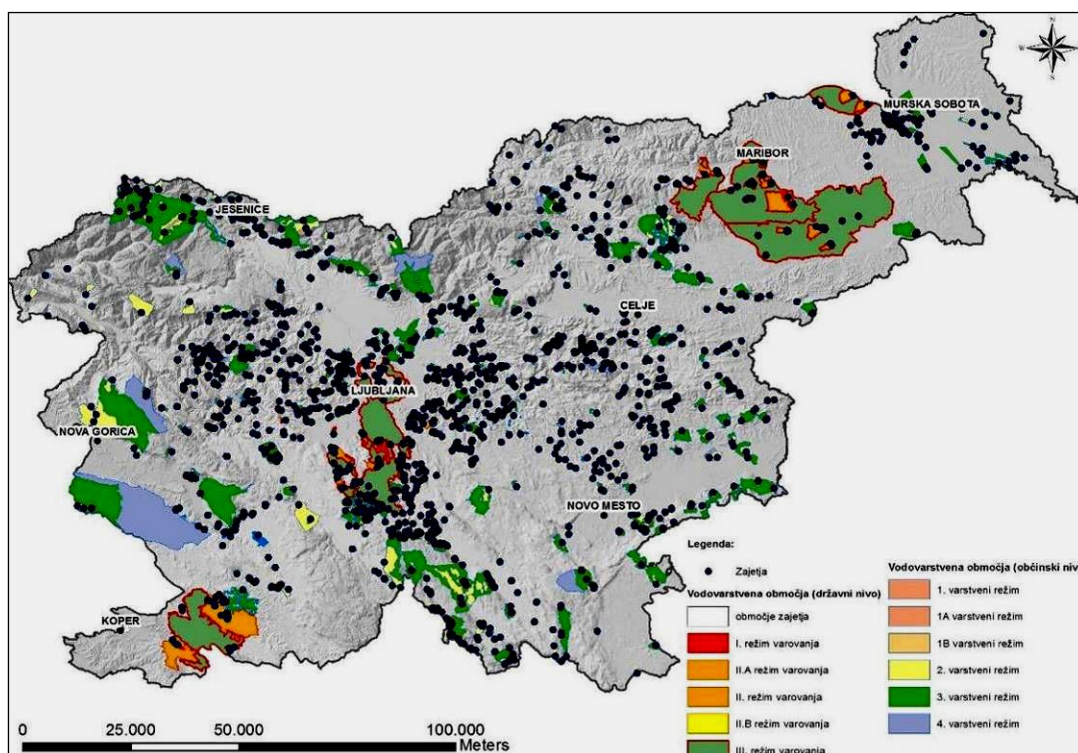


Figure 34 Areas of significant flood impact (Source: Geoportal ARSO, 2014)

An integral map of flood hazards is being prepared, and will be available on the Geoportal ARSO.

#### Water protection areas

Figure 35 shows water protection areas at the national and municipal levels. The area with captured and potential water sources comprises over half of Slovenian territory. Municipal decisions or state regulations and the Rules on criteria for the designation of a water protection zone (Official Gazette of the Republic of Slovenia, nos. 64/04, 5/06, 58/11) which also include protection regimes apply to activities in water protection areas.



**Legend:**

**Catchments**

**Water protection areas (national level)**

Catchment area  
Protection regime I  
Protection regime IIA  
Protection regime II  
Protection regime IIB  
Protection regime III

**Water protection areas (national level)**

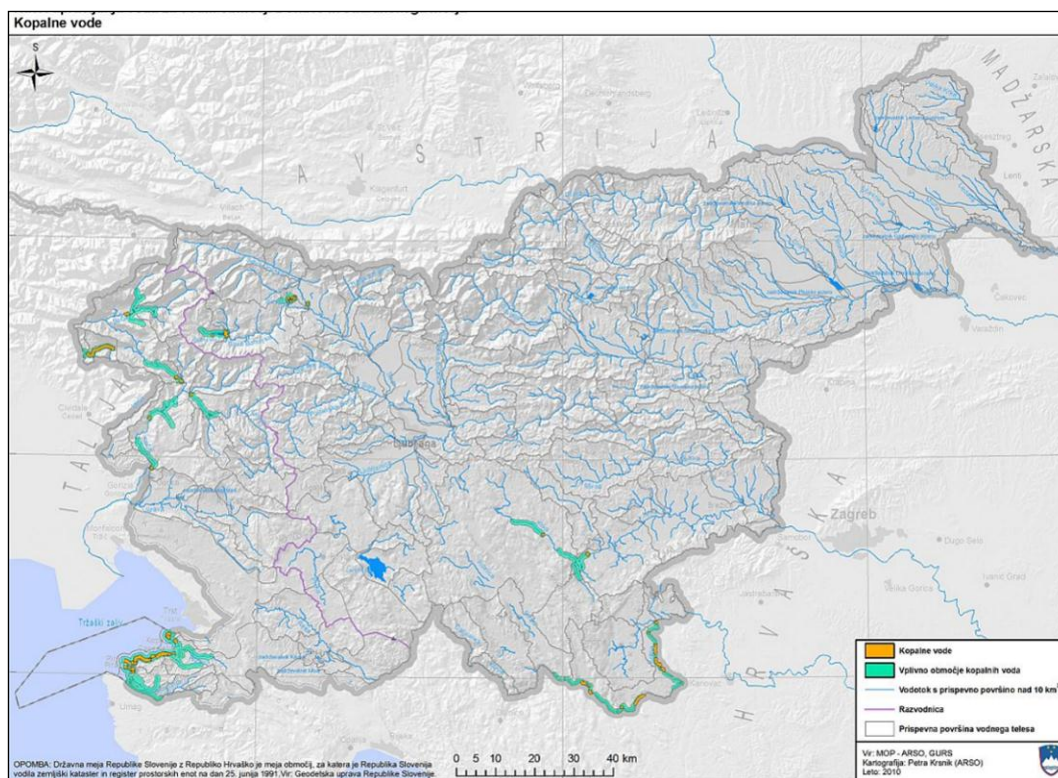
Protection regime 1  
Protection regime 1A  
Protection regime 1B  
Protection regime 2  
Protection regime 3  
Protection regime 4

**Figure 35 Display of water protection areas (Source: Geoportal, 2014)**

Bathing waters

Bathing waters are determined in the Act Amending the Waters Act (Official Gazette of the Republic of Slovenia, no. 57/08, Articles 31 and 31). The list of bathing waters, and the type and manner of implementing tasks of bathing water quality management are determined in more detail by two implementing regulations, i.e. the Decree on the management of bathing water quality (Official Gazette of the Republic of Slovenia, no. 25/08) and the Rules on detailed criteria for the identification of bathing water (Official Gazette of the Republic of Slovenia, no. 39/08). Areas of bathing waters are shown in Figure 36.





## Bathing waters

Bathing waters

Influence area of bathing waters

Watercourse with a catchment area of over 10 km<sup>2</sup>

Watershed

Catchment area of a body of water

Source: MOP, ARSO, GURS

Cartography: Petra Krsnik (ARSO)

Year: 2010

NOTE: the state border between the Republic of Slovenia and the Republic of Croatia is a border between areas for which the Republic of Slovenia kept a land cadastre and a register of spatial units as of 25 June 1991. Source: Surveying and Mapping Authority of the Republic of Slovenia.

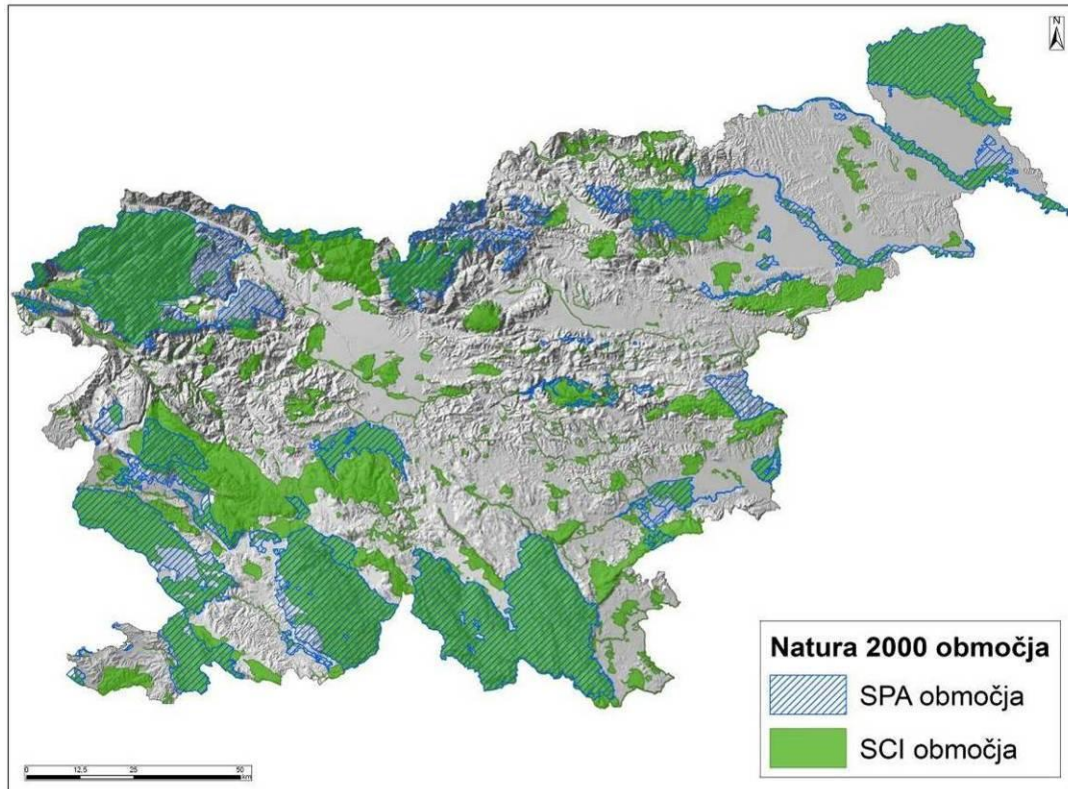
**Figure 36 Display of bathing water areas (Source: WMP)**

## Nature

Activities and interventions in **Natura 2000 sites** (SPA and SCI areas) must be planned pursuant to Article 7 of the Decree on special protection areas (Natural 2000 areas) (Official Gazette of the Republic of Slovenia, nos. 49/04, 110/04, 59/07, 43/08, 33/13, Constitutional Court Decision – no. 39/13, 3/14).

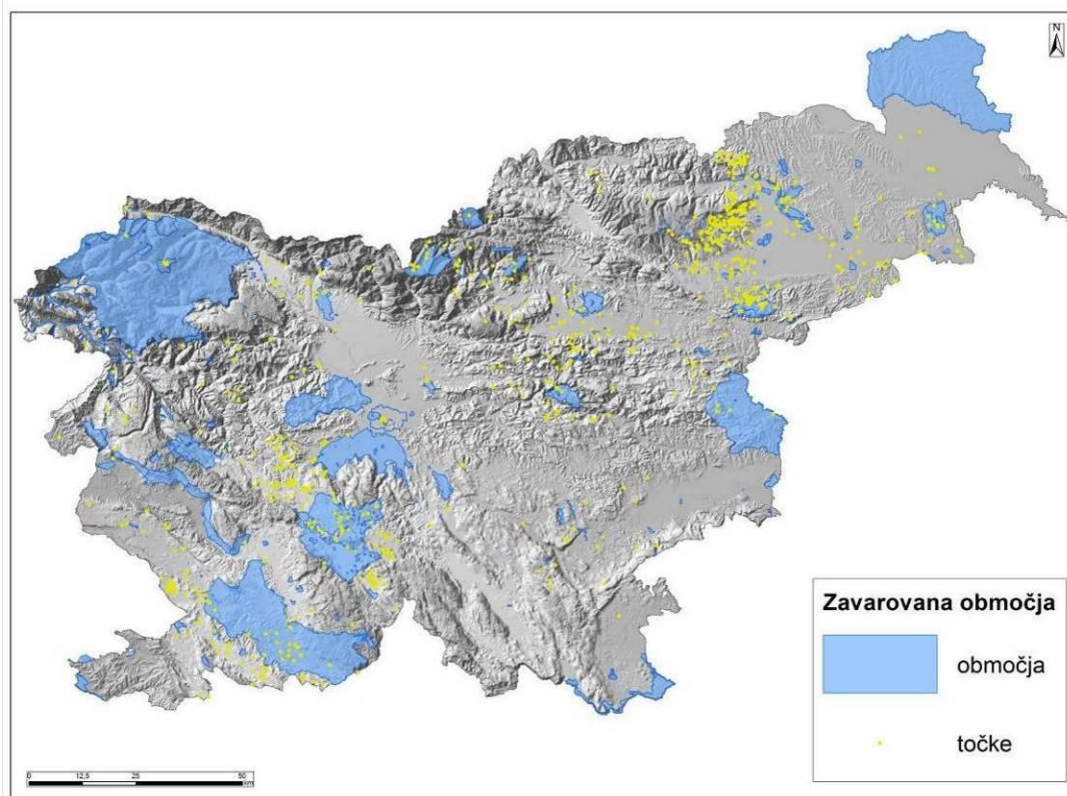
In these areas (figure 37), it is necessary to carry out assessments of the acceptability of activities in nature pursuant to Article 28 of the Nature Conservation Act (Official Gazette of the Republic of Slovenia, nos. 96/04 –ZON-UPB2, 46/14- ZON-C). If an activity is carried out, all possible technical and other measures must be foreseen and implemented to minimise the adverse effects on habitat types, plants and animals and their habitats. Especially those protection objectives defined for each of the Natura 2000 sites must be taken into account.

Interventions and activities in **protected areas** (Figure 38) must be conducted in accordance with the act on protection, and with the management plan of a national and regional park. (A national and regional park must have a management plan). Prohibitions, limitations and regimes are laid down in the Nature Conservation Act (Official Gazette of the Republic of Slovenia, nos. 96/04 –ZON-UPB2, 46/14- ZON-C), i.e. for natural monuments (Article 64), strict nature reserves (Article 65), nature reserves (Article 66), large protected areas (Articles 67 and 68), national parks (Article 69), regional parks (Article 70) and landscape parks (Article 71).



**Natura 2000 sites**  
SPA areas  
SCI areas

Figure 37 Display of Natura 2000 sites (SPA; SCI) (Source: Geoportal, 2014)



**Protected areas**

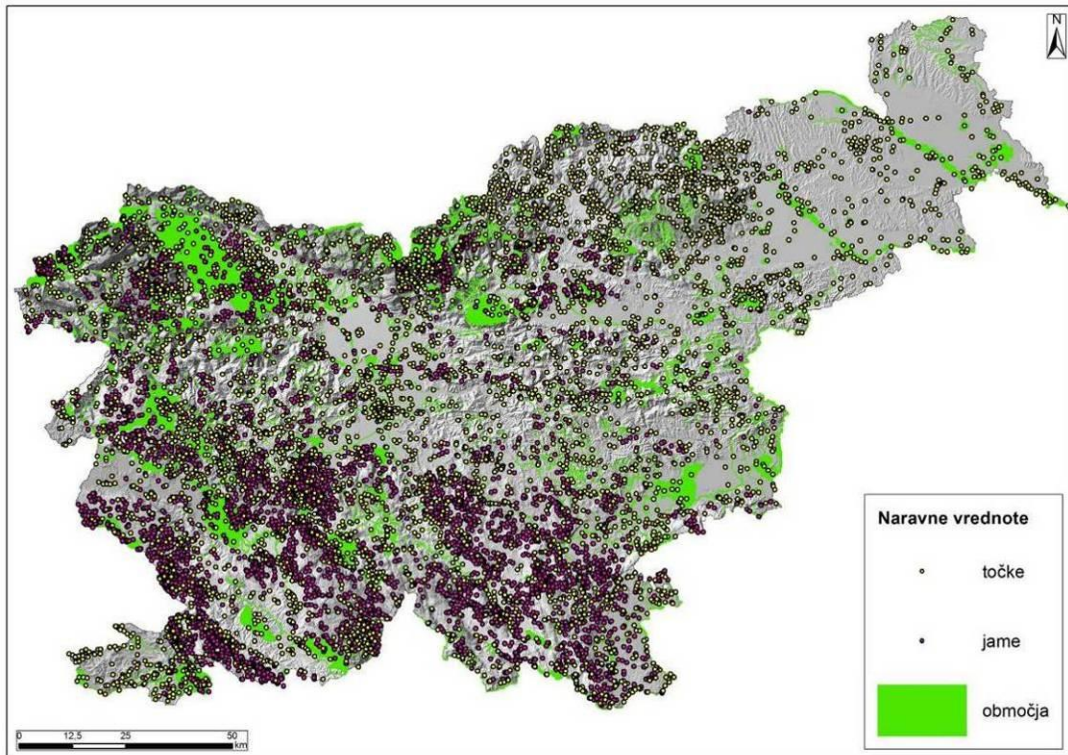
Areas

Spots

**Figure 38 Display of protected areas (Source: Geoportal, 2014)**

Valuable natural features, including protection regimes, are determined by the Rules on the designation and protection of valuable natural features (Official Gazette of the Republic of Slovenia, nos. 111/04, 70/06, 58/09, 93/10).



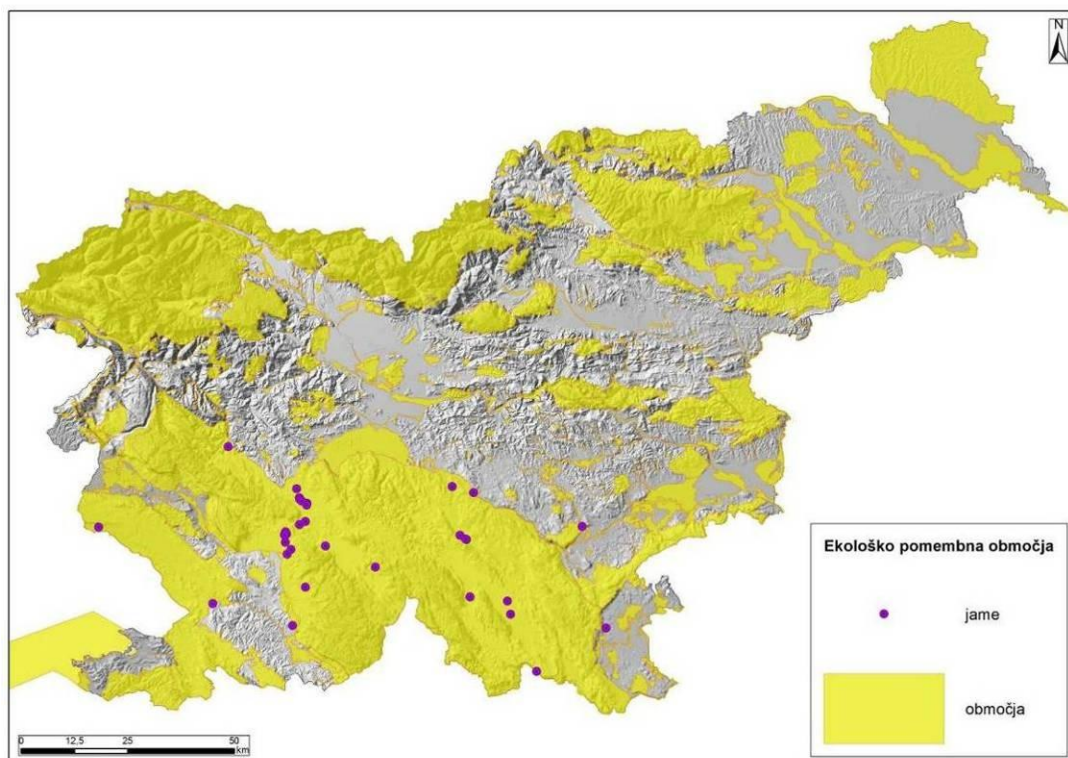


**Valuable natural features**

Spots  
Caves  
Areas

**Figure 39 Display of valuable natural features (Source: Geoportal, 2014)**

Important ecological areas are determined by the Decree on important ecological areas (Official Gazette of the Republic of Slovenia, nos. 48/04, 33/13), Article 5 of which defines behaviour in these areas.



Important ecological areas  
Caves  
Areas

Figure 40 Display of important ecological areas (Source: Geoportal, 2014)

### Cultural heritage

Pursuant to Article 131 of the Cultural Heritage Protection Act (Official Gazette of the Republic of Slovenia, nos. 08, 123/08, 8/11, 90/12 and 111/13), the existing protection regimes (Handbook of legal protection regimes), and other criteria and conditions apply to the implementation of activities in units of cultural heritage included in expert protection designs prepared by the ZVKDS according to the previously applicable legislation until protected heritage areas have been determined.



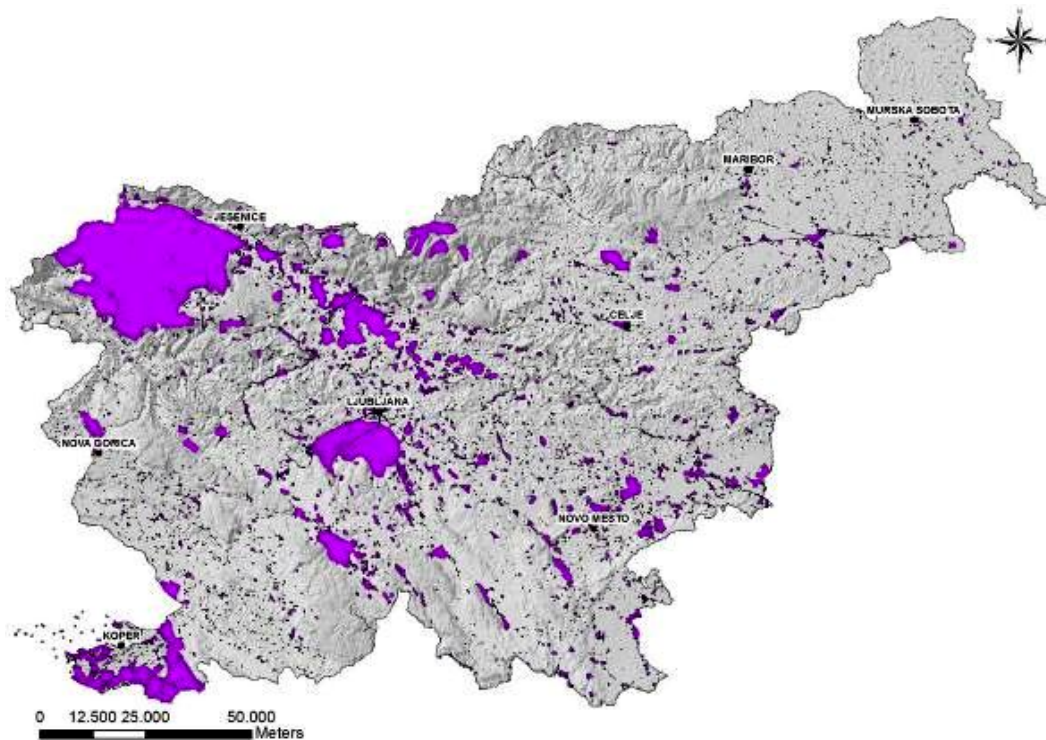
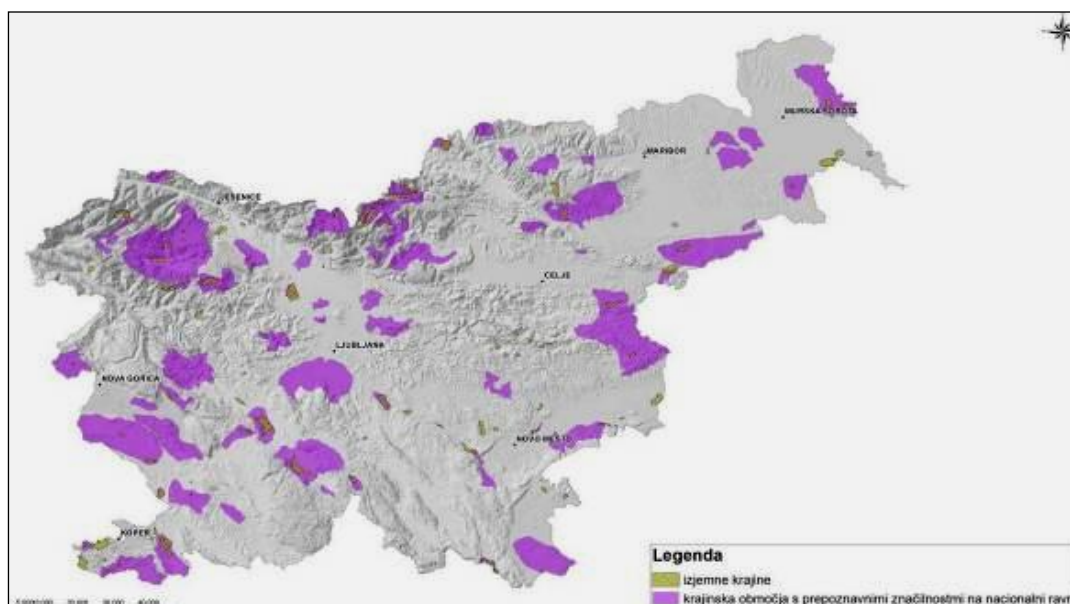


Figure 41 Units of cultural heritage in Slovenia (Source: Heritage Information and Documentation Centre, 2014)

### Landscape

Exceptional landscapes and landscape areas with distinctive features at the national level have a special status. They are defined by the Spatial Planning Strategy of Slovenia; there are 93 areas of exceptional landscapes and 60 landscape areas with distinctive features.



### Legend

Exceptional landscapes

Landscape areas with distinctive features at the national level

Figure 42 Areas of exceptional landscapes and landscape areas with distinctive features (Source: SPSS, 2004)

### **5.3 Development status without the implementation of measures from the Transport Development Strategy in the Republic of Slovenia**

#### **5.3.1 Soil and mineral resources**

##### *Use of agricultural land and woodland*

If the Strategy is not adopted, the actual use of the volume of agricultural land and woodland will remain at the present level. Transport infrastructure will not be reconstructed or constructed on the basis of an analysis of needs and options; therefore, the construction of new transport infrastructure may be unplanned, which could have a negative effect on the actual use of space, and the volume of agricultural land and woodland.

##### *Mineral resources and waste management*

If the Strategy is not adopted, transport infrastructure will not be constructed or modernised in such a way that the excavated soil and construction waste is handled so that most of it is reused at a transport infrastructure construction site or recycled into building material. The unplanned or random construction of transport infrastructure facilities also prevents the use of large quantities of building materials produced by recycling building materials from other construction sites or processing other types of waste which are used to produce building materials of the same quality as building materials from natural mineral resources.

#### **5.3.2 Air**

If the Strategy is not adopted, transport infrastructure will not be planned and arranged in a way that eliminates congestions in road transport, which will prevent smooth and less environmentally burdening traffic, taking into account anticipated transport growth, especially on the road network. The lack of investment in the reconstruction of the railway network also means that most of the do-nothing scenario regarding the anticipated growth in goods transport will not be implemented on the railway network, which will put additional pressure on the use of fuel in road transport and on ambient air pollution due to substance emissions into the air.

Regardless of the fact that the greatest contribution to attaining the environmental objective regarding ceilings of pollutant emissions from transport is expected to come from the use of more and more energy-efficient vehicles, disorganised and congested traffic on the road network undoes all the effects of using vehicles produced in accordance with the technical standards. Despite technically enhanced vehicles, congestion on the road network and increasingly reduced travel speed in urban centres will prevent the emission of pollutants from traffic from being reduced in the medium term so they do not exceed pollutant emission ceilings, especially of NO<sub>x</sub> and PM<sub>2,5</sub> which are anticipated for transport in this Environmental Report and are likely to be determined in the amended Operational programme for complying with national emission ceilings for atmospheric pollutants, which will have to be prepared following the adoption of the directive on national emission ceilings.

#### **5.3.3 Climate factors**

##### **5.3.3.1. Climate change adaptation**

If the Strategy is not adopted, the implementation of measures to reduce the sensitivity of transport infrastructure to climate change will not be systematically approached in the course of planning and arranging transport infrastructure, where the main emphasis is placed on reducing sensitivity to flooding, snow and glaze ice. Each new construction or reconstruction of transport infrastructure must be analysed regarding its sensitivity to extreme weather phenomena, while the financial costs of

potential infrastructure damage and congestion must be preliminarily evaluated. Based on the analysis of the sensitivity of transport infrastructure to extreme weather phenomena, measures must be planned to sustainably reduce negative the effects of climate change on the road network to economically and socially acceptable levels.

### **5.3.3.2 Climate change mitigation**

If the Strategy is not adopted, transport infrastructure will not be planned and arranged in a way that eliminates congestion in road transport, which will prevent smooth and less environmentally burdening transport, taking into account anticipated transport growth, especially on the road network. The lack of investments in the reconstruction of the railway network also means that most of the do-nothing scenario regarding the anticipated growth in goods transport will not be implemented on the railway network, which will put additional pressure on the use of fossil fuels in road transport and on climate factors due to greenhouse gas emissions. The implementation of measures to mitigate climate change by reducing greenhouse gas emissions in sectors covered by Decision No 406/2009/EC will be noticeably at risk, since greenhouse gas emissions from transport produce almost half of all greenhouse gas emissions.

Also in the case of greenhouse gas emissions, the greatest contribution to attaining the environmental objective regarding the target annual quantity of greenhouse gas emissions is expected to come from the use of more and more energy-efficient vehicles; however, disorganised and congested traffic on the road network undoes all the effects of using vehicles produced in accordance with the technical standards. Despite technically enhanced vehicles, congestion on the road network and increasingly reduced travel speed in urban centres will prevent the emission of pollutants from traffic from being reduced below the 2008 level, so they do not exceed the target annual quantity of greenhouse gas emissions defined for the transport sector in 2020 and 2030 in the proposed Operational programme of measures to reduce greenhouse gas emissions by 2020 with a vision by 2030.

### **5.3.4 Water**

If the Strategy is not adopted, transport infrastructure and policy will not be planned and arranged in a comprehensive manner. Transport infrastructure will not be reconstructed or constructed on the basis of an analysis of needs and options. Therefore, the construction of new transport infrastructure might not take into account existing natural features (retention surfaces, soil permeability and impact on groundwater quality, etc.).

The Strategy anticipates enhancing the capacity of the railway network, due to which most goods transport will be transferred to the railways. The danger of accidents involving spillages which affect the chemical status of surface and ground water is significantly greater on roads. If the Strategy is not adopted, more frequent goods transport on road infrastructure will increase the possibility of pollution due to accidents involving spillages of hazardous substances.

#### **Nature**

By adopting the Strategy, transport infrastructure and policy will be planned and arranged in a comprehensive manner. Transport infrastructure will be reconstructed and constructed on the basis of an analysis of needs and options. Due to the aforementioned, transport infrastructure will be planned, which also means less need to construct new road sections. As a result, space will not be unnecessarily further fragmented and the migration routes of wild animals will not be affected. Transport policy measures must include the establishment of suitable passages for wild animals if the existing passages prove to be unsuitable or impassable (passage is prevented by fences or roadkill is increased). Most migration problems occur on older sections of motorways with only a few underpasses for wild animals, and no green bridges. For example, the Ljubljana–Postojna motorway section represents a serious threat to the uninterrupted movement of large carnivores (brown bear, wolf and lynx), which has been shown by several studies (e.g. Harmel and associates, 2005; Zavod Symbiosis, 2012). The

need to construct an ecoduct for lynx and bear on the Vrhnika–Postojna section of the Ljubljana–Koper highway has already been recorded (Zavod Symbiosis, 2012). If the Strategy measures are not implemented, roadkill and connections between populations may worsen, which could in turn affect the biodiversity of the area.

The anticipated measures include measures to reduce noise level in the natural environment (e.g. passive noise protection, use of silent asphalt, electronic toll collection) which will have a permanent local positive affect on wild animals. If these measures are not implemented, noise in the natural environment will increase due to more traffic and the poor condition of vehicles.

### **5.3.5 Human health**

#### **5.3.1.1 Air quality**

If the Strategy is not adopted, transport infrastructure will not be planned and arranged, and public transport and special forms of non-motorised passenger road transport will not be promoted in areas where ambient air is excessively polluted in a way that at least halves particulate (especially PM<sub>10</sub>) and pollutant emissions which contribute to the occurrence of secondary particulates (Especially PM<sub>2,5</sub>) as precursors.

Due to congestion in urban areas and the extremely low speeds of road vehicles, even energy-efficient vehicles cannot contribute much to improving ambient air. In such environments, measures must be taken to promote the use of alternative fuels, and in this context, electric vehicles may be the only economical and energy-efficient solution in the long and medium term.

Improving ambient air quality in urban areas and achieving the prescribed standards regarding ambient air quality are key objectives of the ‘Clean Air for Europe’ Programme, which is based exclusively on measures for environmental protection in transport and measures to improve the environmental characteristics of heating devices, especially medium-sized heating devices.

If the Strategy measures are not implemented or included in detailed programmes of measures to reduce pollution with PM<sub>10</sub> particulates prepared on the basis of the adopted ordinances on the air quality plan in areas of excessive ambient air pollution in the municipalities of Kranj, Celje, Novo mesto, Maribor, Murska Sobota and Ljubljana, and in the area of Zasavje, the desired objective, i.e. to achieve the prescribed environmental standards regarding ambient air quality by 2020, will not be attained in these areas.

#### **5.3.1.2 Noise pollution**

The analysis of the do-nothing scenario in the Strategy assesses the exposure of residents to noise along the road and railway networks in the planning period by 2030. The addressed scenario does not comprise any new transport measures, except maintaining the existing situation and taking into account the anticipated growth in transport on the road and railway network. The data from this scenario on the exposure of residents in the light of the recommended and temporary values set by the WHO for the night-time noise indicator are shown in Table 11.

The level of noise pollution would increase, especially due to more goods transport and relatively densely populated settlements along the national road and railway networks. The exposure of residents would increase by 2030 in comparison with the base year 2011, i.e.:

- in the light of the long-term recommended value of 40 dB(A) set by the WHO, by 8 per cent (821,853 residents or 42 per cent of all residents);
- in the light of the temporary recommended value of 55 dB(A) set by the WHO, by 18 per cent (135,523 residents or 7 per cent of all residents).

According to the assessment, 82 per cent of residents will be affected by road transport and 18 per cent by rail transport on the existing network in the planning period.

**Table 11 Exposure of residents to noise from road and rail transport in 2030 in the light of the recommended values of night-time noise indicator set by the WHO, the do-nothing scenario (Source: Strategy, 2014)**

Night-time, number of residents subject to pollution, existing network, 2030		
Region	Long-term recommended value 40 dB(A)	Temporary recommended value 55 dB(A)*
Pomurje	43,053	6,827
Podravje	144,099	22,506
Koroška	22,949	3,955
Savinjska region	103,818	15,716
Zasavje	16,207	3,554
Spodnjeposavska region	24,610	3,491
SE Slovenia	43,857	7,038
Central Slovenia	246,779	44,549
Gorenjska	80,863	13,825
Notranjsko-kraška region	25,155	6,182
Goriška	33,239	3,751
Obalno-kraška region	37,224	4,129
<b>Total</b>	<b>821,853</b>	<b>135,523</b>
<b>Change in comparison to 2011 (%)</b>	<b>+8</b>	<b>+18</b>

Note: \* - the temporary recommended value of 55 dB(A) of the night-time noise indicator equals the ceiling for infrastructural noise sources in noise protection area III

Transport policy measures will provide cohesion, efficiency and sustainability, and enhance benefits for users. From the aspect of noise protection, the priority measures of transport policy are as follows:

- interconnection of transport systems and development of the railway network, with an emphasis on transferring most long-distance transit transport to railways;
- sustainable transport logistics;
- integrated development of public rail transport to unburden the environment in urban areas;
- internalisation of external costs;
- implementation of measures to reduce environmental impacts.

If transport policy measures are not implemented, the exposure of residents to noise will increase. Pursuant to the Noise Action Programme and legal regulations, managers of individual resources must rehabilitate areas with excessive noise pollution. However, effective environmental sanitation can only be carried out with the intermodal, logistics and organisational measures included in the Strategy.

### 5.3.7 Population and material assets

The transport analysis in the Strategy showed that if the current transport arrangement remains the same, accessibility will be poorer by 2030, i.e.:

- by 15 per cent by private vehicle;
- by 8 per cent by public transport;
- the ratio between accessibility by public transport and accessibility by private vehicles will improve, but only due to much poorer accessibility by private vehicle.

In the existing situation, accessibility from certain parts (Posočje, Bela krajina) is poor, due to which no interest has been shown in economic development, which is also reflected in the higher unemployment rate and lower standard of living.

In 2012, 22,035 road accidents happened in Slovenia, 130 of which caused a fatality; 32 road accidents happened at level crossings, of which 5 were fatal. If the dangerous spots and level crossings are not reconstructed, the number of accidents will rise (direct and permanent impact) by 2020 due to more traffic. The objective of the Strategy on the national programme on road traffic safety between 2013 and 2022 will not be attained if the Strategy is not adopted.

Transport policy measures also refer to sustainable mobility and raising awareness of a healthy lifestyle, e.g. the arrangement of cycling routes, which are essential for developing the use of bicycles for recreation. The system of national cycling routes has not been completed, due to which bicycle traffic cannot properly develop. More than 1,000 road accidents involving cyclists happen on Slovenian roads annually. If sustainable mobility measures are not implemented, no positive effect on lifestyle and better living conditions in main urban agglomerations can be expected.

### **5.3.8 Cultural heritage**

If the Strategy is not adopted and infrastructure corridors are not constructed, the integrity and features of areas and units of cultural heritage, especially of cultural landscapes, historic landscapes, areas of urban heritage and their areas of influence, and archaeological sites, will be conserved to a greater extent. Transport analyses show that transport will increase and thus the unplanned construction of new infrastructure corridors may be expected, which could have a negative effect on cultural heritage.

### **5.3.9 Landscape**

If the Strategy is not adopted and infrastructure corridors are not constructed, the integrity and features of exceptional landscapes and landscape areas with distinctive features at the national level will be conserved. High-quality landscape image of well-conserved areas with important cultural elements would be conserved. Transport analyses show that transport will increase and thus unplanned integration of new infrastructure corridors may be expected, which could significantly influence landscape degradation.

## 6. BASIS FOR PREPARATION

### 6.1 Determining the environmental objectives of the Strategy

#### Based on an analysis of

- the assumed commitments specified in ratified treaties and regulations of the European Union, and strategic documents of the Republic of Slovenia and legislative acts,
- the existing situation in the environment, and
- potential environmental impacts that could be caused by transport infrastructure

#### the Environmental Report defines the following important environmental areas and environmental objectives:

- *Soil and mineral resources*

Environmental objective 1: Ensure sustainable management of land and protection of soil.

Environmental objective 2: Prevent exploitation of natural resources by using at least 70 per cent of recycled materials from construction waste produced in the construction and reconstruction of transport infrastructure.

- *Air*

Environmental objective 3: Ensure the attainment of long-term objectives for annual quantities of pollutant emissions determined for the transport sector in the Operational programme for complying with national emission ceilings for atmospheric pollutants.

- *Climate factors*

Environmental objective 4: Adapt transport infrastructure to climate change and reduce annual quantities of greenhouse gas emissions below the target values determined for the transport sector in the Operational programme of measures to reduce greenhouse gas emissions by 2020.

- *Water*

Environmental objective 5: Limit the effects of the pressure of transport infrastructure on surface and ground water, brackish water, coastal waters and sources of drinking water.

- *Nature*

Environmental objective 6: Ensuring the cohesion of populations and conservation of biodiversity.

Environmental objective 7: Protect areas with nature protection status against activities with considerable impacts.

- *Human health*

#### *Air quality*

Environmental objective 8: In areas of excessive ambient air pollution, considerably contribute to reducing the annual number of days with excessive daily pollution of ambient air with particulates, which must not exceed 35 in a calendar year.

#### *Noise pollution*

Environmental objective 9: Reduce the pollution of the environment by noise from transport and approximate to the levels recommended by the World Health Organisation.

- *Population and material assets*

Environmental objective 10: Improve social cohesiveness, traffic safety and sustainable mobility.

- *Cultural heritage*

Environmental objective 11: Preserve the scope and characteristics of cultural heritage facilities and areas.

- *Landscape*

Environmental objective 12: Ensuring the conservation of exceptional landscapes and landscape areas with distinctive features at the national level, and a high-quality landscape image.

The explanation of the environmental objective selection is provided in chapters 6.1.1, 6.1.2 and 6.1.3.



### 6.1.1 Assumed commitments specified in ratified treaties and regulations of the European Union, and strategic documents of the Republic of Slovenia and legislative acts

To define important environmental objectives, the assumed commitments specified in ratified treaties or regulations of the European Union, and in national strategic documents and legislative acts have been used. **The connection** between environmental areas and environmental objectives, and environmental plans, programmes and policies is shown in **Table 12**.

**Table 12 Connection between environmental areas and environmental objectives, and environmental plans, programmes and policies**

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
European document	7 <sup>th</sup> EU Environment Action Programme to 2020 "Living well, within the limits of our planet", Decision of the Council of 15 November 2013.	The 7th Environment Action Programme of the Union to 2020 provides a general framework for environment policy by 2020 and defines nine priority objectives which must be attained by Member States, i.e.: 1. to protect, conserve and enhance the Union's natural capital; 2. to turn the Union into a resource-efficient, green and competitive low-carbon economy; 3. to safeguard the Union's citizens from environment-related pressures and risks to health and well-being; 4. to maximise the benefits of Union environment legislation; 5. to improve the knowledge and evidence base for Union environment policy; 6. to secure investments for environment and climate policy, and address environmental externalities 7. to improve environmental integration and policy coherence; 8. to enhance the sustainability of the Union's cities; 9. to increase the Union's effectiveness in addressing international environmental and climate-related challenges.	Soil and mineral resources Air Climate factors Water Nature Human health (air quality, noise) and Population and material assets	Sequence number of the environmental objective: 1,2,3,4,5,6,7,8,9,10
National document	Resolution on National Environmental Action Plan 2005–2012 (ReNPVO) (Official Gazette of the Republic of Slovenia, no. 2/06)	The ReNPVO determines the key environmental objectives and priority tasks based on the assessment of the situation in the environment and prevailing trends. The tasks and objectives must be completed prior to the expiry of the programme if not determined otherwise. The ReNPVO is the basis of the environmental dimension of the Slovenia's Development Strategy, which defines the vision of Slovenia's future, and	Soil and mineral resources Air Climate factors Water Nature Human health (air	Sequence number of the environmental objective: 1,2,3,4,5,6,7,8,9,10

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<p>guidelines and measures for the realisation of this vision by 2013. The objectives and measures are defined in four areas, i.e.: climate change, nature and biodiversity, quality of life, and waste and industrial pollution.</p> <p>The basic objectives in individual areas are as follows:</p> <ul style="list-style-type: none"> <li>– emphasise climate change as an important challenge in the coming years, reduce greenhouse gas emissions and thus contribute to the long-term objective of stabilising greenhouse gas concentrations in the atmosphere, as well as reduce emissions of substances that cause depletion of the ozone layer;</li> <li>– protect and conserve natural systems, habitats and wildlife in order to halt the loss of biodiversity, genetic diversity and further soil degradation;</li> <li>– contribute to a high level of the quality of life and social welfare of citizens by providing an environment where pollution does not negatively affect human health or the environment, and by promoting sustainable development in towns, and especially by taking measures to establish a good status of surface and ground water, and for sustainable handling and management of waters, which includes care for hydrologic balance and the rational consumption of water as a natural resource;</li> <li>– waste management, and the use of renewable and non-renewable natural resources which enable sustainable production and consumption, contribute to reducing environmental pollution and the use of energy by not exceeding the carrying capacity of the environment.</li> </ul>	<p>quality, noise) Population and material assets</p>	
National document		<p>To promote sustainable development, environmental protection requirements must be included in the preparation and implementation of policies and activities in all fields of economic and social development.</p> <p>The Act regulates environmental protection against pollution as the fundamental objective for sustainable development, and</p>	<p>Soil and mineral resources Air Climate factors Water Nature Human health (air</p>	<p>Sequence number of the environmental objective: 1,2,3,4,5,6,7,8,9,10</p>

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<p>within this framework, determines the fundamental principles of environmental protection, measures for environmental protection, monitoring of the state of the environment and information on the environment, economic and financial instruments of environmental protection, public services of environmental protection and other issues related to environmental protection. The environmental protection objectives are especially:</p> <ol style="list-style-type: none"> <li>1. protect and reduce environmental pollution;</li> <li>2. conserve and improve the quality of the environment;</li> <li>3. sustainable use of natural resources;</li> <li>4. reduce energy consumption and use more renewable energy sources;</li> <li>5. eliminate the consequences of environmental pollution, improve the upset natural balance and re-establish its regeneration capacity;</li> <li>6. enhance material efficiency of production and consumption; and</li> <li>7. ban and replace the use of hazardous substances.</li> </ol>	<p>quality, noise) Population and material assets</p>	
European document	<p>COM(2010) 2020 final – EUROPE 2020 Strategy for smart, sustainable and inclusive growth is the vision of the social market economy of Europe for the 21<sup>st</sup> century;</p> <p>COM(2011) 571 – Time frame for Resource Efficient Europe</p>	<p>In its communication entitled "Europe 2020 – Strategy for smart, sustainable and inclusive growth", the Commission emphasised that social cohesion, the green economy, education and innovation are important for the European area. The aforementioned objectives must be reflected in various aspects of European transport policy, which strives for sustainable mobility for all citizens, the 'decarbonisation' of transport and the full use of technological progress.</p> <p>The strategy for the sustainable use of natural resources is an integral part of the strategy of impacts <i>generated by the use of natural resources in a growing economy – a concept known as 'decoupling'</i>. In practice, this means the following objective: "Reducing the environmental impact of the use of resources with the simultaneous improvement of efficiency of the use of sources in the entire economy of the EU. In this way,</p>	<p>Soil and mineral resources Population and material assets</p>	<p>Sequence number of the environmental objective: 1 and 10</p>

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<p>renewable energy sources will not be overexploited.”</p> <p>In order to reach this objective, the strategy includes measures for:</p> <ul style="list-style-type: none"> <li>- improving our understanding and knowledge of the use of resources in Europe, its negative environmental impact, and importance in the EU and the world;</li> <li>- developing tools for monitoring and reporting on progress in the EU, member states and economy sectors;</li> <li>- promoting the use of strategic approaches and procedures in various economic sectors and member states, and promoting plans and programmes suitable for development; and</li> <li>- increasing the awareness of interest groups and citizens about the important negative environmental impact of using sources.</li> </ul>		
European document	Thematic Strategy for Soil Protection – COM(2006)231	<p>The positions on which the drafting of the Directive establishing a framework for the protection of soil and amending Directive 2004/35/EC were based should be taken into account. The strategy takes into account various functions, and the diversity and complexity of soil, and numerous degradation processes to which soil can be subjected.</p> <p>The strategic objective is the protection and sustainable use of soil, which is based on the following guiding principles:</p> <ul style="list-style-type: none"> <li>- preventing further degradation of soil, and maintaining the functions of soil when soil is being used and when functions of soil are being exploited and when soil serves as a receptor of the effects of human activity or environmental phenomena;</li> <li>- recovery of degraded soil to the point of functionality, which complies with at least the existing or envisaged use of soil.</li> </ul>	Soil and mineral resources	Sequence number of the environmental objective: 1
National document	National management programme for mineral resources (2009).	The national mining strategy is the fundamental document determining the objective, guidelines and conditions for harmonised research and exploitation of mineral resources in Slovenia, the highest possible level of their exploitation, and the	Soil and mineral resources	Sequence number of the environmental objective: 1

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
National document	Resolution on the strategic guidelines on developing Slovenian agriculture and the food industry by 2020 – ‘Securing Food for Tomorrow’ (ReSURSKŽ) (Official Gazette of the Republic of Slovenia, no. 25/11)	<p>conditions for their rational exploitation.</p> <p>The basic task of agriculture is to provide a sufficiently safe food supply and thus satisfy one of basic human needs. At the same time, agriculture has other socially important functions and provides intangible goods. The environmental function of agriculture is defined with its decisive contribution to the quality of waters, soil and air, and biodiversity. Agriculture significantly affects the image of the cultural landscape, and its aesthetic and natural value. The role of food and production processes in providing human health is indisputable. Agriculture, with its economic and social roles, also significantly contributes to vitality and settlement in rural areas. This wide role is best summarised by the notion of sustainable agriculture.</p> <p>The important objectives of the Resolution are ‘sustainable agriculture’ and ‘the conservation of soil fertility and production potential of agricultural land’, and may be attained by protecting the best agricultural land against permanent changes in its use, improving the productive potential of land, protecting agricultural land against degradation and irrational use, etc.</p>	Soil and mineral resources	Sequence number of the environmental objective: 1
National document	Resolution on National Forest Programme (ReNGP) (Official Gazette of the Republic of Slovenia, no. 111/07)	<p>The National Forest Programme is the fundamental strategic document determining the national policy on the sustainable development of forest management.</p> <p>The main principles (objectives) of the ReNGP are aimed at the preservation of forests and provision of a multipurpose role, which includes the environmental, social and economic aspects. The National Forest Programme also presents the implementation of the Environmental Action Programme at the national level, which defines four priorities: climate change, nature and biodiversity, environment and health, and the quality of life, natural resources and waste.</p> <p>One of the fundamental objectives is ‘to ensure the sustainable development of forests and ecosystems in the sense of their</p>	Soil and mineral resources	Sequence number of the environmental objective: 1

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		biodiversity, and all their ecological, productive and social functions with sustainable and multipurpose management’.		
National document	Agricultural Land Act (Official Gazette of the Republic of Slovenia, nos. 71/11, 58/12)	<p>The Act regulates the protection of agricultural land and its management by stipulating its classification, use and cultivation, land conveyance and leasing, agricultural operations and joint pastures. The Act defines sustainably protected and other agricultural land, and their protection and activities permitted thereon.</p> <p>Another objective of this Act is ‘to conserve and improve the production potential, sustainably treat fertile soil, conserve landscape, and conserve and develop rural areas’.</p>	Soil and mineral resources	Sequence number of the environmental objective: 1
National document	Act on Forests (Official Gazette of the Republic of Slovenia, nos. 30/93, 13/98, 24/99, 67/02, 112/06 115/06, 110/07, 61/2010, 106/2010, 63/13, 17/14)	<p>This Act regulates the protection, cultivation, exploitation and use of forests, and disposal of forests as natural wealth. This Act also regulates the conditions for managing forest land, as well as individual forest trees and groups of forest trees outside planning zones in order for their role in the environment to be conserved and strengthened. The basis for forest management is the National Forest Development Programme and forest management plans. The Act defines protective forests and special purpose forests.</p> <p>Another objective of this Act is ‘to provide sustainable and multipurpose management according to the principles of environment conservation and the conservation of natural assets, and the sustainable and optimum functioning of the forest as an ecosystem while realising its functions’.</p>	Soil and mineral resources	Sequence number of the environmental objective: 1
European document	Directive 2008/98/EC on waste, Directive 2006/12/EC on waste	The essential purpose of all regulations on waste management is to protect human health and the environment against harmful effects generated by the collection, transport, processing, warehousing and disposal of waste. The Waste Framework Directive (2008/98/EC) introduces a new approach to waste management. Waste is a source of raw material (and not just something that must be disposed of as cheaply as possible); therefore, Member States must take measures to reuse as much	Soil and mineral resources	Sequence number of the environmental objective: 2

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<p>waste as possible.                      Directive 2006/12/EC on waste introduces a new environmental objective regarding construction waste, i.e. 'to prepare at least 70 per cent of the total mass of construction waste for reuse, recycling or other material processing by 2020'.</p>		
European document	<p>Directive 2001/81/EC (NEC Directive)                       Gothenburg Protocol to the Convention of the United Nations Economic Commission for Europe on Long-Range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground-Level Ozone</p>	<p>The currently still applicable Directive 2001/81/EC determined the annual national emission ceilings that each Member state must meet by 2010 and which are applicable to sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), non-methane volatile organic compounds (NMVOC) and ammonia (NH<sub>3</sub>). They are intended to reduce air pollution and its harmful effects on public health and the environment across the EU. In addition, they would be used to attain compliance with the Gothenburg protocol (protocol to abate acidification, eutrophication and ground-level ozone – 1999).</p> <p>A proposed new Directive on national emission ceilings which includes updated and verified important health risks and environmental impacts generated by air pollution in the EU has been drafted for national emission ceilings by 2030. By adopting the proposed new Directive, European Union law will be harmonised with new international commitments following a revision of the Gothenburg Protocol in 2012. The proposed Directive is the main legislative pillar of the EU to attain the Union's long-term objective to achieve levels of air quality which do not generate important effects or risks to human health and the environment.</p> <p>The proposed new Directive on national emission ceilings repeals and substitutes the current regime of the EU for annual national emission ceilings of air pollutants as defined in Directive 2001/81/EC. Thus it ensures that national emission ceilings for SO<sub>2</sub>, NO<sub>x</sub>, NMVOC and NH<sub>3</sub> from Directive 2001/81/EC will be applied between 2010 and 2020, and determines new national commitments regarding reducing emissions which will be applied for SO<sub>2</sub>, NO<sub>x</sub>, NMVOC, NH<sub>3</sub>,</p>	Air, Human health – air quality	Sequence number of the environmental objective: 3, 8

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		particulates (PM <sub>2.5</sub> ) and methane (CH <sub>4</sub> ) from 2020 and 2030, and intermediate emission levels of the same pollutants for 2025.		
European document	Directive 2008/50/EC	Directive 2001/81/EC establishes the objectives regarding ambient air quality in order to avoid, prevent or reduce harmful effects on human health and the environment as a whole. Emissions of pollutants must not exceed limit or target values for SO <sub>2</sub> , NO <sub>x</sub> , PM <sub>10</sub> , PM <sub>2.5</sub> and other pollutants (NO <sub>2</sub> , Pb, CO, benzene, ozone, VOC and NH <sub>3</sub> ).	Air, Human health – air quality	Sequence number of the environmental objective: 3, 8
European document	‘Clean Air for Europe’ Programme	In its ‘Clean Air for Europe’ Programme, the Commission emphasises that air quality in Europe has significantly improved in recent decades. However, air pollution remains the main environmental factor related to diseases which could be prevented and early mortality rates in the EU, and at the same time, has a negative effect on a considerable area of the European natural environment. According to the OECD data, urban air pollution is set to become the primary environmental cause of mortality worldwide by 2050, ahead of polluted water and lack of sanitary services.  Currently, ceilings for solid particulates (PM <sub>10</sub> ) are exceeded in more than a third of air quality management areas in the EU, and ceilings for nitrogen dioxide (NO <sub>2</sub> ) in a quarter of all areas. Due to the failure to conform to ceilings applicable to PM <sub>10</sub> , proceedings to establish violations were instigated against 17 Member States, including Slovenia.	Air, Human health – air quality	Sequence number of the environmental objective: 3, 8
National document	Operational programme for the protection of ambient air against pollution caused by PM <sub>10</sub>	Regarding compliance with the requirements of Directive 2008/50/EC, which stipulates that Member States must prepare programmes of measures to ensure that PM <sub>10</sub> concentrations in ambient air do not exceed the ceilings, the Operational programme for the protection of ambient air against pollution caused by PM <sub>10</sub> has been adopted.	Air, Human health – air quality	Sequence number of the environmental objective: 3, 8



Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<p>The Operational programme for the protection of ambient air against pollution caused by PM<sub>10</sub> determines holders and bases for the preparation, adoption and implementation of detailed plans of measures in order to protect human health in areas where ceilings of PM<sub>10</sub> concentrations are exceeded. More detailed plans to reduce exposure to harmful effects of particulates in ambient air were adopted by the Government of the Republic of Slovenia in the form of ordinances on the air quality plan for the municipalities of Kranj, Celje, Novo Mesto, Maribor, Murska Sobota and Ljubljana, and for the area of Zasavje.</p>		
European document	EU Strategy on adaptation to climate change (COM(2013) 216 final).	<p>The general objective of the EU Adaptation Strategy is to contribute to a more climate-resilient Europe. This means enhancing the preparedness and capacity to respond to the impacts of climate change at the local, regional, national and EU levels, developing a coherent approach and improving coordination.</p> <p>The EU Adaptation Strategy states that climate change adaptation has already been mainstreamed in EU transport legislation, i.e. in the provisions of Regulation (EU) no. 1315/2013 on Union guidelines for the development of the trans-European transport network.</p>	Climate factors	Sequence number of the environmental objective: 4
European document	Decision No 406/2009/EC on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments	<p>Decision 406/2009/EC lays down the minimum contribution of Member States to meeting the greenhouse gas emission reduction commitment of the Community for the period from 2013 to 2020 for greenhouse gas emissions covered by this decision, and the rules on making these contributions and for the evaluation thereof.</p> <p>The commitment to reduce greenhouse gas emissions from Decision No 406/2009/EC refers to:</p> <ul style="list-style-type: none"> <li>- emissions from the use of fuels in households and the service</li> </ul>	Climate factors	Sequence number of the environmental objective: 4

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<p>sector;</p> <ul style="list-style-type: none"> <li>- emissions from the use of fuels in transport;</li> <li>- emissions from the use of fuels in small and medium-sized enterprises in industry and the energy sector;</li> <li>- fugitive emissions from the energy sector;</li> <li>- process emission from industrial procedures;</li> <li>- the use of solvents and other products;</li> <li>- emissions from agriculture;</li> <li>- emissions from waste management.</li> </ul> <p>Slovenia's objective by 2020 is for greenhouse gas emissions not to grow by more than 4 per cent in comparison with 2005 and to reduce values to below 12,117 kt of CO<sub>2</sub> equivalent. The commitment to reduce greenhouse gas emissions does not refer to the period up to 2020, since Slovenia also has legally binding annual targets, i.e. in the 2013–2020 period, greenhouse gas emissions must not exceed the target annual emissions determined by linear trajectory by 2020. In compliance with the target by 2020, greenhouse gas emissions from transport may grow by a maximum of 27 per cent in comparison with emissions in 2005.</p>		
National document	Operational Programme for Reducing Greenhouse Gas Emissions by 2020 with a vision by 2030 (proposal)	<p>The proposed Operational Programme for Reducing Greenhouse Gas Emissions by 2020 with a vision by 2030 is also in the process of being adopted, it distributes commitments to reduce greenhouse gas emissions as per Decision No 406/2009/EC between individual sectors, and determines measures to attain the objectives so as to reduce climate policy costs to a minimum also over a longer period by 2030. The indicative sectoral objectives to reduce greenhouse gas emissions which facilitate the attainment of the objectives of Decision No 406/2009/EC are as follows:</p> <ul style="list-style-type: none"> <li>- halt the quick growth of emissions from transport so that they do not to grow by over 18 per cent by 2030 in comparison with</li> </ul>	Climate factors	Sequence number of the environmental objective: 4

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<p>2005 (which is a 15 per cent reduction by 2030 in comparison with 2008) with a vision to reduce emissions by 90 per cent by 2050;</p> <ul style="list-style-type: none"> <li>- in general consumption, a reduction of 66 per cent in comparison with 2005, with a vision of carbon-free energy use in the sector by 2050;</li> <li>- the objective in agriculture is to manage TGP emissions at the level of a maximum of + 6 per cent by 2030 in comparison with 2005, while increasing Slovenia's food self-sufficiency;</li> <li>- reduce emissions in industry by 32 per cent by 2030 in comparison with 2005, with a vision of a 90 per cent reduction by 2050;</li> <li>- reduce emissions in waste management by 57 per cent by 2030 in comparison with 2005, with a vision of a 90 per cent reduction by 2050;</li> <li>- the objective in the energy sector (fuel combustion, fugitive emissions) is for emissions not to grow by more than 27 per cent by 2030, with a vision of carbon-free energy supply by 2050.</li> </ul> <p>The aforementioned proposed Operational Programme highlights that transport is the key sector in attaining the national objectives by 2020 in the field of climate change mitigation. It emphasises that objectives in this field will be aimed at managing greenhouse gas emissions with the following measures:</p> <ul style="list-style-type: none"> <li>- promotion and competitiveness of public passenger transport;</li> <li>- promotion of sustainable goods transport;</li> <li>- promotion of the energy efficiency of road motor vehicles; and</li> <li>- promotion of non-motorised forms of transport.</li> </ul>		
European document	Directive 2000/60/EC (Water Framework Directive )	Directive 2000/60/EC determines measures for the attainment of the strategic objective of good ecological status of waters in 2015.	Waters	Sequence number of the environmental objective: 5

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
European document	Directive 2008/56/EC establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)	<p>Directive 2008/56/EC determines the framework within which Member States must take the necessary measures 'to achieve or maintain a good environmental status in the marine environment' by 2020.</p> <p>In accordance with this Directive, marine strategies are formed and implemented in order to:</p> <ul style="list-style-type: none"> <li>- protect and maintain the marine environment, prevent its degradation or, if possible, restore marine ecosystems in areas affected by harmful effects;</li> <li>- prevent and reduce input in the marine environment for the gradual elimination of pollution and thus ensure that there are no major consequences for marine biodiversity, marine ecosystems, human health or lawful use of the sea, and that they are not significantly threatened.</li> </ul> <p>A Member State develops a marine strategy for its marine waters. Member States sharing a marine region or sub-region cooperate to ensure the coordination of measures in each marine region or sub-region required to attain the objectives of this Directive.</p>	Waters	Sequence number of the environmental objective: 5
European document	Directive 2008/105/EC on environmental quality standards in the field of water policy	<p>This directive determines environmental quality standards for priority substances and other pollutants, as determined in Directive 2000/60/EC with the objective of achieving a good chemical status of surface waters and, in accordance with the provisions and objectives of Directive 2000/60/EC on the prevention of emission of substances into waters, with separation of wastewater.</p> <p>The implementation of the regulation transposing Directive 2008/105/EC into Slovenian legislation regulates the following in relation to the objectives of the good ecological status of waters by 2015:</p> <ul style="list-style-type: none"> <li>- criteria for evaluating the chemical status of surface waters,</li> </ul>	Waters	Sequence number of the environmental objective: 5

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		and - environmental objectives on abandoning or terminating the discharge of certain substances into the aquatic environment.		
European document	Directive 2006/7/EC concerning the management of bathing water quality (OJ L No 64 of 15 February 2006)	This Directive determines measures to: (a) monitor and classify bathing waters by quality; (b) manage the quality of bathing waters; and (c) inform the public of the quality of bathing water.  It does not apply to: (a) swimming pools or spa pools; (b) confined waters subject to treatment or used for therapeutic purposes; (c) artificially created confined waters separated from surface water and groundwater.  The purpose (objective) of this Directive is 'to preserve, protect and improve the quality of the environment, and to protect human health by complementing Directive 2000/60/EC'.	Waters	Sequence number of the environmental objective: 5
European document	Council Directive 98/83/EC on the quality of water intended for human consumption	Council Directive 98/83/EC regulates the quality of water intended for human consumption. Water is wholesome and clean if it is free from any microorganisms, parasites and from any substances which, in numbers or concentrations, constitute a potential danger to human health.  The objective of this directive is to protect human health from the adverse effects of any contamination of water intended for human consumption by ensuring it is wholesome and clean.	Waters	Sequence number of the environmental objective: 5
European document	Directive 2006/118/EC on the protection of groundwater against pollution and deterioration	Directive 2006/118/EC on the protection of groundwater against pollution and deterioration establishes specific measures to prevent and control groundwater pollution in accordance with Directive 2000/60/EC. These measures primarily include: - criteria for assessing the good chemical status of groundwater, and	Waters	Sequence number of the environmental objective: 5

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<p>- criteria for identifying and reversing significant and sustained upward trends, and defining starting points to reverse trend.</p> <p>Objective: 'A good chemical status of groundwater must be attained by 2015'.</p>		
European document	Directive 2000/59/EC on port reception facilities for ship-generated waste and goods residues	<p>The purpose of Directive 2000/59/EC is to reduce discharges of ship-generated waste and goods residues into the sea, especially illegal discharges, from ships using ports.</p> <p>Objective: 'Enhancing the protection of the marine environment by improving the availability and use of port reception facilities for ship-generated waste and goods residues.' The implementation of the regulation transposing Directive 2000/59/EC into Slovenian legislation contributes to achieving a good ecological status of marine waters.</p>	Waters	Sequence number of the environmental objective: 5
European document	Directive 2007/60/EC on the assessment and management of flood risks (Floods Directive)	<p>The Directive determined transboundary negotiations regarding flood risk management, and includes important commitments to enhance transparency and the integration of citizens.</p> <p>The objective of the flood risk management directive is to reduce the risks and adverse consequences of floods in the European Union.</p>	Waters	Sequence number of the environmental objective: 5
National document	Waters Act (Official Gazette of the Republic of Slovenia, nos. 67/02, 110/02 – ZGO-1, 2/04 – ZZdl-A, 41/04 – ZVO-1, 57/08, 57/12 – ZV-1B, 100/13-ZV-1C)	The purpose of the Waters Act is to achieve a good status of waters and other water-related ecosystems, ensure protection against harmful effects of water, conserve and balance water quantities, and promote the sustainable use of waters, which facilitates various types of water use by taking into account the long-term conservation of available water sources and their quality.	Waters	Sequence number of the environmental objective: 5
National document	Water Management Plan – WMP (Decree on the river basin management plan for the Danube	The Water Management Plan includes a programme of basic and supplementary measures for water management 2011–2015 for the Danube Basin and the Adriatic Sea Basin.	Waters	Sequence number of the environmental

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
	Basin and the Adriatic Sea Basin (Official Gazette of the Republic of Slovenia, no. 61/11))	<p>The main environmental objectives for surface waters are to:</p> <ul style="list-style-type: none"> <li>- achieve a good ecological and chemical status by 2015. The objectives to reduce pollution with priority substances and eliminate emissions of priority hazardous substances in order to achieve concentrations near the natural background values are also related to achieving a good chemical status of waters.</li> </ul> <p>The environmental objective for bodies of waters is to:</p> <ul style="list-style-type: none"> <li>- achieve their good chemical and quantity status by 2015.</li> </ul>		objective: 5
European document	Council Directive 79/409/EEC of on the conservation of wild birds	The Directive established an extensive protection system for all species of wild birds in the Union. The Directive acknowledges that the loss and degradation of habitats is the greatest threat to bird conservation in the Union. Therefore, a great deal of attention is given to conserving the habitats of endangered species. For all species of birds referred to in <i>Annex I</i> to the Directive and for all regularly occurring migratory species in need of protection, Member States must form <i>special protection areas (SPA)</i> , also called Natura 2000 sites. In SPAs, Member States must establish that the populations of the protected species are in a favourable situation.	Nature	Sequence number of the environmental objective: 6
European document	Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora	The Directive on habitats in the second paragraph of Article 6 requires that Member States from the day of their accession to the European Union prevent the deterioration of natural habitats and the habitats of species, as well as the disturbance of species for which the Natura 2000 areas have been designated, in so far as such disturbance could be significant in relation to the objectives of this directive. This provision applies to proposed special protection areas (SCI), as determined in accordance with the criteria and procedures of the Habitats Directive (fifth paragraph of Article 4).	Nature	Sequence number of the environmental objective: 6
European document	EU Biodiversity Strategy to 2020 (COM(2011) 244	This strategy realises two important commitments, i.e. to halt the loss of biodiversity in the EU by 2020, and to protect, evaluate and restore biodiversity and ecosystem services in the	Nature	Sequence number of the environmental

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<p>EU by 2050.</p> <p>The objective of this Strategy is to halt the loss of biodiversity and the deterioration of ecosystems in the European Union by 2020 by defining six priority objectives:</p> <ul style="list-style-type: none"> <li>• Objective 1: Conserving and restoring nature</li> <li>• Objective 2: Maintaining and improving ecosystems and their services (restoration of at least 15% of damaged areas)</li> <li>• Objective 3: Ensuring sustainable agriculture, forestry and fishery</li> <li>• Objective 4: Ensuring the sustainable use of fisheries resources</li> <li>• Objective 5: Combating invasive alien species which threaten 22% of native EU species</li> <li>• Objective 6: Measures to prevent loss of biodiversity</li> </ul> <p>Planning and implementing transport policy may especially affect the attainment of objectives 1 and 2.</p>		objective: 6
European document	Bern Convention (Bern, 1979)	Convention on the Conservation of European Wildlife and Natural Habitats. The main objective is to conserve European wild flora and fauna and their natural habitats.	Narava	Zaporedna številka okoljskega cilja: 6
European document	Ramsar Convention (Ramsar, 1971)	<p>Ramsar Convention – the signatories to the Convention have undertaken to:</p> <ul style="list-style-type: none"> <li>• place wetlands on the List of Wetlands of International Importance, and preserve and maintain their ecological balance;</li> <li>• include the conservation of wetlands in national development programmes and plan the comprehensive management of wetlands by observing the principle of sustainable use;</li> <li>• support development policies for the conservation of wetlands in their respective territories by designating protected areas and supporting the professional training of wetland researchers and operators;</li> </ul>	Nature	Sequence number of the environmental objective: 6



Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<ul style="list-style-type: none"> <li>cooperate with other signatories on areas of wetlands located along borders and areas of hydrological systems, as well as on joint development projects directed at wetlands.</li> </ul>		
European document	Alpine Convention (1991)	Alpine Convention – the main objective is to preserve the Alps as a habitat for people and flora and fauna. The Framework Convention was adopted by the European Union and eight Contracting Parties (Austria, Germany, France, Italy, Liechtenstein, Monaco, Slovenia and Switzerland). The Alpine Convention was signed in 1991, it comprises the Framework Convention, protocols and two declarations. It entered into force in 1995, and contributes to the preservation of the qualities and special features of the Alps regardless of state borders, and promotes international cooperation.	Nature	Sequence number of the environmental objective: 6
National document	Nature Conservation Act (Official Gazette of the Republic of Slovenia, no. 96/04 –ZON-UPB2)	The regulation establishes a comprehensive system for nature preservation, with the purpose of protecting valuable natural features and preserving biodiversity. It defines the subjects of protection, ways and measures of protection, organisation in the area of nature protection, funding of nature protection, programming and planning of nature protection and other content necessary for effective nature protection. Listed among the protected subjects in the area of preservation of biodiversity which are determined or determinable as priorities, are habitat types which are preserved as a priority in a favourable condition, habitats of protected and internationally protected species, areas of ecological importance and special protected areas (hereinafter referred to as: Natura 2000 sites), which create the European ecological network. The protected subjects are also endangered, protected and internationally protected animals and plants in the wild.	Nature	Sequence number of the environmental objective: 6,7
National document	Natura 2000 management programme for the period from 2007 to 2013 (MOP, 2007)	The main purpose of the operational programme is to define for the 2007–2013 period the implementation of obligations for the protection of special protected areas – the Natura 2000 sites – to	Nature	Sequence number of the environmental

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<p>which Slovenia is committed under the Birds Directive and the Habitats Directive, which means to conserve and increase biodiversity in the EU by facilitating sustainable development. Promoting the traditional coexistence of humans and nature is included in this objective.</p> <p>The main tasks of the programme are to:</p> <ul style="list-style-type: none"> <li>• define in detail the protection objectives and measures in the Natura sites;</li> <li>• define relevant sectors and responsible holders for implementing protection measures;</li> <li>• enable horizontal connections with strategic plans and development programmes of the Government;</li> <li>• take advantage of the opportunities of the Natura 2000 sites for local and regional development, jobs and economic growth, taking into account the economic, social and demographic features and principles of sustainable development;</li> <li>• prepare a review of research needs, studies and data to be included in research programmes.</li> </ul>		objective: 7
National document	<p>Strategy for Biodiversity Conservation in Slovenia (2002–2012) (MOP, 2001)</p> <p>Analysis of achieving the objectives of the Strategy for Biodiversity Conservation in Slovenia, Zavod Symbiosis, 2012</p>	<p>This is a strategic document adopted by the Government on 20 December 2001 which determined a set of specific objectives and guidelines for the 2002–2012 period for the coordinated implementation of measures contributing to the attainment of three main objectives of the Convention on Biological Diversity. These objectives are:</p> <ul style="list-style-type: none"> <li>• conservation of biodiversity;</li> <li>• sustainable use of its components;</li> <li>• fair and just division of benefits of genetic resources.</li> </ul> <p>The objective of the Strategy for Biodiversity Conservation in Slovenia for transport infrastructure is:</p> <ul style="list-style-type: none"> <li>• to ensure the mobility of people and goods so that biodiversity is conserved.</li> </ul>	Nature	Sequence number of the environmental objective: 6

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<p>To attain this objective, the Strategy lays down the following guidelines:</p> <ul style="list-style-type: none"> <li>• transfer transport to environmentally more acceptable and insufficiently utilised capacities (e.g. rail transport);</li> <li>• manage pollution from transport by avoiding unnecessary or redundant traffic, and establishing structural development in industry and urbanism which is less intensive in terms of transport;</li> <li>• technically optimise vehicles and fuels in order to reduce emissions and energy consumption, develop new drive mechanisms, and connect the collection and recycling of discarded vehicles;</li> <li>• integrate biodiversity conservation principles in transport policy and infrastructure development, which also means avoiding areas of high nature protection value as much as possible;</li> <li>• prevent or limit negative impacts of infrastructure construction and infrastructure activities on landscapes and ecosystems, and utilise existing infrastructure better;</li> <li>• halt the fragmentation of ecosystems due to the construction of new infrastructure facilities, and ensure suitable passages for animal species.</li> </ul>		
European document	Directive 2002/49/EC relating to the assessment and management of environmental noise	The basic objective of this Directive is to define a common approach intended to prevent and reduce the harmful effects of noise pollution, and ensure bases for introducing measures for reducing noise emitted by major sources, in particular road and rail vehicles and infrastructure, aircraft, outdoor and industrial equipment, and mobile machinery.	Human health – Noise pollution	Sequence number of the environmental objective: 9
European document	Report on the implementation of Environmental Noise Directive COM (2011) 321	The Report from the Commission COM (2011) 321 summarises the implementation of Directive 2002/49/EC at the institutional, legal and operational levels, information on the burdening of residents and the environment with noise on the basis of information from the strategic mapping in 2007, and guidelines	Human health – Noise pollution	Sequence number of the environmental objective: 9

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<p>on further measures in the field of environmental noise which comprise:</p> <ul style="list-style-type: none"> <li>- final formation of a harmonised noise assessment method at the EU level (CNOSSOS-EU). The implementation of a harmonised method is anticipated for the third reporting cycle in 2017;</li> <li>- the formation of uniform positions to prepare operational programmes of protection against noise, and to determine and protect quiet areas in agglomerations and in open country;</li> <li>- increasing the synergy between measures to improve ambient air quality and measures to reduce noise by comprehensively planning measures in areas of large transport hubs and settlements;</li> <li>- the harmonisation and modernisation of legislation regulating emissions from noise sources. The objective is to reduce noise emitted by motor vehicles and to use roads with low noise levels, limit emissions of railway vehicles and infrastructure, limit operations at airports, and limit emissions from outdoor machinery and equipment.</li> </ul>		
National document	Noise Action Programme for the first phase major roads and major railways outside the Municipality of Ljubljana 2012–2017	<p>The provisions of the Operational Programme are used to reduce the current burdening of the environment, and prevent an increase in burdening.</p> <p>The objective of the Operational Noise Action Programme is to improve the quality of life from the aspect of noise pollution for people who live in areas near the busiest railway lines and road connections.</p>	Human health – Noise pollution	Sequence number of the environmental objective: 9
European document	Directive 2008/96/EC	The objective of this Directive is to ‘ensure safe road infrastructure for all road users’.	Population and material assets	Sequence number of the environmental

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
National document	Strategy of the Government of the Republic of Slovenia for physical (motion) activities for health enhancement between 2007 and 2012 (Government of the Republic of Slovenia, 2007).	The Strategy comprises expert definitions, guidelines and recommendations regarding physical (motion) activities for improving health.	Population and material assets	objective: 10 Sequence number of the environmental objective: 10
National document	Resolution on the National Programme on Road Traffic Safety for the period from 2013 to 2022 (Together for greater safety) (ReNPVCP13-22) (Official Gazette of the Republic of Slovenia, no. 39/13)	<p>The Resolution transposes Directive 2008/96/EC on road infrastructure safety management into Slovenian legislation. The main attention of transport policy in the Republic of Slovenia is dedicated to sustainable mobility, which is the heart of European Union transport policy. The objective of the transport policy is to separate mobility from its negative side effects, which is essential to attaining safety, environmental and energy objectives by 2020. To attain the objective of transport policy, the EU promotes the development of environmentally friendly transport sector and of efficient transport management systems, and an increase in road traffic safety. The programme pursues the common objective of EU Member States to save as many lives as possible in road transport, and halve the number of fatalities and severely injured. The programme takes into account the Resolution on Transport Policy of Slovenia (Intermodality – Time for synergy) (Official Gazette of the Republic of Slovenia, no. 58/06) whose objective is to improve traffic safety is entered as priority no. 3.</p> <p>Considering the ReNPVCP13-22, the development of road infrastructure in the coming years will be based primarily on road maintenance, the establishment of an efficient information system, the revision of safety features of roads, and the introduction of transport management systems.</p> <p>ReNPVCP13-22 includes the objectives of securing the following:</p>	Population and material assets	Sequence number of the environmental objective: 10

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<ul style="list-style-type: none"> <li>- by the end of 2020, the annual number of fatalities on Slovenian roads will not exceed 70,</li> <li>- by the end of 2020, the annual number of severely injured on Slovenian roads will not exceed 460.</li> </ul>		
European document	European Convention on the Protection of the Archaeological Heritage – Malta Convention (MEKVAD), Official Gazette of the Republic of Slovenia, no. 24/1999)	<p>The Convention refers to the comprehensive protection of archaeological heritage. It defines the connection between the conservation of archaeological heritage and spatial planning. The Convention requires all signatories to:</p> <ul style="list-style-type: none"> <li>- make efforts to coordinate and connect the requirements of archaeology and spatial planning, and to secure the participation of archaeologists in spatial planning policies and different phases of spatial planning;</li> <li>- ensure systematic consultations between archaeologists and urban planners, or between those responsible for spatial planning, in order to enable changes to implementation plans which could damage archaeological heritage, and enough time and resources to implement an adequate scientific study on site and for the publication of results;</li> <li>- ensure that archaeological sites and their locations are fully taken into account in environmental impact assessments and decisions adopted on that basis;</li> <li>- ensure that parts of archaeological heritage found during spatial interventions are preserved in situ if possible;</li> <li>- ensure that archaeological sites are accessible to the public and that access paths for larger numbers of visitors do not harm the archaeological and scientific features of these sites and their surroundings.</li> </ul> <p>Objective: ‘Archaeological sites and their settings must be fully taken into account in programmes and policies, and the <b>integration</b> of activities. Parts of archaeological heritage found during activities at sites must be preserved in situ if possible.’</p>	Conservation of cultural heritage	Sequence number of the environmental objective: 11

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
European document	Convention for the Protection of the Architectural Heritage of Europe – Granada Convention (Official Gazette of the SFRY, no. 4-11/1991; Act Notifying Succession to Conventions of the Council of Europe, Geneva Conventions and Additional Protocols on the Protection of War Victims and International Treaties from the Area of Armament Control Whose Depositories Are the Three Major Nuclear Powers, Official Gazette of the Republic of Slovenia, no. 14/1992)	<p>The convention strengthens the concept of the comprehensive protection of architectural heritage (monuments, architectural units, memorial sites). The convention requires all signatories to:</p> <ul style="list-style-type: none"> <li>- perform adequate control, and exercise powers as requested by legally protecting such structures;</li> <li>- prevent damage, decay or demolition of protected real estate.</li> </ul> <p>The policy on the comprehensive protection of architectural heritage obliges signatories to:</p> <ul style="list-style-type: none"> <li>- include the protection of architectural heritage as an important objective of spatial planning and urban planning;</li> <li>- promote programmes for the reconstruction and maintenance of architectural heritage;</li> <li>- ensure that the protection, revitalisation and improvement of architectural heritage become an important feature of policies in the field of culture, environmental protection and spatial planning;</li> <li>- where possible in spatial planning and urban planning procedures promote the protection and use of structures whose purpose alone does not justify protection, but which are important as part of the urban or rural environment, and as an element of the quality of life;</li> <li>- promote the use and development of traditional skills and materials which are important for the future of architectural heritage.</li> </ul> <p>Objective: ‘The protection of architectural heritage as an important goal of spatial planning and urban planning.’</p>	Conservation of cultural heritage	Sequence number of the environmental objective: 11
National document	Resolution on the 2014–2017 National Programme for Culture (ReNPK14-17) (Official Gazette of the Republic of Slovenia, no. 99/13)	The resolution stipulates that the conservation of cultural heritage and its sustainable use make an irreplaceable contribution to human development and the quality of life. By taking into account the role of cultural heritage in constructing an inclusive democratic society, and by emphasising cultural	Conservation of cultural heritage	Sequence number of the environmental objective: 11

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<p>diversity and sustainable development, the concept of protection is being significantly expanded, evolving from protecting individual cultural monuments organised within professional institutions for physical protection against deterioration and changes to conserving wider areas with cultural and spatial identities to finally introducing cultural heritage as a source of economic, social and local development, which requires going beyond sectoral policies and including sectoral strategies, the active creation of opportunities for financial investments from various sources, and partnerships with local communities.</p> <p>Objective: 'Conservation of cultural heritage and its sustainable use.'</p>		
National document	Cultural Heritage Protection Act (Official Gazette of the Republic of Slovenia, nos. 16/08, 123/08, 8/11, 30/11, 90/12, 111/13)	<p>The Act defines heritage protection as the conservation of material and substantial features of items, groups of items and structures or areas, and care for their integrity, and emphasises their importance as essential components of modern life.</p> <p>The basic content and objectives of heritage protection are:</p> <ul style="list-style-type: none"> <li>- maintaining and restoring heritage and preventing its endangerment;</li> <li>- providing material and other conditions for realising the cultural function of heritage, regardless of its intended function;</li> <li>- ensuring public accessibility of heritage and facilitating the study and research of heritage;</li> <li>- preventing activities which could change the features, content, shape and, consequently, the value of heritage;</li> <li>- securing the implementation and development of the heritage protection system.</li> </ul>	Conservation of cultural heritage	Sequence number of the environmental objective: 11
European document	Act Ratifying the European Landscape Convention (MEKK), (Official Gazette of the Republic of Slovenia, no. 74/03)	<p>The Convention refers to landscapes considered as exceptional, as well as unexceptional or degraded landscapes. Under the convention, every signatory is obliged to:</p> <ul style="list-style-type: none"> <li>- legally recognise landscapes as an important component of the human environment, as an expression of the diversity of the</li> </ul>	Conservation of landscape	Sequence number of the environmental objective: 12



Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<p>common cultural and natural heritage of humans and the foundation of their identity;</p> <ul style="list-style-type: none"> <li>- create and implement a landscape policy whose objectives are to protect, manage and plan landscapes on the basis of the adoption of special measures;</li> <li>- determine procedures for the participation of public, local and regional communities and other interested parties in defining and implementing landscape policy;</li> <li>- include landscape in its policy on regional and urban planning, and in its cultural, environmental, agricultural, social and economic policies, and in all other policies which directly or indirectly influence landscape.</li> </ul> <p>The objectives of the convention are to:</p> <ul style="list-style-type: none"> <li>- promote the protection, management and planning of landscapes;</li> <li>- establish European cooperation on resolving issues related to landscape.</li> </ul>		
National document	Spatial Planning Strategy of Slovenia (Official Gazette of the Republic of Slovenia, no. 76/2004)	<p><b>Sustainable spatial planning</b> is the bases of the Spatial Planning Strategy of Slovenia, which entails ensuring such use of space and spatial arrangements which facilitates meeting the needs of the current generation without threats to the next generation, together with environmental protection, nature conservation, the sustainable use of natural assets, cultural heritage protection, and other qualities of the natural and living environment.</p> <p>Within the development of landscape, the Strategy determines landscape areas with recognisable features which are important at the national level, and determines ways to preserve and develop these areas.</p> <p>The Strategy determines the following as part of the objective of 'cultural diversity as the basis for national spatial identity':</p>	Population material assets and Conservation of landscape	Sequence number of the environmental objective: 10 and 12

Level	Environmental plans, programmes, policies	Purpose and objective	Connection to relevant environment areas	Connection to important environmental objectives
		<p>- promoting the conservation and development of cultural diversity as a basis for quality national spatial identity, a quality living environment and social inclusion.</p> <p>The concept of spatial development in relation to boosting the recognisability of quality natural and cultural features of the landscape determines:</p> <ul style="list-style-type: none"> <li>- that landscapes be developed, considering the features and development potential, as natural and cultural landscape, as urban landscape and as agriculture intensive landscape;</li> <li>- preservation and quality management in areas with recognisable natural and cultural qualities in relation to the economic opportunities enabled by these qualities is promoted;</li> <li>- individual qualities are determined in spatial planning procedures at the regional and local levels and are included in spatial development.</li> </ul>		

## 6.1.2 Analysis of the current state of the environment

This chapter includes a short assessment of the current state of the environment. It has been established that, from the aspect of the impact of transport infrastructure, the biggest problems are PM<sub>10</sub> pollution and greenhouse gas emissions, noise pollution in residential buildings along main roads and railway lines, the gradual reduction in the area of the best agricultural land, and interruption of migration routes of wild animals in individual motorway sections.

### Soil and mineral resources

More than half of the land territory of Slovenia is covered by forests (56 per cent or 58 per cent if scrub forests are included), other natural vegetation (natural pastures, wetlands, aquatic areas and areas with little or no vegetation) accounts for 4 per cent, while 35 per cent of the surface is intended for farming, and slightly more than 3 per cent account for man-made areas. Reduced surfaces of best agricultural land and forests dedicated to wood production, input of substances into or onto soil, the use of mineral resources and activities in the environment which cause accelerated erosion or degrade soil in any other way are deemed pressures on the current state of soil.

### Air

Road transport is one of the main sources of NO<sub>x</sub> emissions, while emissions of PM<sub>2,5</sub> particulates in urban environments are key factors in the pollution of ambient air in these areas. The biggest problem in Slovenia related to air quality is pollution with particulates (PM<sub>10</sub>) and ozone in summer. Measurements of PM<sub>10</sub> particulates show that the ceilings are occasionally exceeded throughout Slovenia, especially in the areas of larger inland agglomerations, where long-lasting temperature inversions occur in winter.

### Climate factors

According to the Kyoto Protocol, Slovenia should reduce the amount of greenhouse gases in the atmosphere by an average of 8 per cent between 2008 and 2012 in view of the basic volume of emissions in 1986. In 2009, which is included in the target period, the amount of greenhouse gas emissions was almost 4 per cent higher than the target, despite a significant reduction. In 2009, the greatest amount of greenhouse gas emissions stemmed from the energy sector, i.e. 82 per cent. The majority of emissions in this sector is due to the use of fossil fuels in transport and energy generation. Due to climate change, natural disasters such as floods, drought or glaze ice strike more and more frequently. Slovenia has 1,200 flood areas, which have around 225,000 residents. Half of the flood areas are located in the Sava River basin, 40 per cent in the Drava River basin and 4 per cent in the Soča River basin.

### Water

Slovenia abounds in various types of surface watercourses which are the result of the diverse geological ground composition and diverse terrain. The assessment of the chemical status for the 2006–2008 period shows that only two bodies of surface water do not achieve a good status. The most burdened with human activity is groundwater in north-eastern Slovenia. Water protection areas in Slovenia cover approximately 4,491 km<sup>2</sup>, which is around a fifth of Slovenian territory. Karst waters deserve special attention due to their vulnerability or limited self-cleaning ability. The territorial waters of the Republic of Slovenia measure slightly more than 300 km<sup>2</sup>. Infrastructure corridors especially affect the hydrological conditions of a certain area: together with bridging structures, they may affect ecomorphological situation in a watercourse, while the discharge of polluted rainwater may affect the quality of surface and ground water, and consequently, drinking water. Sudden spills of large amounts of oil from vessels have the greatest impact on the quality of the sea.

### Nature

Despite its modest size, Slovenia has an abundant diversity of species, with a large number of species in a small territory. On a global scale, it has one of the most biodiversified underground systems, and with more than 58 per cent of forest cover, it is one of the most forested countries in Europe.

Slovenia encompasses 354 Natura 2000 sites; the total area of Natural 2000 sites is 6,639 km<sup>2</sup>, which is 32.1 per cent of Slovenian territory.

268,662 ha are protected in Slovenia, which is 13.3 per cent of Slovenian territory. Slovenia encompasses three areas that are designated as Ramsar wetlands, i.e.: Lake Cerknica and its surroundings, the Sečovlje salt pans and the Škocjan Caves.

Infrastructural activities in the natural environment represents a permanent loss of habitat, and permanently negatively affects the natural distribution of habitat types and habitats of plant and animal species, their quality and the integration of habitats of populations. Slovenia encompasses large forest areas with exceptional value due to their rarity, complexity and role in the ecosystem. Pressure on dense forest stands and other related habitat spots is also great due to the construction of new infrastructure. In the current state, the problem is interrupted migration routes along motorway corridors. Most migration problems occur on older sections of motorway (e.g. Ljubljana–Koper) which have only a few wildlife underpasses, and no green bridges.

### **Noise pollution**

Noise pollution in the environment has been increasing in recent years due to growing transit transport and the expansion of settlement areas. The most important source of noise pollution in Slovenia is road transport, followed by rail transport.

The operational monitoring of noise on the entire motorway and expressway network shows that a total of 2,882 buildings were overexposed to noise in 2011 according to the limit values of noise indicators, and 979 buildings according to the critical values of noise indicators. Most residents who experienced exceeded limit values live on the following road sections: H3/0090 Ljubljana, H3/0086 Ljubljana, A1/0052 Brezovica–Vrhnika, A1/0040 Celje–Arja vas and H3/0088 Ljubljana.

The operational monitoring of noise on roads managed by the Slovene Roads Agency was prepared for approximately 637 km of state roads. In 2011, 9,032 buildings along these roads were overexposed according to the limit values of noise indicators, and 4,570 buildings according to the critical values of noise indicators. Road sections with the highest number of overexposed residents are in Maribor, Ljubljana, Celje, Velenje, Jesenice and Domžale.

Noise pollution in the environment along the main railway lines is greatest at the night, which is especially the consequence of goods transport and strict limit values in this period. A total of 7,474 buildings were overexposed according to the limit values of noise indicators, and 4,501 buildings according to the critical values of noise indicators. The municipalities with the most overexposed residents are Ljubljana, Jesenice and Litija, followed by Laško, Borovnica, Ptuj, Brezovica and Krško. The results of operational monitoring of noise which has been carried out in the vicinity of Ljubljana Jože Pučnik Airport since 2008 have shown that noise pollution due to the operation of the airport in the area of the exposed settlements of Šenčur, Lokarje and Lahovče does not exceed the prescribed limit values of noise, and noise pollution is also reduced by the reduction in transport in the past few years. In the areas of the Maribor and Portorož airports, no regular monitoring of noise is carried out.

### **Population and material assets**

The statistical data for 2014 show that Slovenia has 2,061,085 residents. The density of the population is growing in the vicinity of large city centres, which is shown by the migration statistics in Slovenia. For the past two decades, Slovenia has focused the majority of its vast investments on the road network, especially the construction of the motorway network. The development of railways, which have greater sustainable potential, are lagging behind, since they have been neglected with regard to investments.

Only about 8 per cent of journeys in Slovenia are carried out by public transport. One of the reasons for the relatively low utilisation of public transport is the relatively poor and uncompetitive level of the service. The system of national cycling routes has not been completed, due to which bicycle traffic cannot properly develop.

In 2012, 22,035 accidents occurred in Slovenia, of which 130 caused fatalities. 32 road accidents occurred at level crossings, of which 5 were fatal.

### **Cultural heritage**

In 2013, the Cultural Heritage Register at the Ministry of Culture included 32,035 units of heritage. The number of registered units of cultural heritage has been increasing recently, particularly the number of registered archaeological sites. The integration of new infrastructure facilities presents the possibility of degrading archaeological remains in the ground.

Three cultural monuments (the Plečnik Žale Cemetery, the Franja Partisan Hospital, the Memorial Church of the Holy Spirit in Javorca) have a European Heritage Label, and another two (pre-historic pile dwellings in Ig and the Ljubljana Marshes, mercury mining tradition in Idrija) are on the UNESCO World Heritage list in the cultural heritage category.

### **Landscape**

Thus landscapes in Slovenia show great variety and richness of landscape patterns. Exceptional landscapes and landscape areas with distinctive features at the national level have a special status. They are defined by the Spatial Planning Strategy of Slovenia – there are 93 areas of exceptional landscapes and 60 landscape areas with distinctive features.

Landscape is most encroached upon by transport connections that extend into the open space, where the impacts of transport is more noticeable due to the higher level of its conservation. The impact is especially great in areas of exceptional landscape or landscape areas with distinctive features where an infrastructure corridor is being built.

### **6.1.3 Identification of environmental impacts that could be caused by transport infrastructure**

Environmental impacts were identified in the report entitled ‘Starting points for drafting the Environmental Report for the programme of transport infrastructure development in the Republic of Slovenia’ (Aquarius d.o.o. Ljubljana, June 2014). A summary is shown in Table 13.

**Table 13 Identification of potential impacts (Aquarius d.o.o., Ljubljana, June 2014)**

<b>Environment area</b>	<b>Definition of impacts which can be assessed in the environmental report</b>	<b>Assessment of the area YES/NO</b>
<b>Soil and mineral resources</b>	<ul style="list-style-type: none"> <li>- impact on the fragmentation of vast dense areas of agricultural land and woodland</li> <li>- use of renewable energy sources and biofuels</li> <li>- construction waste management</li> </ul>	<b>YES</b>
<b>Air</b>	<ul style="list-style-type: none"> <li>- emission of pollutants into the air from transport which have harmful impacts on ecosystems and biodiversity</li> <li>- emission of pollutants from transport, for which national emission ceilings have been determined</li> </ul>	<b>YES</b>
<b>Climate factors</b>	<ul style="list-style-type: none"> <li>- sensitivity of the transport network to extreme weather events</li> <li>- greenhouse gas emissions caused by fuels in transport</li> </ul>	<b>YES</b>
<b>Water</b>	<ul style="list-style-type: none"> <li>- impact on flood safety</li> <li>- impact of hazardous substances on the quality of surface and ground water in the event of a spillage of hazardous substances</li> <li>- impact on aquifers and the quality of drinking water</li> <li>- impact on bathing waters</li> </ul>	<b>YES</b>
<b>Nature</b> (habitat fragmentation, biodiversity, nature conservation areas)	<ul style="list-style-type: none"> <li>- impact on the fragmentation of forest habitats</li> <li>- impact on the migration of wild animals</li> <li>- impact on the integrity and functionality of protected areas and Natura 2000 sites</li> <li>- impact on the type and qualities of valuable natural features</li> </ul>	<b>YES</b>
<b>Human health</b>	<b>AIR QUALITY</b> - impact on health (respiratory system) in the event of increased pollutant content in ambient air	<b>YES</b>
	<b>NOISE POLLUTION</b> - impact of noise pollution caused by transport on human health	<b>YES</b>
	<b>ELECTROMAGNETIC RADIATION POLLUTION</b> The impact cannot be assessed at the level of strategic assessment of transport policies.	<b>NO</b>
	<b>LIGHT POLLUTION</b> The impact cannot be assessed at the level of strategic assessment of transport policies.	<b>NO</b>
	<b>IMPACT ON THE QUALITY OF DRINKING WATER AND BATHING WATERS</b> The impact cannot be assessed at the level of strategic assessment of transport policies. The impact is addressed in the field of waters.	<b>NO</b>
	<b>VIBRATIONS</b> The impact cannot be assessed at the level of strategic assessment of transport policies.	<b>NO</b>
<b>Population and material assets</b>	<ul style="list-style-type: none"> <li>- impact on material assets due to needs for space</li> <li>- impact on accessibility and regional connections</li> <li>- impact on traffic safety</li> </ul>	<b>YES</b>
<b>Cultural heritage</b>	- impact on units of cultural heritage	<b>YES</b>
<b>Landscape</b>	- impact on changes in landscape and visible qualities of space	<b>YES</b>

## 6.2 Environmental impact assessment method

The assessment in Chapter 8 was prepared in accordance with the Decree laying down the content of environmental reports and on the detailed procedure for assessing the impacts of certain plans and programmes on the environment (Official Gazette of the Republic of Slovenia, no. 73/05). The important impacts of the Strategy on the environment and environmental objectives have been evaluated and assessed with the following grades:

- A – no impact/positive impact
- B – insignificant impact
- C – impact is insignificant due to the implementation of mitigation measures
- D – significant impact
- E – destructive impact
- X – determination of the impact is not possible

The assessments of the consequences of the plan of A, B and C grades mean that the impacts of plan implementation on the realisation of the environmental objectives are acceptable. Insignificant impacts are graded with B, and impacts that are acceptable, provided mitigation measures are implemented, are graded with C. Grades D and E imply that the impacts of plan implementation on realising environmental objectives are unacceptable. Indicators and evaluation criteria, and the evaluation of grades by individual important environmental objectives are described below.

### Description of evaluation criteria and the evaluation methodology for individual environmental objectives of the Strategy

- **Soil and mineral resources**

The evaluation criteria and methodology for environmental objective 1 are described in the table below: Ensure sustainable management of land and protection of soil.

<b>Indicator/evaluation criteria</b>	<b>Evaluation of grades</b>
<p>- changes in the actual use of agricultural land and woodland <i>(integrating measures for road, rail and public transport on agricultural land and woodland would lead to their permanent loss and change in the category of the actual use of soil (forest and agricultural land categories into built-up and similar land category))</i></p> <p>- changes in the use of agricultural land with better productive potential <i>(integrating measures for road, rail and public transport on agricultural land with better productive potential would lead to permanent loss of high-quality agricultural land)</i></p> <p>- the probability of the route of transport infrastructure in areas of protective forests <i>(integrating measures for road, rail and public transport in protective forests may significantly affect the qualities for which the woodland has been declared protective forest)</i></p> <p>- the probability of the route in forest areas with a defined wood production function at the first level <i>(integrating measures for road, rail and public transport in forest areas with a defined wood production function at the first level would lead to</i></p>	<p><b>A – no impact/positive impact:</b> The anticipated measures do not refer to activities in woodland and agricultural land according to the actual use of soil.</p> <p><b>B – insignificant impact:</b> If legal provisions are observed, the impact on the sustainable use of agricultural land and woodland will be insignificant, despite the fact that measures could be implemented on agricultural land with better productive potential, in areas of protective forests and in areas of forests with a defined wood production function at the first level.</p> <p><b>C – impact is insignificant due to the implementation of mitigation measures:</b> The probability of changes in the actual use of agricultural land and woodland is high. Infrastructure will probably pass through the best agricultural land and through forests with a defined wood production function at the first level. The anticipated mitigation measures must be observed to reduce the impact.</p> <p><b>D – significant impact:</b> The probability of changes in the actual use of agricultural land and woodland is very high. The impact on the sustainable use of agricultural land and woodland will be significant. Infrastructure will pass through the best agricultural land and through forests with a defined wood production function at the first level. There are no</p>

<p><i>permanent loss of these forest areas)</i></p>	<p>mitigation measures to reduce the impact.</p> <p><b>E – destructive impact:</b> There is a probability of changes in the actual use of the best agricultural land and woodland, especially forests with a defined wood production function at the first level, to such an extent that the impact on agriculture and forestry will be destructive.</p> <p><b>X – determination of the impact is not possible:</b> The impact cannot be determined due to the lack of data.</p>
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The valuation criteria and methodology for environmental objective 2 are described in the table below: Prevent the exploitation of natural resources by using at least 70 per cent of recycled materials from construction waste produced in the construction and reconstruction of transport infrastructure.

Indicator/evaluation criteria	Evaluation of grades
<p>- recycling rate of construction waste generated during the construction and reconstruction of the transport network</p> <p><i>(measures in the construction of new and the reconstruction of existing facilities of transport infrastructure must ensure that at least 70 per cent of newly generated construction waste is recycled, and that as much excavated soil as possible is recycled as a construction filling)</i></p>	<p><b>A – no impact/positive impact:</b> The anticipated measures will not cause the generation of construction waste or excavated soil.</p> <p><b>B – insignificant impact:</b> The implementation of measures will generate construction waste. However, it will be fully processed, and 70 per cent will be reused as recycled construction waste.</p> <p><b>C – impact is insignificant due to the implementation of mitigation measures:</b> The implementation of measures will generate construction waste. However, due to the qualities of the waste, it cannot be ensured that at least 70 per cent will be processed and reused without the implementation of mitigation measures.</p> <p><b>D – significant impact:</b> The implementation of measures will generate construction waste. However, due to the qualities of the waste, at least 70 per cent of recycled material cannot be processed or reused. There are no mitigation measures to increase the volume of used recycled construction waste.</p> <p><b>E – destructive impact:</b> The implementation of measures will generate construction waste for which disposal will have to be organised.</p> <p><b>X – determination of the impact is not possible:</b> The impact cannot be determined due to the lack of data.</p>

• **Air**

The evaluation criteria and methodology for environmental objective 3 are described in the table below: Ensure the attainment of long-term objectives for annual quantities of pollutant emissions determined for the transport sector in the Operational programme for complying with national emission ceilings for atmospheric pollutants.

Indicator/evaluation criteria	Evaluation of grades
<p>- annual quantity of pollutant emissions from transport into the air, i.e. of sulphur oxides, nitrogen oxides, non-methane volatile organic compounds, ammonia and particulates</p> <p><i>(Indicative emission ceiling for NO<sub>x</sub> from transport for any year between 2020 and 2029 is 13.27 kt and 6.31 kt after 2030.</i></p>	<p><b>A – no impact/positive impact:</b> The anticipated measures will not cause pollutant emissions into the air for which national emission ceilings have been determined. The implementation of measures will reduce pollutant emissions.</p> <p><b>B – insignificant impact:</b> The implementation of measures will increase pollutant emissions for which national emission ceilings have been determined, but</p>



<p><i>Indicative emission ceiling for PM<sub>2,5</sub> from transport for any year between 2020 and 2029 is 0.981 kt and 0.392 kt after 2030.</i></p> <p><i>the cumulative impacts of all measures of the Strategy must not cause the annual quantity of all emissions of an individual pollutant from transport to exceed the aforementioned emission ceiling or the emission ceiling stipulated for transport in the Operational Programme for complying with national emission ceilings for atmospheric pollutants.)</i></p>	<p>not to the extent that the ceilings stipulated for transport in the Operational Programme would be exceeded.</p> <p><b>C – impact is insignificant due to the implementation of mitigation measures:</b> The implementation of measures will increase pollutant emissions for which national emission ceilings have been determined to the extent that the ceilings stipulated for transport in the Operational Programme will be exceeded. To reduce emissions, mitigation measures must be anticipated which ensure that the emission ceilings stipulated in the Operational Programme for transport will not be exceeded.</p> <p><b>D – significant impact:</b> The implementation of measures will increase pollutant emissions for which national emission ceilings have been determined to the extent that the ceilings stipulated for transport in the Operational Programme will be exceeded. There are no mitigation measures to reduce emissions below the ceiling.</p> <p><b>E – destructive impact:</b> The implementation of measures will increase pollutant emissions for which national emission ceilings have been determined to the extent that the ceilings stipulated for transport in the Operational Programme will be significantly exceeded.</p> <p><b>X – determination of the impact is not possible:</b> The impact cannot be determined due to the lack of data.</p>
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• **Climate factors**

The evaluation criteria and methodology for environmental objective 4 are described in the table below: Adapt transport infrastructure to climate change and reduce annual quantities of greenhouse gas emissions below the target values determined for the transport sector in the Operational programme of measures to reduce greenhouse gas emissions by 2020.

Indicator/evaluation criteria	Evaluation of grades
<p>- adapting transport infrastructure to climate change</p> <p><i>(measures in new construction or the reconstruction of transport infrastructure must include measures to reduce or prevent the consequences of climate change, especially of floods, snow and glaze ice)</i></p> <p>- annual quantity of greenhouse gas emissions from transport</p> <p><i>(the highest quantity of greenhouse gas emissions from transport must not exceed the target annual quantities of greenhouse gas emissions from transport of 5,622 kt of CO<sub>2</sub> equivalent in 2020 and 5,224 kt of CO<sub>2</sub> equivalent in 2030.</i></p> <p><i>The cumulative impacts of all measures of the Strategy must not cause the annual quantity of all greenhouse gas emissions from transport to exceed the target values stipulated for transport in the Operational</i></p>	<p><b>A – no impact/positive impact:</b> The anticipated measures ensure climate change adaptation, or the latter need not be ensured; the anticipated measures will not increase greenhouse gas emissions. The implementation of measures will reduce greenhouse gas emissions.</p> <p><b>B – insignificant impact:</b> The anticipated measures ensure climate change adaptation, or the latter need not be ensured. Greenhouse gas emissions will increase, but not to the extent that the target values stipulated for transport in the Operational Programme would be exceeded.</p> <p><b>C – impact is insignificant due to the implementation of mitigation measures:</b> The anticipated measures ensure climate change adaptation, or the latter need not be ensured. Greenhouse gas emissions will increase to the extent that the target values stipulated for transport in the Operational Programme will be exceeded. To reduce emissions, mitigation measures must be anticipated which ensure that the target values of emissions</p>

<p><i>Programme for Reducing Greenhouse Gas Emissions by 2020 with a vision by 2030.)</i></p>	<p>stipulated in the Operational Programme for transport will not be exceeded.</p> <p><b>D – significant impact:</b> The anticipated measures ensure climate change adaptation, or the latter need not be ensured. Greenhouse gas emissions will increase to the extent that the target values stipulated for transport in the Operational Programme will be exceeded. There are no mitigation measures to reduce emissions below the target value.</p> <p><b>E – destructive impact:</b> Measures do not ensure climate change adaptation or the implementation of measures increase greenhouse gas emissions to the extent that the target values stipulated for transport in the Operational Programme will be significantly exceeded.</p> <p><b>X – determination of the impact is not possible:</b> The impact cannot be determined due to the lack of data.</p>
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• **Water**

The evaluation criteria and methodology for environmental objective 5 are described in the table below: Limit the effects of the pressure of transport infrastructure on surface water, groundwater, brackish water, coastal waters and sources of drinking water.

Indicator/evaluation criteria	Evaluation of grades
<p>- possibility of integration in water protection areas of water sources <i>(integrating measures outside water protection areas means less possibility for polluting groundwater intended for water supply)</i></p>	<p><b>A – no impact/positive impact:</b> Measures will not put additional pressure on surface water, groundwater, brackish water, coastal waters or sources of drinking water, or the impact will be positive.</p>
<p>- possibility of integration in areas of influence of bathing waters <i>(integrating measures in areas of influence of bathing waters means greater possibility for polluting bathing waters)</i></p>	<p><b>B – insignificant impact:</b> If legal provisions are observed, the impact on surface water, groundwater, brackish water, coastal waters and sources of drinking water will be insignificant, despite the fact that measures could be implemented in areas of protected water sources, highly vulnerable aquifers or flood areas.</p>
<p>- possibility of integration in flood areas <i>(integrating measures in flood areas means reduces retention areas and the possibility of flood damage)</i></p>	<p><b>C – the impact is insignificant due to the implementation of mitigation measures:</b> Despite the observation of legal provisions, the pressure on surface water, groundwater, brackish water, coastal waters and sources of drinking water might be great, especially as the probability of the implementation of measures in areas of protected water sources, vulnerable aquifers, in influence areas of bathing waters or flood areas is high. Mitigation measures must be observed to reduce the impact.</p>
<p>- possibility of integration in areas of aquifers with a high vulnerability level <i>(integrating measures in areas of highly vulnerable aquifers means greater possibility for polluting groundwater)</i></p>	<p><b>D – significant impact:</b> Despite the observation of legal provisions, the pressure on surface water, groundwater, brackish water, coastal waters and sources of drinking water will be great, especially as the probability of the implementation of measures in areas of protected water sources, highly vulnerable aquifers, in influence areas of bathing waters or flood areas is very high. Mitigation measures to reduce the impact are not possible.</p> <p><b>E – destructive impact:</b> Despite the observation of legal provisions, the pressure on surface water, groundwater, brackish water, coastal waters and</p>

	<p>sources of drinking water will be extremely high, especially as the probability of the implementation of measures in areas of protected water sources, highly vulnerable aquifers, in influence areas of bathing waters or flood areas is very high.</p> <p>Mitigation measures to reduce the impact are not possible.</p> <p><b>X – determination of the impact is not possible:</b> The impact cannot be determined due to the lack of data.</p>
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• **Nature**

The evaluation criteria and methodology for environmental objective 6 are described in the table below: Ensuring the cohesion of populations and conservation of biodiversity.

Indicator/evaluation criteria	Evaluation of grades
<p>- possibility of integration in the central habitat area of large carnivores <i>(the routes of new or existing infrastructure corridors across important ecological areas of habitats of large carnivores mean greater pressure on large carnivores and interruption of migration routes; possible impacts on biodiversity at the regional and transboundary levels)</i></p> <p>- possibility of integration in dense forest stands <i>(planning of new infrastructure corridors through dense forest stands means negative pressure on wild animals and the interruption of migration routes; possible impacts on biodiversity at the local and regional levels)</i></p>	<p><b>A – no impact/positive impact:</b> There will be no impact on the cohesion of populations or the conservation of biodiversity, or the impact will be positive.</p> <p><b>B – insignificant impact:</b> If legal provisions are observed, the impact on the cohesion of populations and conservation of biodiversity will be insignificant.</p> <p><b>C – the impact is insignificant due to the implementation of mitigation measures:</b> Despite the observation of legal provisions, the cohesion of populations and conservation of biodiversity can not be ensured. The anticipated mitigation measures must be observed to reduce significant impacts.</p> <p><b>D – significant impact:</b> Despite the observation of legal provisions, the cohesion of populations and conservation of biodiversity can not be ensured. Mitigation measures to reduce the impact are not possible.</p> <p><b>E – destructive impact:</b> Despite the observation of legal provisions, the impact on the cohesion of populations and conservation of biodiversity will be destructive. Mitigation measures to reduce the impact are not possible.</p>

The evaluation criteria and methodology for environmental objective 7 are described in the table below: Protect areas with nature protection status against activities with considerable impacts.

Indicator/evaluation criteria	Evaluation of grades
<p>- possibility of integration in Natura 2000 sites and protected areas <i>(the routes of new or existing infrastructure corridors across protected areas mean negative impacts on the functionality and cohesion of these areas, and on qualifying species and habitat types )</i></p> <p>- possibility of integration in areas of recorded valuable natural features <i>(the routes of new or existing infrastructure corridors across areas of valuable natural features mean negative impacts on the type and quality of a valuable natural feature)</i></p>	<p><b>A – no impact/positive impact:</b> There will be no impact on areas with nature protection status, or the impact will be positive.</p> <p><b>B – insignificant impact:</b> If legal provisions are observed, the impact on areas with nature protection status will be insignificant, despite the fact that there is a probability of activities in protected areas and areas of valuable natural features.</p> <p><b>C – the impact is insignificant due to the implementation of mitigation measures:</b> Despite the observation of legal provisions, areas with nature protection status can not be protected. The anticipated mitigation measures must be observed to reduce significant impacts.</p> <p><b>D – significant impact:</b> Despite the observation of</p>

	<p>legal provisions, areas with nature protection status can not be protected. Mitigation measures to reduce the impact are not possible.</p> <p><b>E – destructive impact:</b> Despite the observation of legal provisions, the impact on areas with nature protection status will be destructive. Mitigation measures to reduce the impact are not possible.</p>
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- **Human health**

### Air quality

The evaluation criteria and methodology for environmental objective 8 are described in the table below: In areas of excessive ambient air pollution, considerably contribute to reducing the annual number of days with excessive daily pollution of ambient air with particulates, which must not exceed 35 in a calendar year.

Indicator/evaluation criteria	Evaluation of grades
<p>- annual number of days with excessive ambient air pollution with particulates measures at monitoring points which are exposed to pollutant emissions from transport</p> <p><i>(the measure must not cause the annual number of days with excessive ambient air pollution with particulates to exceed 35; the fewer days with excessive ambient air pollution, the less the impact on human health and the costs to society due to the number of exposed people whose health is affected)</i></p>	<p><b>A – no impact/positive impact:</b> The anticipated measures will not increase pollutant emissions which cause ambient air pollution with particulates. The implementation of measures will reduce pollutant emissions.</p> <p><b>B – insignificant impact:</b> The implementation of measures will increase pollutant emissions which cause ambient air pollution with particulates, but not to the extent that ambient air pollution with particulates would be excessive.</p> <p><b>C – impact is insignificant due to the implementation of mitigation measures:</b> The implementation of measures will increase pollutant emissions which cause ambient air pollution with particulates to the extent that ambient air pollution with particulates will be excessive. Mitigation measures must be anticipated to reduce the impact which ensures that pollutant emissions which cause ambient air pollution with particulates does not increase to the extent that ambient air pollution with particulates is excessive.</p> <p><b>D – significant impact:</b> The implementation of measures will increase pollutant emissions which cause ambient air pollution with particulates to the extent that ambient air pollution with particulates will be excessive. No mitigation measures are possible to keep the impact below excessive ambient air pollution with particulates.</p> <p><b>E – destructive impact:</b> The implementation of measures will increase pollutant emissions which cause ambient air pollution with particulates to an extent that has a significant and harmful effect on human health.</p> <p><b>X – determination of the impact is not possible:</b> The impact cannot be determined due to the lack of data.</p>

### Noise pollution

The evaluation criteria and methodology for environmental objective 9 are described in the table below: Reduce the pollution of the environment by noise from by transport and approximate to the levels recommended by the World Health Organisation.

Indicator/evaluation criteria	Evaluation of grades
<p>- exposure to noise from transport</p> <p><i>(the less the disturbance in the environment due to noise, the less the impact on the quality of the environment, human health and the costs to society due to the number of exposed people whose health is affected)</i></p>	<p><b>A – no impact/positive impact:</b> The anticipated measures will not increase noise exposure. On the contrary, the anticipated measures will reduce noise exposure.</p> <p><b>B – insignificant impact:</b> The implementation of measures will slightly increase noise exposure, but with the observation of legal bases, the impact will be insignificant.</p> <p><b>C – impact is insignificant due to the implementation of mitigation measures:</b> The implementation of measures will increase noise exposure. Despite the observation of legal bases, the impact will be significant. Additional mitigation measures must be anticipated to reduce the impact.</p> <p><b>D – significant impact:</b> The implementation of measures will increase noise exposure. Despite the observation of legal bases, the impact of measures will be significant. There are no mitigation measures to reduce the impact.</p> <p><b>E – destructive impact:</b> The implementation of measures will increase noise exposure to an extent that has a significant and harmful effect on human health.</p> <p><b>X – determination of the impact is not possible:</b> The impact cannot be determined due to the lack of data.</p>

- **Population and material assets**

The evaluation criteria and methodology for environmental objective 10 are described in the table below: Improving social cohesiveness, traffic safety and sustainable mobility.

Indicator/evaluation criteria	Evaluation of grades
<p>- accessibility from settlements to regional centres <i>(better and speedier accessibility improves social cohesion: speedier access to city centres means a better basis for the development of tourist and economic activities, which in turn means a positive impact on the income of individuals and local communities, the individual's lifestyle and the value of material assets – real estate)</i></p> <p>- inclusion of measures to improve traffic safety <i>(more measures means better traffic safety and fewer accidents)</i></p> <p>- inclusion of measures to enhance the efficiency of public passenger transport (PPT) <i>(more public passenger transport means more efficient sustainable mobility; more efficient PPT means reduced density of traffic routes and preservation of the value of material assets such as land and real estate; more efficient PPT also reduces financial strain on households, as the need for several vehicles per household is reduced)</i></p> <p>- inclusion of measures to enhance opportunities for a</p>	<p><b>A – no impact/positive impact:</b> Measures will not affect the attainment of the objective, or the implementation of measures will enhance the connections between remote settlements and regional centres, and improve traffic safety and sustainable mobility.</p> <p><b>B – insignificant impact:</b> The implementation of measures will ensure connections between remote settlements and regional centres, traffic safety and sustainable mobility, but in comparison with the current state, they will be slightly poorer.</p> <p><b>C – the impact is insignificant due to the implementation of mitigation measures:</b> The implementation of measures will make the connections between remote settlements and regional centres, traffic safety and sustainable mobility significantly poorer in comparison with the current state. Mitigation measures must be observed to reduce the impact.</p> <p><b>D – significant impact:</b> The implementation of measures will make the connections between remote settlements and regional centres, traffic safety and sustainable mobility significantly poorer in comparison with the current state. Mitigation</p>

<p>healthy lifestyle (sustainable mobility measures entail the good arrangement of recreational infrastructure (for example, cycling routes and footpaths, including their accessibility); recreation positively affects the mental and physical condition of people and thus reduces the costs of society due to a healthier lifestyle)</p>	<p>measures are not possible. <b>E – destructive impact:</b> The implementation of measures will make the connections between remote settlements and regional centres, traffic safety and sustainable mobility considerably poorer in comparison with the current state. <b>X – determination of the impact is not possible:</b> The impact cannot be determined due to the lack of data.</p>
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• **Cultural heritage**

The evaluation criteria and methodology for environmental objective 11 are described in the table below:

Preserve the scope and qualities of cultural heritage facilities and areas.

Indicator/evaluation criteria	Evaluation of grades
<p>- probability of the route running across registered units of cultural heritage (integrating measures for road, rail and public transport on units of cultural heritage may significantly endanger the integrity of heritage and modify its qualities. Especially endangered are cultural landscapes, and historical landscapes of areas of architectural heritage and archaeological sites)</p> <p>- probability of destroying archaeological remains (integrating measures for road, rail and public transport on units of cultural heritage means encroachment upon soil and thus great probability of destroying archaeological remains )</p>	<p><b>A – no impact/positive impact:</b> The anticipated measures do not pass through registered units of cultural heritage. Since the open space will not be encroached upon, archaeological remains will not be destroyed.</p> <p><b>B – insignificant impact:</b> There is a probability that measures will pass through registered units of cultural heritage. Since the route is sited in or along existing transport corridors, the probability of activities in registered units of cultural heritage and destruction of archaeological remains is low. With the observation of legal bases, the impact on the qualities of registered units of cultural heritage will be insignificant.</p> <p><b>C – impact is insignificant due to the implementation of mitigation measures:</b> The probability of measures passing through registered units of cultural heritage and thus of the reduction of their size is high. Despite the observation of legal bases, the impact of measures on the qualities of cultural heritage will be significant. Due to activity in the open space, the probability that archaeological remains will be destroyed is high. Mitigation measures must be observed to reduce the impact.</p> <p><b>D – significant impact:</b> The probability of measures passing through registered units of cultural heritage and thus of the reduction of their size is very high. Despite the observation of legal bases, the impact of measures on the qualities of cultural heritage will be considerable. Due to activity in the open space, the probability that archaeological remains will be destroyed is very high. There are no mitigation measures to reduce the impact.</p> <p><b>E – destructive impact:</b> The impact of measures on the qualities of registered units of cultural heritage will be destructive. The impact of measures on archaeological remains will also be destructive.</p> <p><b>X – determination of the impact is not possible:</b> The impact of measures on registered units of cultural heritage and archaeological remains cannot be determined due to the lack of data</p>

• **Landscape**

Evaluation criteria and methodology for environmental objective 12 are described in the table below: Ensure the conservation of exceptional landscapes and landscape areas with distinctive features at the national level, and a quality landscape image.

Indicator/evaluation criteria	Evaluation of grades
<p>- probability of the route passing through exceptional landscapes and landscape areas with distinctive features at the national level <i>(integrating measures for road, rail and public transport on units of cultural heritage may significantly endanger the integrity of exceptional landscapes and landscape areas with distinctive features at the national level, and destroy their qualities)</i></p> <p>- probability of the route passing through landscape areas with preserved natural elements and exceptionally balanced cultural landscape with special symbolic meaning <i>(integrating measures for road, rail and public transport on units of cultural heritage may significantly change the existing landscape image. The impact is especially noticeable in landscape areas with preserved natural elements and exceptionally balanced cultural landscape.)</i></p>	<p><b>A – no impact/positive impact:</b> The anticipated measures do not pass through exceptional landscapes or landscape areas with distinctive features at the national level. The high-quality landscape image will be preserved, as measures will be integrated in areas of major landscape degradation.</p> <p><b>B – insignificant impact:</b> There is the probability of measures passing through exceptional landscapes or landscape areas with distinctive features at the national level, and of the existing landscape image deteriorating. The impact on the existing landscape image will be insignificant, as most measures will be integrated in areas of landscape degradation.</p> <p><b>C – impact is insignificant due to the implementation of mitigation measures:</b> The probability of measures passing through exceptional landscapes and landscape areas with distinctive features at the national level, and of the existing landscape image to deteriorate is high. The impact on their qualities is high. Measures will be integrated in well-conserved natural areas and cultural landscapes, and thus the impact on the high-quality landscape image will be significant. Mitigation measures must be observed to reduce the impact.</p> <p><b>D – significant impact:</b> The probability of measures passing through exceptional landscapes and landscape areas with distinctive features at the national level is considerable, and thus its impact is significant. Measures will be integrated in natural areas with preserved natural elements and exceptionally balanced cultural landscape, and thus the impact on the high-quality landscape image will be significant. There are no mitigation measures to reduce the impact.</p> <p><b>E – destructive impact:</b> The impact of measures on the qualities of exceptional landscapes and landscape areas with distinctive features at the national level will be destructive. The high-quality landscape image in landscapes with exceptional natural elements and cultural landscape will be destroyed.</p> <p><b>X – determination of the impact is not possible:</b> The impact of measures on exceptional landscapes and landscape areas with distinctive features at the national level, and the existing landscape image cannot be determined due to the lack of data.</p>

## 7. OBJECTIVE COMPLIANCE ASSESSMENT

The selected environmental objectives determined at the international, Union and Slovenian level must be, in compliance with Directive 2001/42/EC, important for the assessment of measures defined in the Strategy to attain its objectives. To establish the importance of environmental objectives, the compliance of the Strategy objectives with the selected environmental objectives must be assessed. The assessment of compliance establishes conflicts or mutual interactions between different objectives, as well as pronounced conflicts of interest between the objectives, which should be especially pointed out in the assessment of the measures in the Strategy.

The compliance of the objectives and sub-objectives of the Strategy was assessed in view of the selected environmental objectives of this strategic environmental assessment through a standard approach to matrix assessment. A colour evaluation chart was used for levels of compliance between objectives, which is shown in Table 14. The assessment of internal compliance of both sets of objectives, i.e. the sub-objectives of the Strategy and environmental objectives, was carried out in a similar way.

**Table 14 Evaluation chart for levels of compliance between objectives**

Level of compliance	Explanation	Numerical evaluation
	The objectives are very compliant.	3
	The objectives are partly compliant.	2
	The connection between the objectives is vague.	1
	There is no connection between the objectives.	0
	The objectives are not compliant.	-1

### Compliance assessment of the Strategy objectives with the environmental objectives

The results of the compliance assessment of the Strategy objective with the environmental objectives are shown in Table 15. The table shows that all objectives of the Strategy in principle are in compliance with the environmental objectives.

For four sub-objectives of the Strategy under 'Specific objective no. 4: Improve the organisational and operational structure of the transport system to ensure the efficiency and sustainability of the system', it was assessed that they were not directly connected to the environmental objectives or that a direct connection with the environmental objectives was not evident without information about the measures, so that their compliance with the environmental objectives was categorised as 'there is no connection between the objectives' (highlighted in grey).

In general, the sub-objectives of the Strategy in view of the environmental objectives are:

- very compliant (81 of 252 possible results of compliance assessment) or
  - partly compliant (27 of 252 possible results of compliance assessment) or
  - the connection between the objectives is vague (89 of 525 possible results of compliance assessment)
- or
- there is no connection between the objectives (55 of 525 possible results of compliance assessment).

Each sub-objective of the Strategy is very compliant or partly compliant with at least three environmental objectives, except those sub-objectives of the Strategy under 'Specific objective no. 4: Improve the organisational and operational structure of the transport system to ensure the efficiency and sustainability of the system', whose compliance with the environmental objectives was assessed as 'there is no connection between the objectives' (highlighted in grey).



**Table 15 Compliance assessment of the Strategy objectives and sub-objectives with the environmental objectives**

ENVIRONMENTAL OBJECTIVE	EO1	EO2	EO3	EO4	EO5	EO6	EO7	EO8	EO9	EO10	EO11	EO12	Average
Strategy OBJECTIVE	Soil and mineral resources – sustainable land management	Soil and mineral resources – exploitation of natural resources	Air	Climate factors	Water	Nature – biodiversity	Nature – conservation areas	Health – air	Health – noise	Population and material assets	Cultural heritage	Landscape	Numerical evaluation
<b>Objective no. 1: Improve transport connections and harmonisation with neighbouring countries</b>													
1a Eliminate congestions at borders													1.83
1b Improve accessibility of international inter-urban passenger transport													1.25
1c Improve accessibility of international cargo transport													1.67
<b>Objective no. 2: Improve national and regional connections within Slovenia</b>													
2a North-east													1.92
2b South-east													1.92
2c North-west													1.92
2d Goriška													1.58
2e Koroška													2.00
2f Primorska													1.83

ENVIRONMENTAL OBJECTIVE	EO1	EO2	EO3	EO4	EO5	EO6	EO7	EO8	EO9	EO10	EO11	EO12	Average
2g Central Slovenia	Yellow	Green	Green	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	1.58
2h Accessibility within regions (to regional centres)	Yellow	Green	Green	Green	Yellow	Yellow	Green	Green	Green	Green	Yellow	Yellow	2.00
Objective no. 3: Improve accessibility of passengers to the main urban agglomerations and within them													
3a Ljubljana	Yellow	Green	Green	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	1.58
3b Maribor	Yellow	Green	Green	Green	Yellow	Yellow	Yellow	Green	Green	Green	Yellow	Yellow	1.92
3c Koper	Yellow	Green	Green	Green	Yellow	Yellow	Yellow	Green	Green	Green	Yellow	Yellow	1.92
Objective no. 4: Improve the organisational and operational structure of the transport system to ensure the efficiency and sustainability of the system													
4a Harmonisation of legislation, rules and standards with European requirements, and best practice			Green	Green									0.50
4b Improvement of the organisational system structure and cooperation between respective stakeholders								Green	Green				0.50
4c Improvement of the operational system structure								Green	Green				0.50
4d Improvement of the transport system safety		Green			Green					Green			0.75
4e Reduction/mitigation of environmental impacts	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green			2.50
4f Improvement of energy efficiency			Green	Green		Green		Green	Green	Green			1.50
4g Financial sustainability of the transport system			Green	Green				Green	Green				1.00

Regarding the sub-objectives of the Strategy whose level of compliance with individual environmental objectives was assessed as ‘the connection between the objectives is vague’ (highlighted in yellow), both positive and negative environmental impacts may occur. This compliance group comprises those sub-objectives of the Strategy which may be attained especially by improving the transport network. For example, the construction of new roads or the expansion of existing roads may have a negative impact on biodiversity, aquatic environment and local air quality, and may produce additional noise pollution in the environment. However, improving the transport network along with the implementation of mitigation measures may affect the environment, but does not prevent the environmental objective from being attained or may even contribute to the attainment of the environmental objective.

In general, certain aspects of environmental impacts are not clear, so there is a need to categorise the compliance of the Strategy sub-objective as ‘the connection between the objectives is vague’ (highlighted in yellow) if this Strategy sub-objective may be attained only by measures of new construction or expansion of the transport network.

To compare the comprehensive compliance of individual objectives of the Strategy with the environmental objectives, a numerical evaluation was also prepared in which the average value of compliance equals 1.53 on the basis of the numerical evaluation from Table 15. The following sub-objectives of the Strategy must be emphasised as above-average compliant with the environmental objectives:

- 4e Reduce/mitigate environmental impacts;
- 2h Accessibility within regions (to regional centres);
- 1a Eliminate congestions at borders;
- 1c Improve accessibility of international cargo transport;
- environmental objectives from group 2: 2a, 2b, 2c, 2d, 2e, 2f and 2g; and
- environmental objectives from group 3: 3a, 3b and 3c.

The following environmental objectives are very compliant with the Strategy objective (level of compliance is ‘the objectives are very compliant’ – highlighted in dark green):

- EO3 (pollutant emissions),
- EO4 (greenhouse gas emissions), and
- EO10 (population and material assets), and partly also
- EO8 (health – air pollution).

The aforementioned environmental objectives are explicitly supported by the implementation of measures to attain the objectives of the Strategy.

The results of the compliance assessment of the sub-objectives of the Strategy are as follows:

- in general, the sub-objectives of the Strategy comply with the objectives defined at the international, Union or Slovenia level;
- none of the sub-objectives of the Strategy is non-compliant with any of the environmental objectives in the Environmental Report;
- all sub-objectives of the Strategy comply with or partly comply with at least three environmental objectives in the Environmental Report, which ensures sustainable transport development and long-term high level of accessibility of people to the transport network in the Republic of Slovenia;
- those sub-objectives of the Strategy which require the construction or expansion of the existing network are very likely to have a negative environmental impact, especially from the aspect of soil use (best agricultural land, protective forest), habitat fragmentation, the aquatic environment, and human health (air pollution, noise) whose consequences may be prevented or mitigated by suitable mitigation measures.

### **Internal compliance of the Sub-objectives of the Strategy**

The results of the assessment of internal compliance of the Sub-objectives of the Strategy are shown in Table 16.

Of a total of 105 possible results of compliance assessment, the internal compliance of the Sub-objectives of the Strategy was assessed as very compliant (highlighted in dark green) in 27 cases, as partly compliant (highlighted in light green) in 37 cases, and as without a connection between the objectives in 41 cases (highlighted in grey).

None of the sub-objectives of the Strategy was assessed as non-compliant with each other (highlighted in red), and none of the sub-objectives of the Strategy was assessed as 'the connection between the objectives is vague' (highlighted in yellow), which means that measures to attain the sub-objectives of the Strategy always positively contribute to the attainment of another objective if there is a connection between them.

The sub-objectives of the Strategy under 'Specific objective no. 4: Improve the organisational and operational structure of the transport system to ensure the efficiency and sustainability of the system', the so-called horizontal objectives, are assessed as very compliant (highlighted in dark green) with all other sub-objectives of the Strategy.

### **Internal compliance of the environmental objectives**

The results of the assessment of the internal compliance of the environmental objectives in the Environmental Report are shown in Table 17.

None of the environmental objectives was assessed as non-compliant with each other (highlighted in red), and none of the environmental objectives was assessed as 'the connection between the objectives is vague' (highlighted in yellow), which means that measures to attain the environmental objectives always positively contribute to the attainment of another objective if there is a connection between them.

In general, the environmental objectives in view of other environmental objectives are:

- very compliant (11 of 66 possible results of compliance assessment) or
- partly compliant (26 of 66 possible results of compliance assessment) or
- there is no link between the objectives (29 of 66 possible results of compliance assessment).

The environmental objective EO 10 'Improve social cohesiveness, traffic safety and sustainable mobility' was assessed as the most compliant with all other environmental objectives.

Table 16 Assessment of internal compliance of the Sub-objectives of the Strategy

1a Eliminate congestions at borders															
1b Improve accessibility of international inter-urban passenger transport	1														
1c Improve accessibility of international cargo transport	1	1													
2a North-east	1	1	1												
2b South-east	1	1	1	1											
2c North-west	1	1	1	1	1										
2d Goriška	1	1	1	1	1	1									
2e Koroška	1	1	1	1	1	1	1								
2f Primorska	1	1	1	1	1	1	1	1							
2g Central Slovenia	1	1	1	1	1	1	1	1	1						
2h Accessibility within regions (to regional centres)	1	1	1	1	1	1	1	1	1	1					
3a Ljubljana	1	1	1	1	1	1	1	1	1	1	1				
3b Maribor	1	1	1	1	1	1	1	1	1	1	1	1			
3c Koper	1	1	1	1	1	1	1	1	1	1	1	1	1		
Horizontal objectives: 4a, 4b, 4c, 4d, 4e, 4f and 4g	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1a	1b	1c	2a	2b	2c	2d	2e	2f	2g	2h	3a	3b	3c	4

Table 17 Assessment of internal compliance of the environmental objectives

EO1 – Soil and mineral resources – sustainable land management												
EO2 – Soil and mineral resources – exploitation of natural resources												
EO3 – Air												
EO4 – Climate factors												
EO5 – Water												
EO6 – Nature – biodiversity												
EO7 – Nature – conservation areas												
EO8 – Health – air												
EO9 – Health – noise												
EO10 – Population and material assets												
EO11 – Cultural heritage												
EO12 – Landscape												
	EO1	EO2	EO3	EO4	EO5	EO6	EO7	EO8	EO9	EO10	EO11	EO12

## 8. ASSESSMENT OF THE IMPACT

### 8.1 Evaluation of the consequences of the Strategy implementation, and assessment of the impacts of the Strategy implementation on the realisation of the environmental objectives of the Strategy

Chapter 8.1 includes the compliance assessment of the Strategy with individual environmental areas and important environmental objectives. Guidelines, mitigation measures and specific measures are stated in Chapter 10.

#### 8.1.1 Soil and mineral resources

##### **Environmental objective 1: Ensuring sustainable management of land and protection of soil**

The greatest impact during construction is expected in the development of the road and railway networks, while development in the maritime and air transport networks will be limited locally. By occupying land, the construction of transport infrastructure produces extensive irreversible impacts, which is reflected after the development as a change in land use. Agricultural land and forests will be permanently (irreversibly) destroyed on reconstructed sections only in a narrow strip along the existing route, while new construction will permanently destroy agricultural land and forests in the width of the road or railway body and the maintenance area. New traffic routes also permanently affect the fragmentation of agricultural land. The short-term (reversible) impacts that could occur during the construction include accessibility to agricultural land or forest, damage to agricultural land (trampling) and damage to produce due to the proximity of the construction site, soil pollution etc.

Due to transport, the existing use of agricultural land is being changed by the positioning of new infrastructure connections. The implementation measures could permanently reduce the scope of the best agricultural land and land with better productive potential, which would mean a permanent loss of soil function for agricultural production. If measures for transport infrastructure are positioned outside existing transport corridors, the fragmentation of agricultural land will increase and the conditions for agricultural processing will worsen.

The positioning of new infrastructure connections in an open and naturally conserved space could very well lead to activities in continuous forest areas with wood production functions at the first level and in areas of protective forests (irreversible destruction).

The general guidelines and mitigation measures stated in Chapter 10 should be taken into account to attain this objective.

##### **Environmental objective 2: Prevent the exploitation of natural resources by using at least 70 per cent of recycled materials from construction waste produced in the construction and reconstruction of transport infrastructure**

The construction of new and reconstruction of existing transport infrastructure is a source of large quantities of waste, and also puts pressure on the use of natural resources. Waste is generated not only temporarily during the construction, but permanently by the maintenance of transport infrastructure. The impact of waste generation is permanent and in many cases irreversible in terms of natural resources. Therefore, this negative environmental impact should be reduced with waste management measures.

Considering the manner of its generation and structure, waste from road and rail transport are similar, while waste from maritime transport is specific due to the management of sea silt. The quantity of waste from air transport is significantly lower and its structure more similar to the structure of waste from the urban environment.

The EU supplemented the policy framework in the field of waste management with the new framework Directive 2008/98/EC on waste. The Directive also introduces the objective regarding construction waste, whose preparation for reuse, recycling and material processing should increase to at least 70 per cent of the total volume by 2020.

The construction of new or expansion of existing transport infrastructure within the implementation of measures in the Strategy offers an ideal opportunity to reuse or materially process construction and industrial waste, where a synergy effect is reflected especially in the following facts:

- large quantities of waste may be used, especially in road construction;
- potential toxic substances in waste may be permanently mobilised when used appropriately; and
- new construction composites frequently have better functional features in comparison with conventional ones.

Along with the implementation of the measures in the Strategy, the economical management of mineral resources as a natural resource should be supported with additional general measures which promote the reduction of environmental pollution by using recycled materials in the construction and reconstruction of transport infrastructure. No such general measure has been included in the Strategy. Therefore, such measures must be prepared and included in the development programme in question.

The general guidelines and mitigation measures stated in Chapter 10 should be taken into account to attain this objective.

### **8.1.2 Air**

#### **Environmental objective 3: Ensure the attainment of long-term objectives for annual quantities of pollutant emissions determined for the transport sector in the Operational programme for complying with national emission ceilings for atmospheric pollutants**

Pollutant emissions are characteristic of the construction or reconstruction of transport infrastructure, and its operation.

During the construction or reconstruction of existing infrastructure, pollutant emissions have a short-term impact on the environment, and most effects of such emissions are reversible.

During the operation of transport infrastructure, major emissions are present in road, air and maritime transport. A generally accepted assessment is that the transition from road transport to rail or maritime transport reduces air pollution.

The implementation of measures aimed at attaining the objectives of the Strategy is expected to have a positive impact due to a reduction in pollutant emissions, primarily due to transferring cargo transport and partially also passenger transport from road to rail. Other measures in the Strategy are also



expected to contribute to positive effects due to a reduction of pollutant emissions, in particular those aimed at reducing congestion and the greater use of public road and rail transport.

Nevertheless, there is a risk that improving the road network will produce so-called 'induced demand' by reducing existing congestion, which would in turn increase the quantity of pollutant emissions, especially in areas which were not polluted prior to the implementation of the measures in the Strategy. However, the negative impact of improving the road network may be reduced or even prevented by simultaneously taking general measures to promote the use public passenger transport.

Amendments to the Operational programme for complying with national emission ceilings for atmospheric pollutants, which need to be drafted after the adoption of the new Directive on national emission ceilings for certain pollutants, will define a reduction in emissions of pollutants for the 2020–2029 period and for the period after 2030 for the transport sector and other sectors, with the obligation to attain the indicative objectives of reduced pollutant emissions from the proposed new Directive.

At the level of each Member State, the indicative objectives to reduce pollutant emissions were prepared by taking into account the legally binding objectives of the Union within the Convention of the United Nations Economic Commission for Europe the on Long-Range Transboundary Air Pollution. Considering that the transport sector produces noticeable quantities of pollutant emissions within the permitted pollutant emission ceilings determined for Slovenia, it would be most appropriate to assume reduction values determined for the total pollutant emissions in Slovenia in order to reduce pollutant emissions from transport.

The objectives of reduced pollutant emissions for the transport sector are as follows:

reduce nitrogen oxide emissions in the 2020-2029 period by at least 39 per cent in comparison with 2005;

the reduction of nitrogen oxide emissions after 2030 must not be lower than 71 per cent in comparison with 2005;

reduce emissions of PM<sub>2,5</sub> particulates in the 2020-2029 period by at least 25 per cent in comparison with 2005; and

the reduction of emissions of PM<sub>2,5</sub> particulates after 2030 must not be lower than 70 per cent in comparison with 2005.

The mutual distribution of burdens to attain the annual national emission ceilings for each sector (energy, industry, trade and services, transport, agriculture and waste management) will be defined in more detail in amendments to the Operational programme for complying with national emission ceilings. However, the requirements for reduced emissions from transport are not expected to be lower than the average reduction determined for the total pollutant emissions in Slovenia. Due to this, emission ceilings for NO<sub>x</sub> and PM<sub>2,5</sub> which are the main pollutants from road transport have been determined on the basis of indicative reduction in pollutant emissions.

**Table 18 Commitments regarding reducing emissions in Slovenia for the following pollutants important for emissions from transport: nitrogen oxides (NO<sub>x</sub>) and particulates (PM<sub>2</sub>).**

Member State	Reduction of NO <sub>x</sub> in comparison with 2005		Reduction of PM <sub>2,5</sub> in comparison with 2005	
	For any year between 2020 and 2029	For any year after 2030	For any year between 2020 and 2029	For any year after 2030
<b>Slovenia</b>	39%	71%	25%	70%
<b>EU-28</b>	42%	69%	22%	51%

The renewal of the vehicle fleet most significantly contributes to reducing pollutant emissions, as the development in type-approval standards for vehicles ensures that most target pollutant emissions from transport are achieved. Measures to promote public passenger transport and rail cargo transport also contribute to reducing pollutant emissions.

General measures in the Strategy do not address the promotion of renewing the vehicle fleet, except the vehicle fleet in public passenger transport, but all other measures in the Strategy, especially measures to promote public passenger transport, and the transfer of cargo transport from roads to railways, have a positive impact on the objectives of amendments to the Operational programme for complying with national emission ceilings.

The general guidelines and mitigation measures stated in Chapter 10 should be taken into account to attain this objective.

### 8.1.3 Climate factors

#### **Environmental objective 4: Adapt transport infrastructure to climate change and reduce annual quantities of greenhouse gas emissions below the target values determined for the transport sector in the Operational programme of measures to reduce greenhouse gas emissions by 2020**

The construction and use of new transport infrastructure has a permanent (reversible) impact on greenhouse gas (GHG) emissions, which are the main caused of climate change. Since fossil fuels (petroleum) which emit GHG into the air when used are currently the most important source of energy in transport, the sector is the second largest source of greenhouse gas emissions (after the energy sector). The impact on climate change is also reflected in damage suffered due to extreme weather and climate conditions, and grows each year. Another consequence of higher global temperatures is a change in patterns of average climate phenomena and more frequent occurrences of extreme weather conditions (drought, floods, erosions, storms with hail, heat waves, low temperatures with frost, etc.).

##### 8.1.3.1 Climate change adaptation

In 2013, the Commission issued the EU Strategy on adaptation to climate change (COM(2013) 216 final). The general objective of the EU Adaptation Strategy is to contribute to a more climate-resilient Europe. This means enhancing the preparedness and capacity to respond to the impacts of climate change at the local, regional, national and EU levels, developing a coherent approach and improving coordination.

The EU Adaptation Strategy states that the climate change adaptation has already been mainstreamed in EU transport legislation, i.e. in the provisions of Regulation (EU) no. 1315/2013 on Union guidelines on the development of the trans-European transport network.

The provisions of Article 5 of Regulation (EU) no. 1315/2013 requires Member States to plan, develop and operate the trans-European transport network in a resource-efficient way, which means that the sensitivity of transport infrastructure to climate change is properly observed.

Article 41 of Regulation (EU) no. 1315/2013 defines in more detail what is deemed appropriate handling of the sensitivity of transport infrastructure to climate change. The provisions of this Article require Member States to take into account when planning infrastructure measures from risk assessment and adaptations which suitably enhance resilience to climate change, especially in relation to precipitation, storms, high temperatures and heat waves, drought, rises in sea level and storm surges. Pursuant to Article 41 of this Regulation, an analysis of the sensitivity of transport infrastructure to climate change must be prepared for all measures in the Strategy, and based on its results, measures and adaptations which suitably enhance resilience to climate change must be carried out.

Since measures in the field of climate change adaptation are treated as general measures at the strategic level of transport policy development, measures from the general measure group must be expanded by creating guidelines, methodology and procedures for collecting information about extreme weather events, and for planning and implementing:

- measures to improve the resilience of road infrastructure to floods;
- measures to improve the resilience of road infrastructure to snow; and
- measures to improve the resilience of the rail network to glaze ice.

#### **8.1.3.2 Climate change mitigation**

In general, the measures of the Strategy related to rail transport have a positive or neutral impact on climate change mitigation. The negative impact on climate change mitigation may be expected only temporarily during the construction or reconstruction of the railway network.

Greenhouse gas emissions from road transport represent a considerable threat to climate change mitigation. In addition to temporary greenhouse gas emissions due to construction works in the implementation of the measures of the Strategy, greenhouse gas emissions are expected to rise despite the elimination of congestion on the road network if the general measures of the Strategy are not implemented. The implementation of general measures must ensure greater use of public passenger transport. The implementation of the general measures of the Strategy that promote public passenger transport, and the use of more energy-efficient road vehicles will contribute to the stagnation of emissions from road transport in the medium term and even a decline by 2030.

Growth in greenhouse gas emissions in air transport is expected due to construction works, while potential growth in greenhouse gas emissions due to an increased volume of air transport does not represent a significant share in the structure of total emissions in Slovenia. Maritime transport is similar to air transport in that the share of greenhouse gas emissions is insignificant.

The implementation of measures to attain the objectives of the Strategy must take into account the so-called indicative objectives to reduce greenhouse gas emissions, which are listed for individual sectors in the Operational Programme for Reducing Greenhouse Gas Emissions by 2020 with a vision by 2030.

The indicative objectives to reduce greenhouse gas emissions were prepared by individual sectors, taking into account the legally binding objectives for the 2013–2020 period, political solutions adopted at the EU level regarding long-term objectives, the costs of reducing greenhouse gas emissions in Slovenia by 2030, and other general development, sectoral and environmental objectives, and in the formation of a vision, also by taking into account the effects of the technological solutions which are being developed. The indicative sectoral objectives to reduce greenhouse gas emissions are stated among general guidelines in Chapter 10.3.

Transport is the key sector in attaining the national objectives for climate change mitigation by 2020. Emissions in this sector have been rapidly growing, in Slovenia faster than in other countries included in the Annex I to the Kyoto Protocol. In addition, a lot of transit transport which is only partially affected by measures in Slovenia may significantly affect the objectives.

The general guidelines and mitigation measures stated in Chapter 10 should be taken into account to attain this objective.

#### 8.1.4 Water

##### **Environmental objective 5: Limit the effects of the pressure of transport infrastructure on surface water, groundwater, brackish water, coastal waters and sources of drinking water**

The greatest impact on the attainment of this environmental objective is expected in the development of the road and railway networks, while development in the maritime and air networks will be limited locally. Impacts on surface water, groundwater, brackish water, coastal waters and sources of drinking water are characteristic of the period of construction or reconstruction of transport infrastructure, and also afterwards. They are largely limited to the local environment, while in the case of major pollution accidents, the impact is also felt regionally and across the border. During the construction or reconstruction of transport infrastructure, impacts are mostly short term and reversible (for example, the impact on water quality). After the construction, impacts are mostly less extensive, but permanently irreversible (for example, the impact on the morphology of watercourses, hydrologic conditions, retention areas). The aforementioned impacts may produce changes in quality elements for the establishment of the ecological status of surface waters, which are biological elements, hydromorphological elements supporting biological elements, chemical and physiochemical elements supporting biological elements, and the chemical status of waters. If the general guidelines and mitigation measures are observed, the changes in quality elements will not be extensive enough to threaten the attainment of the environmental objective.

Measures for road, rail, maritime, air and public transport may significantly impact the attainment of the environmental objective for waters:

- positioning of infrastructure corridors may permanently directly or indirectly impact the hydrological situation in a certain area, and bridging structures may impact the eco-morphological situation in a watercourse;
- continuous leaching of hazardous substances which are the result of pollution from transport (impact the quality of surface waters and groundwater, potential impact on bathing waters);
- spillage of hazardous substances due to an extraordinary event (potential direct, remote and transboundary impact on the quality of surface waters and groundwater, potential impact on bathing waters);

- increased existing flood risk due to the route (applicable to new construction and the reconstruction of existing infrastructure lines) in flood areas or watercourse regulation; changes in the hydrological situation in a certain area, including the reduction in the area of retention areas (direct and remote);
- changes in the water regime of groundwater due to draining water from the rear areas of tunnels (direct and remote);
- positioning of transport infrastructure facilities in areas with extremely highly, very highly and highly vulnerable aquifers may have negative impacts on existing and potential water sources (direct, remote, transboundary);
- positioning in water protection areas of water sources (local, potentially regional and transboundary impact).

The Waters Act (Official Gazette of the Republic of Slovenia, nos. 67/02, 57/08, 57/12, 100/13 and 40/14) stipulates that activities in water and waterside land may be carried out only if they are based on national spatial planning plans and cannot be positioned elsewhere without generating disproportionately high costs. The positioning of such activities may significantly impact the ecological status of watercourses, and reduce the area of retention areas and the cumulative impacts on the biodiversity of the area and ecosystems services of the area.

The main direct impacts of maritime transport on water quality stem from oil spills and ballast water discharge. Potential sources of sudden pollution of the sea and the coastal area by oil, oil derivatives and other hazardous substances in maritime transport and at coastal facilities are especially the following:

- cargo of oil (30–31 million tonnes annually), and other hazardous substances (unknown quantities) transported to and from the port of Trieste;
- cargo of oil and derivatives transported to the port of Koper; approx.. 1–2 million tonnes annually (tankers up to 60,000 tonnes);
- transport of cargo of chemicals and special cargo to the port of Koper, or from the port of Koper by sea to other destinations;
- discharge of waste oils from ships sailing into or from the port of Koper or Trieste (unintentionally or out of negligence);
- lesser but more frequent pollution by washing handling areas of ports and ships;
- waste or ballast water which may cause foreign organisms to enter our waters, which is a specific problem which requires preventive supervision of these waters.

The general guidelines and mitigation measures stated in Chapter 10 should be taken into account to attain this objective.

### 8.1.5 Nature

#### **Environmental objective 6: Ensuring the cohesion of populations and conservation of biodiversity**

The greatest impact during the construction is expected in the development of road and railway network, while development in the maritime and air transport networks will be limited locally. Impacts on the fragmentation of habitats and biodiversity are characteristic of the period of new construction and reconstruction of transport infrastructure, and also afterwards. They are mostly noticed in the local environment, while in the event of an extensive project, impacts are also felt regionally and across the border (for example, the migration of large carnivores, migration routes of birds). During the construction or reconstruction of transport infrastructure, impacts are mostly short term and reversible (for example, noise pollution of the construction site area, animals run over by construction machinery, etc.). After construction, impacts are mainly permanent and irreversible due to the changed use of land (for example, the interruption of migration routes, increased noise pollution from transport, obstacles in the environment – electric lines, etc.).

The construction of new road or rail connections, and the reconstruction or modernisation of existing infrastructure facilities may result in:

- loss of habitat areas and habitat types, and representatives of individual plant and animal species (direct, permanent impact);
- direct, permanent impact on the functionality of a certain habitat due to habitat fragmentation;
- in the event of extensive activities in a more endangered habitat, a direct impact is possible on the biodiversity of the narrower or wider area (permanent impact);
- new routes often fragment the habitats of wild animals and interrupt migration routes and flight paths or prevent the migration of certain groups of animals (especially mammals and amphibians; if a route crosses a migration or flight corridor, collisions with birds and bats are also possible), which may permanently prevent the migration of individual animals between individual populations, and cause a decline in biodiversity in a certain areas (direct, cumulative, remote impact);
- most migration problems occur on constructed sections of motorways where there are only a few wildlife underpasses, and no green bridges. The need for the construction of an ecoduct for lynx and bear on the Vrhnika–Postojna section of the Ljubljana–Koper motorway has already been noted. On numerous sections of regional and local roads, the passages for amphibians remain unresolved, which leads to a high mortality rate during their spring migrations to spawning sites (direct, remote impact) (Zavod Symbiosis, 2012);
- in areas of unprotected traffic routes (roads and railways), there is a possibility of collisions of vehicles with mammals during daily commuting and of amphibians being run over during the migration season (direct, remote impact); regular and frequent roadkill may also cause a decline in the size of individual populations (direct, cumulative, remote impact);
- noise has a negative impact especially on birds and mammals, and is not present only in the direct vicinity of a facility, but spreads much farther (remote impact);
- sky-oriented radiation from the lighting of roads, stops, tunnels and other accompanying infrastructure may directly disturb life cycles, especially of nocturnal animals and animals which are active in the evening;
- the positioning of activities on water and waterside land<sup>1</sup> (which is permissible for arrangements of national importance which cannot be positioned elsewhere without generating disproportionately high costs), permanent and direct negative impacts on water and waterside habitats may occur, especially if infrastructure runs along watercourses.

Negative impacts of air transport are possible if migration and flighty routes of birds are interrupted, and habitats are lost due to the expansion of airports and collisions of planes and birds, which is also a threat to people. Impacts may be direct, remote and permanent.

Most negative impacts of ports and maritime transport are due to noise (scaring off birds) and water pollution (impact on biodiversity and groups). Impacts may be direct, remote and permanent.

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<sup>1</sup> High biodiversity is characteristic of pristine water and waterside lands. Such land is also highly valuable due to its numerous ecosystem services (especially balancing services: balancing ecosystem processes, improving air quality, balancing climate, water treatment, balancing soil erosion, retention areas for flood waters; and cultural services, e.g. recreational).

The impact on the attainment of the objectives of the EU Biodiversity Strategy to 2020: this strategy realises two important commitments, i.e. to halt the loss of biodiversity in the EU by 2020, and to protect, evaluate and restore biodiversity and ecosystem services in the EU by 2050. The objective of the Strategy for Biodiversity Conservation in Slovenia for transport infrastructure is to ensure the mobility of people and goods in a way which conserves biodiversity.

Measures for road, rail, maritime, air and public transport may significantly impact the attainment of the environmental objectives of the Strategy: road and rail infrastructure represent lines that may cross natural corridors which wild animals use in their daily or seasonal migrations. Such lines are an obstacle to wild animals (especially mammals and amphibians, and in some cases, birds and bats). This has various impacts on the affected species (primary ecological impacts categorised as direct, remote, cumulative, temporary or permanent):

- loss of habitat or its destruction;
- habitat fragmentation;
- loss of individual animals due to collisions (decline in the size of a population or extinction of a population);
- negative changes in the environment, such as hydrological and chemical changes, noise and light disturbance due to reflectors; and
- open space by roads/railways – directing animals towards settlements.

The Strategy proposes no measure to reduce the impact of transport on wild animals and biodiversity. Therefore, the general measures of the Strategy must include measures that will facilitate the preservation of animal migration corridors, and the attainment of the objectives of the Strategy for Biodiversity Conservation, and support the 7<sup>th</sup> EU Environment Action Programme, whose sub-objective is: ‘The loss of biodiversity and the degradation of ecosystem services, including pollination, are halted, ecosystems and their services are maintained and at least 15 per cent of degraded ecosystems have been restored by 2020.’

The general guidelines and mitigation measures stated in Chapter 10 should be taken into account to attain this objective.

#### **Environmental objective 7: Protect areas with nature protection status against activities with considerable impacts**

The greatest impact during the construction is expected in the development of the road and railway networks, while development in the maritime transport network will be limited locally. The development of air transport network could have impacts, especially if an airport is positioned within a protected area. Infrastructural development in the natural environment represents a permanent loss of habitat, and permanently negatively affects the natural distribution of habitat types and habitats of plant and animal species, their quality and integration of habitats of populations. If development is placed in areas with nature protection status, impacts can be especially extensive and destructive, as they can permanently degrade the level of the conservation of the natural environment and the protection objectives for protected areas, Natura 2000 sites, IEAs and valuable natural features. Special attention must be paid if infrastructure facilities are positioned in protected areas where a permanent loss of surfaces of qualifying and key HT and habitats of species, and impact on the integrity, functionality and cohesion of areas may occur. Permanent and direct impacts on the quality of a valuable natural feature and its type due to which the feature has been declared is also possible. Since a large part of Slovenian territory has been declared an area with nature protection status, there is a great probability that new construction in road and rail transport will encroach on these areas.

Impacts on areas with nature protection status are possible during the period of new construction or reconstruction of transport infrastructure, and also afterwards. They are mostly noticed in the local environment, while in the event of extensive activities, they may also be felt regionally and across the border (for example, the impact on the cohesion and integrity of the Natura 2000 network). During the construction or reconstruction of transport infrastructure, impacts are mostly short term and reversible (for example, noise pollution of the construction site area, making watercourses murky). After construction, impacts are mainly permanent and irreversible due to the changed use of land (for example, increased noise pollution from transport, obstacles in the environment, destruction of a habitat of a qualifying species, etc.).

The general guidelines and mitigation measures stated in Chapter 10 should be taken into account to attain this objective.

## 8.1.6 Human health

### 8.1.6.1 Air quality

**Environmental objective 8: In areas of excessive ambient air pollution, considerably contribute to reducing the annual number of days with excessive daily pollution of ambient air with particulates, which must not exceed 35 in a calendar year**

Emissions of particulates will be temporarily increased in areas where measures for the reconstruction or new construction of transport infrastructure are implemented (reversible impact). In accordance with the regulation which regulates measures to reduce particulate emissions from construction sites, the implementation of construction works ensures that temporary excessive local ambient air pollution is still acceptable for the environment and people.

Exposure to polluted air has a major negative impact on human health. It is estimated that 2 million people die prematurely due to polluted air each year. Most problems in securing an appropriate quality of ambient air in Slovenia lie in achieving the determined ceilings for particulates. In the past few years, the prescribed ceilings for PM<sub>10</sub> particulates were exceeded in almost all municipalities.

Along with solid fuel heating units, transport is the major source of ambient air pollution with particulates. Particulates can have numerous negative impacts on health: they cause and aggravate asthma, cause atherosclerosis, worsen the underlying respiratory and cardiovascular diseases, cause cancer etc. The mortality rate in towns where pollution with particulates is high is 15 to 20 per cent higher in comparison with towns with relatively clean air.

Harmful ground-level ozone (tropospheric ozone) is produced by pollutant emissions from human activities. Emissions of nitrogen oxides and hydrocarbons from road transport play the dominant role in the emergence of tropospheric ozone. Ozone is a highly reactive gas and a strong irritant, with strong oxidative functioning in the respiratory system. Children and people with asthma or low immunity are the most sensitive.

It is expected that the implementation of the measures of the Strategy will permanently reduce emissions of particulates from road transport, primarily due to the elimination of congestion, better maintenance of road surfaces and the use of more energy-efficient road vehicles.

The objective of the measures from the Clean Air for Europe Programme (COM(2013) 918 final) is to achieve perfect compliance with the existing air quality standards in all settlement areas, including areas where road transport is a significant source of particulate emissions, in the EU no later than by 2020.



Therefore, a new directive on national emission ceilings which transposes the provisions of the amended Gothenburg Protocol adopted in 2012 in the EU legal framework is about to be adopted by the Union legislative bodies. However, achieving national emission ceilings for certain pollutants does not ensure the elimination of non-compliance of air quality with the prescribed standards, which occurs locally. The Clean Air for Europe Programme imposes on Member States to enhance national and local operations in order to achieve ambient air quality standards.

In order to attain the objectives of eliminating non-compliance of air quality with the prescribed standards for air quality, which occurs occasionally and in a limited area, usually in municipalities due to population density and in the Zasavje region due to higher industrial pollution, the Government of the Republic of Slovenia has adopted ordinances on air quality plans in areas with excessive ambient air pollution. Detailed programmes of measures for the reduction of pollution with PM(10) particulates will be prepared according to these plans. These programmes will have to be fully considered in the implementation of the measures of the Strategy.

The general guidelines and mitigation measures stated in Chapter 10 should be taken into account to attain this objective.

#### **8.1.6.2 Noise pollution**

##### **Environmental objective 9: Reduce the pollution of the environment by noise from by transport and approximate to the levels recommended by the World Health Organisation**

Almost all transport policy measures indirectly or directly influence noise pollution. An increased impact on noise pollution is expected during the construction and use of infrastructure and network.

The impacts during the construction will be of a short-term nature and reversible. The greatest impact during the construction is expected in the development of the road and railway networks, while development in the maritime and air transport network will be limited locally. In individual areas, a higher level of environmental pollution is expected during construction than during operation. Therefore, mitigation measures will have to be carried out during construction, especially supervision of the prescribed emissions from construction machinery, setting a time limit for construction and, if necessary, implementing protection measures to prevent noise from spreading into the environment.

The impacts during the operation will be long term. As a rule, new transport corridors mean greater impacts on the environment directly along corridors, but at the same time, by redirecting traffic flows, they reduce impacts on the environment along existing roads whose surroundings are usually densely populated.

In accordance with legislation on noise protection, the following conditions apply to the operation of new transport infrastructure:

- a new source of noise must not produce excessive noise pollution in the environment;
- a new source of noise must not increase noise pollution in an area where pollution was excessive prior to the activity of the new source;
- noise protection measures must be ensured to prevent and reduce noise stemming from the use or operation of a source in the environment.

From the aspect of noise protection, the direct impact of all measures for the rail, road and maritime networks regarding all transport sub-objectives was assessed as insignificant, as the noise protection measures referred to in the legislation must be used to reduce noise pollution in all the anticipated measures to below the legally prescribed limits. The implementation of additional noise protection measures will be necessary in the areas of major urban centres and transport corridors of railway infrastructure. The only exception is measure Ro.12 (the motorway network around Ljubljana), as this is area is currently the most polluted in Slovenia in terms of noise from road transport; therefore, individual logistics measures (transfer of transit transport from the northern Ljubljana bypass and reduction of speeds) will have to be carried out in this area, which will additionally reduce noise emissions.

Transport policy measures will indirectly relieve the existing road network, which will result in a reduction of noise pollution in the area of major transport hubs on the motorway network and in urban centres (Ljubljana, Maribor, Celje, Koper). Measures on the railway network and in the field of public transport will contribute the most to relieving the road network in major urban centres.

Increased noise pollution is expected in the vicinity of airports, especially if air traffic increases. From the aspect of noise protection, measures A.2 and A.3 were assessed as conditionally insignificant. They comprise the extension of the runway at the airports in Maribor and Portorož, since both are located near residential buildings, while the airport in Portorož is also located near noise-sensitive tourist facilities and activities.

All important mitigation measures that ensure the reduction of noise emissions at source and prevent noise pollution in the environment, which is in accordance with EU and Slovenian legislation on noise protection, have already been included in the transport policy measures.

The most important measures among general transport policy measures from the aspect of the noise protection for the environment are measures that ensure a reduction of noise emissions, such as the modernisation of the vehicle fleet (rail passenger transport and cargo transport, public transport, road vehicles), the modernisation of road and railway infrastructure, and measures to reduce the impact of noise on the environment. Measures that indirectly influence the redirection of traffic flows in long-distance transit transport corridors (to the railway network as a priority) and in the urban environment (public transport) are also important. Almost all general transport policy measures will have a positive impact on reducing noise pollution by road and rail transport.

In the positioning of measures on the road and railway networks in space, general and technical solutions will have to be provided which ensure that noise pollution by transport is not excessive. All required mitigation measures stem from the legislation and the Operational Noise Action Programme, and are harmonised with the transport policy programme. The measures of the Strategy in which most noise protection will have to be carried out are all measures in the wider area of Ljubljana (R.1, R.3, R.4, R.5), and connections R.2 (Zidani Most–Dobova), R.3 (Ljubljana–Jesenice) and R.8 (Maribor–Šentilj). Extensive noise protection is also expected under measure Ro.12 (the motorway network around Ljubljana) and in all transport corridors running in areas of major urban centres (Ljubljana, Maribor, Celje, Koper, Kranj, Nova Gorica, Velenje, Slovenj Gradec, Ptuj).

Under measures A.2 and A.3 (Maribor and Portorož airports, extension of the runway), the reduction of noise from air transport is not feasible, with the exception of providing internationally adopted standards for aircraft emissions and logistics measures of transport management. A potential additional mitigation measure is the purchase and modification of the intended use of buildings for which excessive noise pollution is established. An alternative

mitigation measure is the provision of a multimodal transport connection with airports in the wider surroundings (Ljubljana, Trieste, Rijeka, Pula, Graz, Zagreb) where the capacity of passenger and cargo transport in the existing situation is greater.

The general guidelines and mitigation measures stated in Chapter 10 should be taken into account to attain this objective.

### **8.1.7 Population and material assets**

#### **Environmental objective 10: Improve social cohesion, traffic safety and sustainable mobility**

The general objectives of the transport strategy which will make the transport system more sustainable by 2030 are as follows: reduce greenhouse gas emissions, significantly reduce dependence on oil and limit increasing congestion. In addition to impacts on human health, the attainment of all these general objectives of the transport strategy also considerably influences people's economic situation and the material assets they have at their disposal. There are also significant synergies with the objective of 'limit increasing congestion' which requires increased use of non-motorised and public transport, and reduces the need of transport for space and energy, as well as harmful effects on material assets due to their exposure to polluted air. The impact will be positive, permanent and regional.

The measure to reduce or limit increasing congestion has a positive impact on people, especially due to the beneficial economic effects of this measure, in which travel time is also considered an economic category. The aforementioned measures also positively affect people's material assets. Especially in urban areas, it is important (local impact) to reduce the use of space for transport infrastructure, the need for energy sources available for people to meet their needs, the harmful effects of polluted air on material assets, travel time through better accessibility, etc.

People's awareness of environmental problems due to transport and especially its harmful effects on people and the material assets they have at their disposal does not automatically result in changing their mobility habits. Providing information, raising awareness, dialogues with all interested parties and inclusion of the public in decisions on transport policies crucially contribute to changing habit patterns regarding sustainable mobility, which is highlighted in the principles and strategic guidelines of the Resolution on National Environmental Action Plan.

Bicycle traffic is classified among the most suitable means of transport in terms of the environment and health. It is also the quickest means of transport for short distances (up to three kilometres). At the national level, the system of cycling routes may facilitate transfer to work, school, shops, etc. over short distances, and recreation over long distances. The arrangement of cycling paths and footpaths, and adequate access to recreational centres will have a positive impact on human health (the impact will be local).

The fundamental objective of the Resolution on National programme on Road Traffic Safety for the 2013–2022 period is to ensure safe road infrastructure for all road users. This means that the number of fatalities will not exceed 70 and the number of severely injured persons will not exceed 460 on an annual basis on Slovenian roads by the end of 2022. The Strategy ensures enhanced traffic safety with measures stated in the sub-objective 'improve transport system safety'. The impact will be regional and permanent. The measures of the Strategy will have a positive impact on the provision of traffic safety.

Due to geographic features, diverse transport accessibility and diverse economic growth in individual areas in Slovenia, the differences between weak and developed areas are increasing. The following areas have the poorest accessibility to the nearest motorway or expressway slip road (i.e. access time is over 30 minutes): the Kočevje region, the Kolpa River Valley, Kozjansko, the Ribniško and Lovrenško Pohorje Range, the central part of the Kozjak Range, Goričko, the southern part of Prlekija, the upper Soča River region to Kanal, Cerkljansko, Baška grapa, the western part of the Škofja Loka Hills, the Bloke Plateau, the Lož Valley (access will improve for Haloze after the construction of the Draženci–Gruškovje motorway section). The review of measures anticipated to attain sub-objectives 2a, 2b, 2c and 2d showed that some measures were not focused on the development of the transport-gravitation areas defined in sub-objectives.

The general guidelines and mitigation measures stated in Chapter 10 should be taken into account to attain this objective.

### **8.1.8 Cultural heritage**

#### **Environmental objective 11: Preserve the scope and characteristics of cultural heritage facilities and areas**

The greatest impact during construction is expected in the development of the road and railway networks, while development in the maritime and air transport networks will be negligible and limited only to the construction of facilities (buildings) on land.

The development of transport infrastructure impacts units and areas of cultural heritage directly during the construction and operation of new infrastructure connections by:

- degrading landscape features of the surroundings of units of cultural heritage (indirect, irreversible impact);
- damaging cultural heritage facilities (direct, reversible impact);
- destroying archaeological remains during construction (direct, local, irreversible impact);
- vibrations that may cause damage to cultural heritage buildings (indirect, reversible impact);
- gas emissions, since nitrogen oxides and sulphur dioxide are the components of acid rain that cause damage to buildings and monuments (indirect, cumulative, remote impact).

Since a large part of Slovenian territory has been declared a cultural heritage area (32,035 units of cultural heritage), there is a great probability that new construction in road and rail transport will encroach on these areas, especially cultural landscapes, historical landscapes, architectural heritage and their areas of influence, as well as archaeological sites. The positioning of transport infrastructure will permanently change the use of space in these areas. Therefore, adequate measures to preserve the features of cultural heritage areas must be implemented. From the aspect of preserving archaeological remains, activities in the environment are considered destructive acts (e.g. excavation). Extensive preliminary archaeological research will have to be carried out, their results will have to be taken into account when positioning transport infrastructure, and measures to preserve archaeological remains will have to be implemented.

In addition to permanent direct impacts, the implementation of transport policy measures may also affect cultural heritage indirectly, i.e. by degrading landscape features in the surroundings of units of cultural heritage, vibrations that may cause damage to cultural heritage buildings, and exhaust gas emissions,

since nitrogen oxides and sulphur dioxide are the components of acid rain that cause damage to buildings and monuments. In addition to being indirect, the impact of exhaust gas emissions may also be cumulative and remote.

During the operation, these measures may also have a positive direct impact on cultural heritage. Better accessibility to historically and culturally important areas will result in more visitors. On the other hand, a positive direct impact may quickly turn into a negative impact. More visitors may produce more waste and increase noise pollution.

The general guidelines and mitigation measures stated in Chapter 10 should be taken into account to attain this objective.

### **8.1.9 Landscape**

#### **Environmental objective 12: Ensure the conservation of exceptional landscapes and landscape areas with distinctive features at the national level, and a quality landscape image**

Determining the impact on the quality of landscape primarily stems from the visible features of space and characteristic landscape elements present in space. Landscape is most encroached on by transport connections that extend into open space where the impacts of transport are more noticeable due to a higher level of its preservation (permanent, irreversible impact). The impact is particularly great in the event of the construction of an infrastructure corridor in areas of exceptional landscape or landscape areas with distinctive features, and landscapes with preserved natural elements and exceptionally balanced cultural elements which have great symbolic meaning.

The impacts on landscape features of areas may be defined as direct, cumulative, indirect and remote. Infrastructure facilities in space become elements of the landscape and part of its experience. Therefore, their arrangement must be in accordance with the existing types of landscapes. Taking into account the natural features and topography of the area of activity will reduce the fragmentation of landscape.

The general guidelines and mitigation measures stated in Chapter 10 should be taken into account to attain this objective.

### **8.1.10 Assessment conclusion**

Table 19 shows the impact assessment for Strategy implementation on the realisation of the environmental objectives of the Strategy, displayed by individual groups of measures to attain the sub-objectives of the Strategy. The table was prepared on the basis of impact assessments of Strategy implementation on the environmental objectives by individual areas for each group of measures to attain the sub-objectives of the Strategy.

Table 19 shows that acceptable impacts on the environmental objectives may occur during the implementation of individual groups of measures (grades A, B and C), while no significant impacts were established. In general, it was established that by suitably positioning spatial activities and taking all the required mitigation measures, all groups are acceptable from the environmental aspect. In accordance with this finding, general and specific mitigation measures are proposed in Chapter 10.

The assessment results show that there will be no impacts or they will be positive, especially during the implementation of the group of measures to attain the fourth objective. The implementation of general measures will also have a positive environmental impact or there will be no impact.

During the implementation of measures to attain the first, second and third objectives, positive and negative impacts are expected. Positive impacts are expected on air and climate change as well as population and material assets.

In general, it was established that most negative impacts refer to the planning phase (the positioning of infrastructure facilities in space and the preparation of suitable technical arrangements), since Slovenia has diverse and numerous natural, cultural and landscape features which could be significantly affected by the construction of a new infrastructure corridor. Negative impacts in the planning phase were established from the aspect of soil use, effect on water, nature (biodiversity and areas with nature protection status), cultural heritage and landscape, especially during the road and rail activities, and in the event of air transport measures.

In the operation phase, negative impacts on human health may occur due increased noise pollution and impacts on air quality, especially in the case of the construction of road connections (to attain sub-objectives 1b, 1c, 2g and 3a) and air transport (to attain sub-objective 1b). Impacts of other groups of measures on human health were defined as insignificant, positive or non-existent.

Table 19 Display of compliance with the environmental objectives by individual groups of measures to attain the sub-objectives of the Strategy

ENVIRONMENTAL OBJECTIVES/SUB-OBJECTIVES OF THE STRATEGY	Objective 1			Objective 2								Objective 3			Objective 4							
	1.a	1.b	1.c	2.a	2.b	2.c	2.d	2.e	2.f	2.g	2.h	3.a	3.b	3.c	4.a	4.b	4.c	4.d	4.e	4.f	4.g	
<b>EO1 – TOTAL ASSESSMENT (soil and mineral resources)</b>	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	A	A	A	A	A	A	A
General	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Rail transport	C	C	C	C	C	C	C	A	C	C	A	C	C	C	A		A	A	A	A		
Road transport	C	C	C	C	C	C	B	C	C	C	C	B	B	B		A	A	A	A	A	A	A
Public transport				A	B	C				C	A	C	A	A								
Maritime transport		A	B								A				A			A	A	A		
Air transport		C	B														A	A	A	A		
<b>EO2 – TOTAL ASSESSMENT (soil and mineral resources)</b>	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A	A	A	A
General	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Rail transport	B	B	B	B	B	B	B	A	B	B	A	B	B	B	A		A	A	A	A		
Road transport	B	B	B	B	B	B	B	B	B	B	B	B	B	B		A	A	A	A	A	A	A
Public transport				A	B	B				B	A	B	A	A								
Maritime transport		A	B								A				A			A	A	A		
Air transport		B	B														A	A	A	A		
<b>EO3 – TOTAL ASSESSMENT (air)</b>	A	B	B	B	A	A	A	A	A	B	A	B	B	A	A	A	A	A	A	A	A	A
General	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
Rail transport	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A	A		
Road transport	A	B	B	B	A	A	A	A	A	B	A	B	B	A		A	A	A	A	A		
Public transport				A	A	A				A	A	A	A									

ENVIRONMENTAL OBJECTIVES/SUB-OBJECTIVES OF THE STRATEGY	Objective 1			Objective 2								Objective 3			Objective 4						
	1.a	1.b	1.c	2.a	2.b	2.c	2.d	2.e	2.f	2.g	2.h	3.a	3.b	3.c	4.a	4.b	4.c	4.d	4.e	4.f	4.g
Maritime transport		B	B								A				A			A	A	A	
Air transport		B	B														A	A	A	A	
<b>EO4 – TOTAL ASSESSMENT (climate factors)</b>	A	B	B	A	A	A	A	A	A	B	A	B	A	A	A	A	A	A	A	A	A
General	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A
Rail transport	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A		A	A	
Road transport	A	B	B	A	A	A	A	A	A	B	A	B	A	A		A	A		A	A	A
Public transport				A	A	A				A	A	A	A	A							
Maritime transport		B	B								A				A				A	A	
Air transport		B	B														A		A	A	
<b>EO5 – TOTAL ASSESSMENT (water)</b>	C	C	C	C	C	C	C	C	C	C	C	C	C	C	B	A	A	A	A	A	A
General	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Rail transport	C	C	C	B	C	C	B	B	C	C	A	C	B	C	A		A	A	A	A	
Road transport	C	C	C	C	B	C	C	C	C	C	C	C	C	C		A	A	A	A	A	A
Public transport				B	B	C				C	B	C	B	A							
Maritime transport		B	C								B				B			A	A	A	
Air transport		C	B														A	A	A	A	
<b>EO6 – TOTAL ASSESSMENT (nature)</b>	C	C	C	C	C	B	B	C	C	C	C	C	C	C	B	A	A	A	A	A	A
General	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Rail transport	C	C	C	C	B	B	B	A	C	C	A	C	C	C	A		A	A	A	A	
Road transport	B	C	C	C	C	B	B	C	C	C	C	C	B	B		A	A	A	A	A	A
Public transport				A	B	B				B	A	B	A	A							
Maritime transport		B	B								B				B			A	A	A	
Air transport		B	B														A	A	A	A	



ENVIRONMENTAL OBJECTIVES/SUB-OBJECTIVES OF THE STRATEGY	Objective 1			Objective 2								Objective 3			Objective 4						
	1.a	1.b	1.c	2.a	2.b	2.c	2.d	2.e	2.f	2.g	2.h	3.a	3.b	3.c	4.a	4.b	4.c	4.d	4.e	4.f	4.g
<b>EO7 – TOTAL ASSESSMENT (nature)</b>	C	C	C	B	C	C	B	C	C	C	C	C	C	C	B	A	A	A	B	B	A
General	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Rail transport	C	C	C	B	C	C	B	B	C	C	A	C	C	C	A		A	A	B	B	
Road transport	B	C	C	B	B	C	B	C	C	C	C	C	B	B		A	A	A	A	A	A
Public transport				A	B	B				B	A	B	A	A							
Maritime transport		B	B								B				B			A	A	A	
Air transport		C	B														A	A	A	A	
<b>EO8 – TOTAL ASSESSMENT (health–air)</b>	A	C	C	B	A	A	A	A	A	C	A	C	B	A	A	A	A	A	A	A	A
General	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Rail transport	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A	A	
Road transport	A	C	C	B	A	A	A	A	A	C	A	C	B	A		A	A	A	A	A	A
Public transport				A	A	A				A	A	A	A	A							
Maritime transport		A	A								A				A			A	A	A	
Air transport		B	B														A	A	A	A	
<b>EO9 – TOTAL ASSESSMENT (health–noise)</b>	B	C	C	B	B	B	B	B	B	C	B	C	B	B	B	A	A	A	A	A	A
General	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Rail transport	B	B	B	B	B	B	B	A	B	B	A	B	B	B	A		A	A	A	A	
Road transport	B	C	C	B	B	B	B	B	B	C	B	C	B	B		A	A	A	A	A	A
Public transport				B	B	B				B	B	B	B	A							
Maritime transport		B	B								B				B			A	A	A	
Air transport		C	B														A	A	A	A	
<b>EO10 – TOTAL ASSESSMENT (population and material assets)</b>	A	C	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

ENVIRONMENTAL OBJECTIVES/SUB-OBJECTIVES OF THE STRATEGY	Objective 1			Objective 2								Objective 3			Objective 4							
	1.a	1.b	1.c	2.a	2.b	2.c	2.d	2.e	2.f	2.g	2.h	3.a	3.b	3.c	4.a	4.b	4.c	4.d	4.e	4.f	4.g	
General	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Rail transport	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A	A		
Road transport	A	A	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A	A	A	A	A
Public transport				A	A	A				A	A	A	A	A								
Maritime transport		A	A								A				A			A	A	A		
Air transport		C	B														A	A	A	A		
<b>EO11 – TOTAL ASSESSMENT (cultural heritage)</b>	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	A	A	A	A	A	A	A
General	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Rail transport	C	C	C	C	C	C	B	A	C	C	A	C	C	C	A		A	A	A	A		
Road transport	C	C	C	C	C	C	C	C	C	C	C	C	C	C		A	A	A	A	A	A	A
Public transport				A	B	C				C	A	C	A	A								
Maritime transport		A	B								A				A			A	A	A		
Air transport		C	B														A	A	A	A		
<b>EO12 – TOTAL ASSESSMENT (landscape)</b>	C	C	C	C	C	C	C	C	C	C	C	C	C	C	A	A	A	A	A	A	A	A
General	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Rail transport	C	C	C	B	C	C	B	A	C	C	A	C	C	C	A		A	A	A	A		
Road transport	C	C	C	C	C	C	C	C	C	C	C	C	C	C		A	A	A	A	A	A	A
Public transport				A	A	C				C	A	C	A	A								
Maritime transport		A	B								A				A			A	A	A		
Air transport		C	B														A	A	A	A		

Legend:

**A** no impact/positive impact



**insignificant impact**



**impact is insignificant due to the implementation of mitigation measures**

## **8.2 Cumulative impacts**

Cumulative environmental impacts are defined in this Environmental Report as:

- a combination of impacts of implementing the objectives and sub-objectives of the Strategy on various aspects of the environment;
- a combination of environmental impacts caused by implementing the objectives and sub-objectives of the Strategy with the implementation of other programming documents of the Republic of Slovenia.

### **A) Combination of environmental impacts of the objectives and sub-objectives of the Strategy**

In the implementation of measures of the objectives and sub-objectives of the Strategy, cumulative environmental impacts vary according to individual aspects of the environment.

When assessing impacts on soil and mineral resources, air and climate factors, the cumulative impacts of implementing the Strategy measures are expressed as the sum of impacts of all measures, so that in the assessment of cumulative impacts on:

- soil, the area of agricultural land and woodland fragmented due to the integration of new infrastructure facilities are combined;
- mineral assets, the recycling rate of construction waste generated during the construction and reconstruction of the transport network are combined;
- air, pollutant emissions following the implementation of the measures are combined; and
- climate factors, greenhouse gas emissions from transport following the implementation of the measures are combined.

From the aspect of impacts on mineral resources, air and climate factors, the cumulative impacts as the sum of impacts of all measures to attain the objectives and sub-objectives of the Strategy are important for attaining the environmental objectives defined for the transport sector in Slovenia for 2020 and 2030 in other programming documents in relation to:

- construction waste management;
- emission ceilings of pollutants from transport; and
- the highest annual quantity of greenhouse gas emissions.

When assessing impacts on waters, nature, cultural heritage and landscape, cumulative impacts usually cannot be expressed as a sum of impacts of all measures to attain the objectives and sub-objectives of the Strategy. When assessing cumulative impacts on the aforementioned aspects, the characteristics of an individual impact which contributes to cumulative impacts are very important. These are generally characteristics in which impacts differ from one another according to the place (direct and remote impacts) and time (short-term, medium-term and long-term, temporary and permanent) of the impact.

When assessing impacts on human health, cumulative impacts of implementing the Strategy measures are expressed as a combination of impacts which contribute to people's health and well-being, and usually refer to:

- the reduction of exposure to excessive noise levels;
- the reduction of exposure to excessively polluted ambient air; and
- measures which facilitate hiking and cycling in a healthy environment over short distances, especially during daily commuting (the impacts were assessed among the population).

When assessing impacts on the population and material assets, the cumulative impacts of implementing the Strategy measures are expressed as a combination of various impacts which affect their living space and their life in a space which has a transport network. Measures to attain the objectives and sub-objectives of the Strategy are positive from the aspect of impacts on the population and material assets if their cumulative impact contributes to enhanced social cohesion, traffic safety and sustainable mobility.

In this Environmental Report, the cumulative impacts of measures to attain the objectives and sub-objectives of the Strategy were not precisely assessed, since the measures were prepared at the strategic level, but not placed in terms of place and time or precisely defined. The assessment of cumulative impacts can only be made in later phases of the planning of transport infrastructure development.

### **B) Combination of impacts of objectives/sub-objectives of the Strategy and the implementation of other programming documents in Slovenia**

The programming documents listed below were drafted so that they are in accordance with the existing legally valid documents or legal acts, and mutually harmonised. When significant environmental impacts may be expected during their implementation, they will be evaluated separately in the strategic environmental assessment procedure. The cumulative impacts of implementing the strategic documents enumerated below are assessed as positive. Negative impacts may be expressed in subsequent planning or implementation phases.

- Water Management Plan,
- Operational programme for complying with national emission ceilings for atmospheric pollutants (amendments are being prepared),
- Noise Action Programme for the first phase major roads and major railways outside the Municipality of Ljubljana 2012–2017,
- Operational programme for the protection of ambient air against pollution caused by PM10,
- Operational programme for limiting greenhouse gas emissions (amendments are being prepared),
- National Forest Development Programme,
- Natura 2000 Management Programme for the Period 2007–2013,
- Resolution on National Programme on Road Traffic Safety for the Period 2013–2022,
- Resolution on National Environmental Action Plan,
- Resolution on the 2014–2017 National Programme for Culture,
- Resolution on the strategic guidelines on the development of Slovenian agriculture and the food industry by 2022,
- Strategy for Biodiversity Conservation in Slovenia,
- Spatial Planning Strategy of Slovenia.

### **8.3 Transboundary impacts**

Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment requires that Member States define and consult on the transboundary effects of the drafting of plans and programmes (those which may affect other Member States).

The measures of the Strategy are not placed in terms of space and time or precisely defined. The measures are prepared at the strategic level. Therefore, the occurrence of transboundary impacts could not be defined with certainty during the drafting of the Environmental Report, which will be carried out in later phases. Measures on which activities which require assessment in accordance with the SEA Directive are based are expected to be reassessed at the level of plans.

Table 20 shows the positive and negative transboundary impacts on the environmental objectives for measures under individual sub-objectives. The table shows that negative impacts on noise, water, nature and landscape are possible, and under one measure, also on the population. Permanent positive impacts will be reflected in air quality and climate change, and human health and the population. From the aspect of health, measures which enhance throughput in border areas will have a positive transboundary impact (positive impact on air quality and reduced noise pollution). The

implementation of other measures is not expected to have a transboundary impact on the environmental objectives.

**Table 20 Display of transboundary impacts**

ENVIRONMENTAL OBJECTIVES/SUB-OBJECTIVES OF THE STRATEGY	OBJECTIVE 1			OBJECTIVE 2								OBJECTIVE 3			OBJECTIVE 4								
	1.a	1.b	1.c	2.a	2.b	2.c	2.d	2.e	2.f	2.g	2.h	3.a	3.b	3.c	4.a	4.b	4.c	4.d	4.e	4.f	4.g	4.h	
EO1 – SOIL AND MINERAL RESOURCES (SUSTAINABLE LAND MANAGEMENT)																							
EO2 – SOIL AND MINERAL RESOURCES (EXPLOITATION OF NATURAL RESOURCES)																							
EO3 – AIR	+	+	+																				
EO4 – CLIMATE FACTORS	+	+	+																				
EO5 – WATER	-	-	-				-		-					-									
EO6 – NATURE (BIODIVERSITY PRESERVATION)	-	-	-						-														
EO7 – NATURE (PROTECTION OF AREAS WITH NATURE PROTECTION STATUS)	-	-	-						-														
EO8 – HEALTH–AIR	+	+	+																				
EO9 – HEALTH–NOISE	±	-	±				-		-	-	-	-		-									
EO10 – POPULATION AND MATERIAL ASSETS	+	±	+						+														
EO11 – CULTURAL HERITAGE																							
EO12 – LANDSCAPE	-		-						-	-		-		-									

Legend:

- (-) – negative impact
- (+) – positive impact

Those sub-objectives of the Strategy which contain measures which may produce transboundary impacts are stated below.

### 8.3.1 Soil and mineral resources

There will be no transboundary impacts, as the measures dictate activities in agricultural land and woodland on Slovenian territory (grade A).

There will be no transboundary impacts regarding the use of mineral resources or soil excavation and waste management, as waste management will be carried out either on transport infrastructure construction sites or in devices for waste processing on Slovenian territory (grade A).

### 8.3.2 Air

Transboundary impacts due to the transport of pollutants across Slovenian borders will be reduced proportionately with the reduction of pollutants from transport due to the implementation of measures of the Strategy (grade A). Measures anticipated under sub-objectives 1a, 1b and 1c in particular are expected to have a permanent impact on air quality in Austria, Italy, Hungary and Croatia.

### 8.3.3 Climate factors

The rate of reduction of greenhouse gas emissions from transport is harmonised with the international commitments of the Republic of Slovenia to contribute its share to climate change mitigation. Therefore, the implementation of measures of the Strategy will have a positive transboundary impact on climate factors (grade A). Measures anticipated under sub-objectives 1a, 1b and 1c in particular are expected to have a permanent impact on climate change.

### 8.3.4. Water

Transboundary impacts are possible on the chemical status of groundwater and surface waters, including sea, in the event of pollution of watercourses (for example, continued leaching of hazardous substances as a result of traffic assignment, spillage of hazardous substances in extraordinary events) in the direction of neighbouring countries. Transboundary impacts on the ecological status of surface waters in the event of activities which could cause an impact on the hydrological regime of surface waters across the border, and transboundary impacts on the quantity of groundwater are also possible (grade C).

If guidelines and mitigation measures are not observed, potential transboundary impacts on waters were assessed for the following measures:

- R.1 Koper–Ljubljana (sub-objectives 1.a, 1.c, 2.f, 2.g, 3.a, 3.c) – impact on Italy;
- R.6 Divača–Sežana (sub-objectives 1a, 1c, 2d, 2f); potential impact on groundwater on the Italian side of the border – impact on Italy;
- R.7 Pragersko–Hodoš (sub-objectives 1a, 1c, 2d, 2f); potential impact on the Velika Krka River on the Hungarian side of the border – impact on Hungary;
- Ro.2 The Karavanke Tunnel (sub-objectives 1a, 1b, 1c, 2c); potential impact on water protection areas and groundwater on the Austrian side of the border – impact on Austria;
- Ro. 17 Road network around Koper (sub-objectives 2f, 3c): the Koper–Dragonja connection, potential impact on the Dragonja River – impact on Croatia;
- M.1–M.4 arrangements in the area of the port of Koper (sub-objective 1.c): potential negative impacts on the Italian side – impact on Italy.

### **8.3.5 Nature**

The construction of motorways, expressways and railways without passages for wild animals could have negative impacts in neighbouring countries (Croatia, Austria). Negative impacts are possible primarily on large carnivores with very extensive habitats, and which migrate across several borders (the Dinaric–Alpine area for brown bear, lynx and wolf). New routes would additionally fragment the habitat of large carnivores and prevent their migration. Closing the corridors of large carnivores might permanently prevent the movement of individual animals between populations. The conservation of corridors for large carnivores in the long term is an important nature conservation task, since the corridors allow the movement of individual animals between populations. The relationship between the newly emerging populations of large carnivores in the wider Alpine areas and vital Dinaric populations is of key importance for the continued existence of large carnivores in Central Europe. Transboundary negative impacts on the cohesion of populations (Environmental objective 6) is possible during the implementation of measures under sub-objectives 1a, 1b, 1c and 2f (grade C).

### **8.3.6 Human health**

#### **8.3.6.1 Air quality**

The implementation of measures to attain the objectives of the Strategy will reduce congestion in road and rail transport in areas of border crossings, and thus reduce the negative impact on air quality in these areas. Since areas of border crossings are not known as areas where ambient air quality does not meet the prescribed environmental standards, the impact of the implementation of measures on ambient air quality will be positive (grade A). Especially measures anticipated under sub-objectives 1a, 1b and 1c are expected to have a permanent impact on air quality in Austria, Italy, Hungary and Croatia.

#### **8.3.6.1 Noise pollution**

Potential transboundary impacts on increased noise pollution was assessed for three measures, i.e.:

- R.1, Koper–Ljubljana (sub-objectives 1a, 1c, 2f, 2g, 3a, 3c) – impact on Italy;
- Ro.21 Nova Gorica network (sub-objectives 2d, 2h) – impact on Italy;
- A.3 Portorož Airport – extension of the runway (sub-objective 1b) – impact on Croatia.

The transboundary impact of measure R.1 (Koper–Ljubljana) on increased noise pollution is possible due to the route of the railway connection corridor along the Italian border (Vignano, Rosandra). A similar outcome might occur due to the bypass network in Nova Gorica, which runs near the densely populated town Gorizia on the Italian side of the border.

The potential transboundary impact was also assessed for measures A.3 (Portorož Airport), as an increase in the airport's capacity could cause an increase in noise pollution in the tourist area of Savudrija.

In the preparation of spatial planning and implementation documentation for measures R.1, R.2 and R.3, all necessary mitigation measures must be ensured in order to prevent transboundary impacts on noise pollution. No transboundary impacts are expected if guidelines and mitigation measures are observed.

From the aspect of noise protection, measures Ro.1 (the Draženci–Gruškovje motorway), Ro.2 (the Karavanke Tunnel), Ro.17 (the road network around Koper) and Ro.18 (the connection of Ilirska Bistrica with the motorway system) will have a positive transboundary impact in Austria, Italy and Croatia, since they will improve throughput in border areas which is problematic, especially during the peak summer tourist season, and will consequently reduce noise pollution along international road connections in border areas.

### **8.3.7 Population and material assets**

Measures anticipated under sub-objectives 1a (Italy, Croatia, Austria), 1b (Croatia, Austria) and 2f (Croatia) will have permanent positive impacts on the population and material assets. The implementation of measure A.3 (sub-objective 1b) may have a negative and positive impact (Croatia).

Sub-objective 1a: Eliminate bottlenecks in rail transport (R.2, R.3, R.6, R.7, R.8) will have a positive transboundary impact, as economic connections with neighbouring countries will be enhanced. Measures carried out on roads (Ro.1, Ro.2) will have a permanent impact on improving throughput at border crossings with Croatia and Italy, and facilitate greater safety in the Karavanke Tunnel. Transboundary impact will be positive.

Sub-objective 1b: The implementation of the Karavnake Tunnel (Ro.2) will improve traffic safety in the tunnel, while the Draženci–Gruškovje motorway will improve international connections with Croatia. The rearrangement and upgrading of infrastructure at the Jože Pučnik Airport (A.1) and Portorož Airport (A.3) will have a positive impact from the aspect of connections with international airports and facilitate the quicker flow of passengers and goods. Better connections with Portorož Airport will have a positive impact on the development of tourism also in part of Croatian Istria, while lowering the quality of the living environment (noise produced by aircraft) (grade C).

Sub-objective 2f: Impact will be transboundary, since the Postojna–Ilirska Bistrica–Šapjane road connection (Ro.18) will improve transport connections (especially during the tourist season) – positive economic impact.

### **8.3.8 Cultural heritage**

Not all sub-objectives will produce transboundary impacts on preserving the volume and features of units and areas of cultural heritage, as the measures require activities on Slovenian territory, while cultural heritage protection areas do not extend across borders (grade A).

### **8.3.9 Landscape**

Impact on the visual image of the landscape is possible during the integration of transport infrastructure in border areas if infrastructure of large proportions is integrated in an area that is clearly



visible from Italy (measure R1 Koper–Ljubljana railway line). The sub-objectives which contain measure R.1 are 1a, 1c, 2f, 2g, 3a and 3c. No transboundary impacts (Italy) are expected if guidelines and mitigation measures are observed (grade C).

## 9 ASSESSMENT OF ALTERNATIVES

The Transport Development Strategy in the Republic of Slovenia defines transport measures for each sub-objective which are deemed most suitable for attaining this sub-objective.

In order to assess the compliance of measures of the Strategy with the environmental objectives, the measures are divided into two groups, i.e.:

- general measures (so-called horizontal measures), and
- alternative measures, which differ from one another according to the transport mode (measures in rail transport, measures in road transport, measures in maritime transport and measures in air transport).

General (horizontal) measures have the following characteristics:

- express a high level of internal compliance with other measures;
- are mutually complementary;
- are necessary irrespective of the transport mode; and
- can not compete with any other group of measures.

The group of general measures has no alternatives. The application of general measures is needed to attain the Strategy objectives regardless of the selected mode of transport. Since general measures are not an alternative to other groups of measures, their compliance with the environmental objectives is not being assessed.

The chapter includes the assessment of individual groups of alternative measures regarding their compliance with the environmental objectives. The assessment of individual groups of alternative measures was carried out on the basis of determining the average grade of compliance with all 12 environmental objectives for each individual transport policy measure. Individual grades of compliance with the environmental objectives from A to F were evaluated with numerical values from 1 to 5. The evaluation of compliance of groups of alternative measures with the environmental objectives was carried out according to the following scale:

Code	Explanation	Numerical evaluation
	The group of alternative measures is very compliant with the environmental objectives.	1.0–1.4
	The group of alternative measures is partly compliant with the environmental objectives.	1.5–2.0
	The connection between the group of alternative measures and the environmental objectives is vague; the group of alternative measures is conditionally compliant with the environmental objectives.	2.1–3.0
	The group of alternative measures is not compliant with the environmental objectives.	>3.0

A common comparison of groups of the alternative measures in question with the environmental objectives is shown in tables 21 and 22. A more detailed comparison of compliance with environmental guidelines of groups of alternative measures with the environmental objectives by individual sub-objectives of transport policy is shown in tables in Annex 2.

Almost all anticipated public transport measures and most measures in road, rail, air and maritime transport will be very or partly compliant with the environmental objectives during the implementation and operation of activities, and at least the basic mitigation measures arising from legislation will have to be ensured in almost all activities to reduce environmental impacts.

Individual measures in the railway, road and air networks were assessed as conditionally compliant according to the respective environmental objectives. These transport policy measures are:

*Railway transport:*

- R.1 Koper–Ljubljana (evaluation-based assessment 2.2),
- R.3 Ljubljana–Jesenice (evaluation-based assessment 2.1).

*Road transport:*

- Ro.9 Connection of Koroška with the motorway system (evaluation-based assessment 2.2),
- Ro.10 Connection of Hrastnik with Zidani Most (evaluation-based assessment 2.1),
- Ro.11 Connection of Kočevje with Ljubljana (evaluation-based assessment 2.1),
- Ro.12 Motorway network around Ljubljana (evaluation-based assessment 2.5),
- Ro.15 Connection of Škofja Loka/Medvode with Ljubljana (evaluation-based assessment 2.1),
- Ro.16 Motorway network around Maribor (evaluation-based assessment 2.1),
- Ro.18 Connection of Ilirska Bistrica (HR) with the motorway system (evaluation-based assessment 2.2).

*Air transport:*

- A.2 Maribor Edvard Rusjan Airport (evaluation-based assessment 2.1),
- A.3 Portorož Airport (evaluation-based assessment 2.6).

The need to integrate conditionally environment-compliant transport measures must be presented in a special acceptability study within which all possible negative environmental impacts must be evaluated and additional mitigation measures added to make the intervention environmentally acceptable.

The comparison of individual groups of alternative measures shows as follows:

- from the environmental aspect, this is the most suitable and acceptable alternative to public transport, with most measures being very or partly compliant with the environmental objectives;
- in most sub-objectives of the transport policy, the railway alternative is more suitable than the road alternative, despite increased impacts on the environment being expected in individual rail transport measures;
- in the light of most environmental objectives, the road alternative is acceptable for the environment, but extensive mitigation measures to reduce environmental impacts will have to be implemented for activities planned in densely populated areas or protected natural areas;
- the group of alternative measures for maritime transport is mainly partly compliant with the environmental objectives; an increased impact is expected especially in coastal areas near Koper, Piran, Ankaran and Izola, but it will be manageable;
- the air transport alternative is mainly only conditionally compliant with the environmental objectives; negative environmental impacts are expected in the area of Portorož Airport, while Maribor Airport also presents a potential problem.

In general, it was established that by suitably integrating spatial interventions and implementing all necessary mitigation measures, all groups of alternative measures are acceptable from the environmental aspect. The most environmentally-friendly alternative is public transport; rail and maritime transport are more adequate alternatives than road transport, while air transport is the least adequate.

**Table 21 Comparison of individual groups of alternative measures in view of their compliance with the environmental objectives, shares of evaluated impacts**





General comparison of alternatives	Rail transport				Road transport				Public transport				Maritime transport				Air transport			
	No. of measure	VC%	PC%	C%	No.	M%	P%	C%	No.	M%	P%	C%	No.	M%	P%	C%	No.	M%	P%	C%
1a Eliminate congestion at borders	7	14	57	29	3	33	67	0												
1b Improve accessibility of international inter-urban passenger transport	9	33	56	11	5	40	40	20					1	0	100	0	3	0	33	67
1c Improve accessibility of international cargo transport	12	25	58	17	5	40	40	20					5	20	80	0	1	0	100	0
2a North-east	5	60	40	0	9	22	67	11	1	100	0	0								
2b South-east	4	75	0	25	6	33	67	0	1	0	100	0								
2c North-west	4	75	0	25	8	25	63	13	4	25	75	0								
2d Goriška	4	75	25	0	3	67	33	0												
2e Koroška	3	100	0	0	3	67	0	33												
2f Primorska	6	50	33	17	4	50	25	25												
2g Central Slovenia	6	17	50	33	9	22	33	44	6	33	67	0								
2h Accessibility within regions (to regional centres)	1	100	0	0	11	27	45	27	4	100	0	0	1	100	0	0				
3a Ljubljana	4	25	25	50	6	83	0	17	9	56	44	0								
3b Maribor	4	0	100	0	6	83	0	17	3	100	0	0								
3c Koper	1	0	0	100	6	83	17	0	1	100	0	0								
4a Harmonisation of legislation, rules and standards with European requirements, and best practice	1	100	0	0									2	100	0	0				
4b Improve the organisational system structure and cooperation between respective stakeholders					1	100	0	0												
4c Improve the operational system structure	1	100	0	0	1	100	0	0									1	100	0	0
4d Improve transport system safety	1	100	0	0	1	100	0	0					1	100	0	0	1	100	0	0
4e Reduce/mitigate environmental impacts	1	100	0	0	4	100	0	0					1	100	0	0	1	100	0	0
4f Improve energy efficiency	1	100	0	0	1	100	0	0					1	100	0	0	1	100	0	0
4g Financial sustainability of the transport system					2	100	0	0												

Legend: No. of measures – number of measures, VC% – share of compliant measures, PC% – share of partly compliant measures, CC% – share of conditionally compliant measures

**Table 22 Comparison of individual groups of alternative measures in view of their compliance with the environmental objectives**

Splošna primerjava alternativ	Železniški promet	Cestni promet	Javni promet	Pomorski promet	Letalski promet
1a Odprava zastojev na mejah					
1b Izboljšanje dostopnosti mednarodnega medkrajevnega potniškega prometa					
1c Izboljšanje dostopnosti mednarodnega tovornega prometa					
2a Severovzhodna					
2b Jugovzhodna					
2c Severozahodna					
2d Goriška					
2e Koroška					
2f Primorska					
2g Osrednjeslovenska					
2h dostopnost znotraj regij (do regionalnih središč)					
3a Ljubljana					
3b Maribor					
3c Koper					
4a Prilagoditev zakonodaje, pravil in standardov evropskim zahtevam in najboljša praksa					
4b Izboljšanje organ. strukture sistema in sodelovanje med ustreznimi deležniki					
4c Izboljšanje operativne strukture sistema					
4d Izboljšanje varnosti prometnega sistema					
4e Zmanjševanje/ublažitev vplivov na okolje					
4f Izboljšanje energetske učinkovitosti					
4g Finančna vzdržnost prometnega sistema					

General comparison of alternatives	Rail transport	Road transport	Public transport	Maritime transport	Air transport
1a Eliminate congestion at borders					
1b Improve accessibility of international inter-urban passenger transport					
1c Improve accessibility of international cargo transport					
2a North-east					
2b South-east					
2c North-west					
2d Goriška					
2e Koroška					
2f Primorska					
2g Central Slovenia					
2h Accessibility within regions (to regional centres)					
3a Ljubljana					
3b Maribor					
3c Koper					
4a Harmonisation of legislation, rules and standards with European requirements, and best practice					
4b Improve the organisational system structure and cooperation between respective stakeholders					
4c Improve the operational system structure					
4d Improve transport system safety					
4e Reduce/mitigate environmental impacts					
4f Improve energy efficiency					
4g Financial sustainability of the transport system					

Legend:  very compliant,  partly compliant,  conditionally compliant,  - non-compliant

## 10 GUIDELINES AND MITIGATION MEASURES

Chapter 10 of the Environmental Report defines the **general guidelines and mitigation measures** to ensure the attainment of important environmental objectives in individual fields. By implementing general guidelines and mitigation measures, the negative impacts described in Chapter 8.1 will be prevented and the attainment of the environmental objectives of the Strategy will be ensured. Definition of the feasibility of general guidelines and mitigation measures:

- they must be included in the Transport Development Strategy in the Republic of Slovenia. The entities that prepared the Strategy are responsible for its implementation (PNZ d.o.o., DRI d.o.o. and Ministry of Infrastructure). During the strategic environmental assessment procedure for the Transport Development Strategy, consideration of measures will be supervised by the ministry responsible for the environment.

Tables in Chapter 10 provide for each field **specific mitigation measures** for individual transport measures within a particular sub-objective. The implementation of specific mitigation measures will prevent negative impacts and ensure the attainment of the environmental objectives of the Strategy. Definition of feasibility:

- The entities that prepared the project documentation are responsible for implementing specific mitigation measures during the planning of, and activities in, an individual transport measure. The performance of implemented measures is monitored by the ministry responsible for the environment within the strategic environmental assessment procedure for an individual plan.

### **10.1 Soil and mineral resources**

#### **General guidelines and mitigation measures to attain environmental objectives 1 and 2**

By occupying land, the construction of transport infrastructure will cause extensive permanent impacts, which will be reflected as a change in the use of land. Therefore, sustainable land management and soil protection must be ensured when planning the integration of transport infrastructure in the environment. Activities in agricultural land and woodland must be reduced to the lowest level possible, and the planning of activities in land with poorer production potential, and land outside dense forest areas and forest areas with important wood production functions at the first level must be given top priority. When integrating transport infrastructure in the environment, upgrading within the existing transport corridor has priority over new construction. Transport infrastructure should be planned in a way that does not increase the probability of landslides in the wider area of activities.

To ensure the sustainable use of natural resources, general measures for the road and railway networks (measures in Group 4) must be supplemented with guidelines that in the construction and reconstruction of transport infrastructure promote recycling and the use of own waste, and more importantly, the use of certified building materials made of recycled by-products or waste material from other sectors (the measure is taken into account in public procurement in accordance with the Decree on Green Public Procurement). When using building materials for transport infrastructure which are not of primary natural origin, the fact should be taken into account that:

- large quantities of building materials are used, especially as construction fillings;
- certain hazardous substances from waste materials are permanently mobilised; and
- new building materials may have better functional qualities than materials of natural origin.

**Specific mitigation measures**

Sub-objectives	Specific mitigation measures
1a	In the spatial integration of measures R.1, R.3, R.6 and Ro.1, protective forests, especially along the Sava River (R.3) and the Mura River (R.7) and north from Brestanica pri Komnu (R.6), and forest areas with defined wood production functions at the first level must be avoided. Activities on agricultural land and woodland must be reduced in measures R.1, R.3, R.6, R.8, R.10 and Ro.12 with the rational integration of individual transport infrastructure, whereby the use of land with lower productive potential and land outside dense forest stands must be given priority.
1b	In the spatial integration of measures R.3, R.5, R.10, protective forests, especially along the Sava River (R.3, R.5) and the Savinja River (R.10) and at Spodnja Polskava (R.p), and forest areas with defined wood production functions at the first level must be avoided. Activities on agricultural land and woodland must be reduced in measures R.3, R.5, R.8, R.10, Ro.1 and A.3 with the rational integration of individual transport infrastructure, whereby the use of land with lower productive potential and land outside dense forest stands must be given priority.
1c	In the spatial integration of measures R.3, R.5, R.10 and Ro.12, protective forests, especially along the Sava River (R.3, R.5) and the Savinja River (R.10), at Spodnja Polskava (R.9) and east of Logatec and Zadobrova and Polje in Ljubljana (Ro.12), and forest areas with defined wood production functions at the first level must be avoided. Activities on agricultural land and woodland must be reduced in measures R.1, R.3, R.5, R.8, R.10 and Ro.12 with the rational integration of individual transport infrastructure, whereby the use of land with lower productive potential and land outside dense forest stands must be given priority.
2.a	In the spatial integration of measures R.5, Ro.13, Ro.14, Ro.20, protective forests, especially along the Sava River (R.5, Ro.14), the Savinja River (Ro.14) and at the Borovci settlement (Ro.20), and forest areas with defined wood production functions at the first level must be avoided. Activities on agricultural land and woodland must be reduced in R.5, Ro.1, Ro.13, Ro.14, Ro.20 with the rational integration of individual transport infrastructure, whereby the use of land with lower productive potential and land outside dense forest stands must be given priority.
2.b	In the spatial integration of measure Ro.14, protective forests, especially along the Sava River and the Savinja River, and forest areas with defined wood production functions at the first level must be avoided. Activities in agricultural land and woodland must be reduced in measures R.3, Ro.4, Ro.14 with the rational integration of individual transport infrastructure, whereby the use of land with lower productive potential and land outside dense forest stands must be given priority .
2.c	In the spatial integration of measures Ro.7, R.3, Ro.6, Ro.13, protective forests, especially along the Sava River and the Savinja River, and forest areas with defined wood production functions at the first level must be avoided. Activities on agricultural land and woodland must be reduced in measures R.3, Ro.6, Ro.7, Ro.13, U.4 (railway) with the rational integration of individual transport infrastructure, whereby the use of land with lower productive potential and land outside dense forest stands must be given priority.
2.d	In the spatial integration of measure R.6, protective forests, especially at Brestanica pri Komnu, and forest areas with defined wood production functions at the first level must be avoided. Activities on agricultural land and woodland must be reduced in measure R.6 with the rational integration of individual transport infrastructure, whereby the use of land with lower productive potential and land outside dense forest stands must be given priority.
2.e	In the spatial integration of measure Ro.9, protective forests along the Paka River and the Velunja River, and forest areas with defined wood production functions at the first level must be avoided. Activities on agricultural land and woodland must be reduced in measure Ro.9 with the rational integration of individual transport infrastructure, whereby the use of land with lower productive potential and land outside dense forest stands must be given priority.
2.f	In the spatial integration of measure Ro.18, forest areas with defined wood production functions at the first level must be avoided. Activities on agricultural land and woodland must be reduced in measure Ro.18 with the rational integration of individual transport infrastructure, whereby the use of land with lower productive potential and land outside dense forest stands must be given priority.
2.g	In the spatial integration of measures R.3, R.5 , Ro.10, Ro. 13 , Ro.14, protective forests, especially along the Sava River and the Savinja River, and south of Radomlje, and forest areas with defined wood production functions at the first level must be avoided. Activities on agricultural land and woodland must be reduced in measures R.1, R.3, R.5, Ro.10, R.11, Ro.13, R.14, Ro.15, U.4 (railway) with the rational integration of individual transport infrastructure, whereby the use of land with lower productive potential and land outside dense forest stands must



	be given priority.
2.h	In the spatial integration of measures Ro.7, Ro.10, Ro. 13, Ro.20, protective forests, especially along the Sava River and the Savinja River, and south of Radomlje, protective forests of the Idrijsko-Cerkljansko Hills and at Boranci, and forest areas with defined wood production functions at the first level must be avoided. Activities on agricultural land and woodland must be reduced in measures Ro.7, Ro.9, Ro.10, Ro.11, Ro.20 with the rational integration of individual transport infrastructure, whereby the use of land with lower productive potential and land outside dense forest stands must be given priority.
3.a	In the spatial integration of measures R.3 and R.5, protective forests, especially along the Sava River, and forest areas with defined wood production functions at the first level must be avoided. Activities on agricultural land and woodland must be reduced in measures R.1, R.3, R.5, U.4 (railway) with the rational integration of individual transport infrastructure, whereby the use of land with lower productive potential and land outside dense forest stands must be given priority.
3.b	In the spatial integration of measure R.10, protective forests, especially along the Sava River and the Savinja River (R.10), and forest areas with defined wood production functions at the first level must be avoided. Activities in agricultural land and woodland must be reduced in measures R.8, R.10 with the rational integration of individual transport infrastructure, whereby the use of land with lower productive potential and land outside dense forest stands must be given priority.
3.c	In the spatial integration of measures R.1, forest areas with defined wood production functions at the first level must be avoided. Activities on agricultural land and woodland must be reduced in measure R.1 with the rational integration of individual transport infrastructure, of land with lower productive potential and land outside dense forest stands must be given priority.
4.a–g	-

## 10.2 Air

### General guidelines and mitigation measures to attain Environmental objective 3

Regardless of the fact that the largest share in the attainment of the environmental objectives regarding national pollutant emission ceilings in transport will be achieved on the basis of renewing the vehicle fleet with vehicles that meet the increasingly higher environmental standards, attention in the measures of the Strategy should be paid to those measures that significantly impact pollutant emissions, i.e. especially to:

- ensure in the planning and implementation of environmental protection measures of the Strategy that great attention is paid to the inspection of exhaust gases during regular technical examinations of motor vehicles;
- regularly renew the road vehicle fleet and ensure when purchasing new vehicles that they meet the technical standards;
- limit the access or use of light commercial vehicles in city centres if they do not comply with environmental standards for new vehicles;
- pay equal attention to promoting the use of public transport in urban centres as to other forms of sustainable mobility (cycling, pedestrian zones).

General measures (measures in Group 4) should be supplemented with the aforementioned.

Since most measures are local, it is recommended that some of them be included in the more detailed programmes of measures to reduce PM<sub>10</sub> particulate pollution prepared on the basis of the adopted ordinances on the air quality plan in areas of excessive ambient air pollution, i.e.:

- Ordinance on the air quality plan in Kranj Municipality (Official Gazette of the Republic of Slovenia, no. 108/13)
- Ordinance on the air quality plan in Celje Municipality (Official Gazette of the Republic of Slovenia, no. 108/13)
- Ordinance on the air quality plan in Novo Mesto Municipality (Official Gazette of the Republic of Slovenia, no. 108/13)
- Ordinance on the air quality plan in Maribor Municipality (Official Gazette of the Republic of Slovenia, no. 108/13)

- Ordinance on the air quality plan in the Zasavje area (Official Gazette of the Republic of Slovenia, no. 108/13)
- Ordinance on the air quality plan in Murska Sobota Municipality (Official Gazette of the Republic of Slovenia, no. 88/13)
- Ordinance on the air quality plan in Ljubljana Municipality (Official Gazette of the Republic of Slovenia, no. 24/14).

Reduced private passenger transport should be a priority of all big towns with a large number of daily commuters. In addition to measures to reduce private passenger transport in towns based on internalising environmental costs and related to time limitations on parking and high parking fees, strategies should be implemented to improve both urban and local public transport. People would use public transport services more frequently if it were available at more favourable prices and did not additionally impede the everyday tempo of life.

#### **Specific mitigation measures**

No specific mitigation measures are anticipated to attain Environmental objective 3.

### **10.3 Climate factors**

#### **General guidelines and mitigation measures to attain Environmental objective 4**

##### **10.3.1 Climate change mitigation**

- The implementation of measures to attain the objectives of the Strategy must take into account the so-called indicative objectives to reduce greenhouse gas emissions which are listed for individual sectors in the proposed Operational Programme for Reducing Greenhouse Gas Emissions by 2020 with a vision by 2030. The indicative sectoral objectives to reduce greenhouse gas emissions for transport are as follows:
  - the rapid rise in greenhouse gas emissions must be halted and reduced by 9 per cent by 2020 in comparison with 2008 through the introduction of sustainable mobility measures;
  - the trend of increasing greenhouse gas emissions produced by traffic must be reversed to prevent them increasing by more than 18 per cent by 2030 in comparison with 2005; i.e. a 15 per cent reduction by 2030 in comparison with 2008;
  - a vision of a further emission reduction by 90 per cent by 2050 must be integrated into measures for attaining the objectives of the Strategy.

To attain the environmental target value defined for the transport sector in the Operational Programme for Reducing Greenhouse Gas Emissions by 2020 with a vision by 2030, special importance is given to measures to attain the sub-objectives of the Strategy included in specific objective no. 4 'Improve the organisational and operational structure of the transport system to ensure the efficiency and sustainability of the system', among which special focus in terms of climate change mitigation should be put on:

- establishing charging stations for alternative fuels;
- internalising external costs; and
- implementing a restrictive parking policy in urban areas.

##### **10.3.2 Climate change adaptation**

Pursuant to the provisions of Article 5 of Regulation (EU) No 1315/2013, the measures of the Strategy should be designed in a resource-efficient way, meaning that the sensitivity of transport infrastructure to climate change, natural disasters and anthropogenic disasters is properly observed. This means that measures from risk assessment and adaptations must be taken into account when planning infrastructure, which suitably enhance infrastructure resilience to climate change, especially in relation to precipitation, floods, storms, high temperatures and heat waves, drought, sea level rise and storm surges. Pursuant to Article 41 of this Regulation, for all measures of new transport infrastructure arrangements in terms of climate change adaptation, it is necessary to:

- prepare a sensitivity analysis of transport infrastructure to climate change, and
- implement measures and adjustments on the basis of the analysis results which properly improve the infrastructure's resilience to climate change.

To attain the environmental objective regarding climate change adaptation, the following must be ensured:

- in the long term, transport infrastructure in Slovenia must be less sensitive to the consequences of extreme precipitation due to floods or sudden snow on road surfaces, and the railway network in particular must not be sensitive to glaze ice;
- when planning any new construction or expansion of the existing transport network, a sensitivity analysis of transport infrastructure to the aforementioned extreme weather conditions must be carried out, and on the basis of its results, a plan of measures to permanently reduce the consequences of these phenomena must be prepared;
- it has to be ensured that the implementation of measures to reduce the sensitivity of the transport network to extreme weather conditions becomes a central task of transport network management, and the purpose of implementing these measures must be based especially on reducing damage caused to users of this weather-sensitive network if they cannot use it; and

a measure on developing guidelines, methodology and procedures for collecting information on extreme weather conditions, and for planning and implementing measures to reduce the sensitivity of transport infrastructure to extreme weather conditions must be added to the general measures of the Strategy.

#### **Specific mitigation measures**

No specific mitigation measures are anticipated to attain Environmental objective 4.

### **10.4 Water**

#### **General guidelines and mitigation measures to attain Environmental objective 5**

In order to limit the effects of the pressure which the transport infrastructure exerts on drinking water sources and thus prevent negative impacts on the quality of drinking water, the spatial integration of transport infrastructure in water protection areas must be avoided.

In the spatial integration of transport infrastructure, it is necessary to avoid integrating facilities in areas at risk of flood and related erosion. In the event of activities in these areas, it must be proved that the existing level of flood risk of the wider area will not increase. The aforementioned guideline must be considered in order to reduce the pressure of transport infrastructure on areas at risk of flood, and to ensure that the level of flood risk in individual areas does not increase.

When planning interventions in areas with extremely high, very high and highly vulnerable aquifers, it is necessary to study and plan appropriate technical solutions to prevent negative impacts of construction and operation, as well as in the case of exceptional events (e.g. spillages of hazardous substances). Consideration of the aforementioned guideline will reduce the probability of groundwater pollution – ensuring limited impacts of the pressure of transport infrastructure on groundwater.

Transport infrastructure should not be integrated into coastal land. Such activities may significantly impact the ecological status of watercourses, and reduce retention areas, and produce cumulative impacts on the biodiversity of the area and ecosystem services of the area. According to Article 37 of the Waters Act, an exception is possible only on the basis of expert argumentation stating that the facility cannot be integrated elsewhere without disproportionately high costs. The costs of reducing ecosystem services in the case of activities in the coastal area must also be included in the cost calculation. Consideration of the aforementioned guideline will make the calculation of costs more

accurate and adequately balanced. Fewer activities are expected in coastal areas, which will prevent significant negative impacts on the ecological status of watercourses.

A measure to permanently reduce negative impacts on sea quality should be added to the measures under sub-objective 4, e.g.:

- train inspection services;
- purchase proper equipment to deal with spillages of hazardous substances into the sea;
- construct proper infrastructure to receive and dispose of waste material from vessels;
- provide the circulation of watercourses and thus prevent eutrophication through proper planning and construction of ports.

Consideration of the guideline will limit the effects of the pressure of transport infrastructure on the sea.

### Specific mitigation measures

Sub-objectives	Specific mitigation measures
1a	<p>In Ro.1, Ro.2, R.3 and R.1, the following must be considered: There is a great probability that the implementation of the measure will significantly affect a highly vulnerable aquifer; therefore, an assessment of the hazard to groundwater must be prepared during the drafting of project documentation. The assessment must also include an appropriate way of bridging such an area in accordance with groundwater protection.</p> <p>In R.1, the following must be considered: Appropriate technical solutions must be planned to prevent negative impacts on bathing waters of bathing areas in the wider area of Koper during construction and operation as well as in case of extraordinary events (e.g. spillages of hazardous substances).</p>
1b	<p>In Ro.1, Ro.2, Ro.13, R.3 and A.2, the following must be considered: There is a great probability that the implementation of the measure will significantly affect a highly vulnerable aquifer; therefore, an assessment of the hazard to groundwater must be prepared during the drafting of project documentation. The assessment must also include an appropriate way of bridging such an area in accordance with groundwater protection.</p> <p>In A.3, the following must be considered: Appropriate technical solutions must be planned to prevent negative impacts on bathing waters of bathing areas in the wide area of Strunjan during construction and operation, as well as in case of extraordinary events (e.g. spillages of hazardous substances).</p>
1c	<p>In R.3, and Ro.12, Ro.2, R.1, the following must be considered: There is a great probability that the implementation of the measure will significantly affect the highly vulnerable aquifer; therefore, an assessment of the hazard to groundwater must be prepared during the drafting of project documentation. The assessment must also include an appropriate way of bridging such an area in accordance with groundwater protection.</p> <p>In R.1, M.1 – M.4, the following must be considered: Appropriate technical solutions must be planned to prevent negative impacts on bathing waters of bathing areas in the wide area of Koper during construction and operation as well as in case of extraordinary events (e.g. spillages of hazardous substances).</p>
2.a	<p>In Ro.1, Ro.13, Ro.16 and Ro.20, the following must be considered: There is a great probability that the implementation of the measure will significantly affect a highly vulnerable aquifer; therefore, an assessment of the hazard to groundwater must be prepared during the drafting of project documentation. The assessment must also include an appropriate way of bridging such an area in accordance with groundwater protection.</p>
2.b	<p>In R.3, the following must be considered: There is a great probability that the implementation of the measure will significantly affect a highly vulnerable aquifer; therefore, an assessment of the hazard to groundwater must be prepared during the drafting of project documentation. The assessment must also include an appropriate way of bridging such an area in accordance with groundwater protection.</p>
2.c	<p>In R.3, Ro.6, Ro.13 and Ro.15, U.4, Ro.2, the following must be considered: There is a great probability that the implementation of the measure will significantly affect a highly vulnerable aquifer; therefore, an assessment of the hazard to groundwater must be prepared during the drafting of project documentation. The assessment must also include an appropriate way of bridging such an area in accordance with groundwater protection.</p> <p>In Ro.6 and Ro.7, the following must be considered: Appropriate technical solutions must be</p>

	planned to prevent negative impacts on bathing waters during construction and operation as well as in case of extraordinary events (e.g. spillages of hazardous substances).
2.d	In R.6, the following must be considered: There is a great probability that the implementation of the measure will significantly affect a highly vulnerable aquifer; therefore, an assessment of the hazard to groundwater must be prepared during the drafting of project documentation. The assessment must also include an appropriate way of bridging such an area in accordance with groundwater protection.
2.e	In Ro.9, the following must be considered: There is a great probability that the implementation of the measure will significantly affect a highly vulnerable aquifer; therefore, an assessment of the hazard to groundwater must be prepared during the drafting of project documentation. The assessment must also include an appropriate way of bridging such an area in accordance with groundwater protection.
2.f	In R.1, the following must be considered: There is a great probability that the implementation of the measure will significantly affect a highly vulnerable aquifer; therefore, an assessment of the hazard to groundwater must be prepared during the drafting of project documentation. The assessment must also include an appropriate way of bridging such an area in accordance with groundwater protection. In R.1 and Ro.17, the following must be considered: Appropriate technical solutions must be planned to prevent negative impacts on bathing waters of bathing areas in the wide area of Koper during construction and operation as well as in case of extraordinary events (e.g. spillages of hazardous substances). In Ro.18, the following must be considered: If the route passes through the area of influence of the Škocjan Caves Regional Park, appropriate technical measures must be provided to facilitate the efficient prevention of district groundwater pollution in the area of the Škocjan Caves.
2.g	In R.1, R.3, Ro.10, Ro.12, Ro.13, Ro.15 and U.4, the following must be considered: There is a great probability that the implementation of the measure will significantly affect the highly vulnerable aquifer; therefore, an assessment of the hazard to groundwater must be prepared during the drafting of project documentation. The assessment must also include an appropriate way of bridging such an area in accordance with groundwater protection. In R.1, the following must be considered: Appropriate technical solutions must be planned to prevent negative impacts on bathing waters of bathing areas in the wide area of Koper during construction and operation as well as in case of extraordinary events (e.g. spillages of hazardous substances).
2.h	In Ro.7, Ro.9, Ro.10, Ro.20 and Ro.21, the following must be considered: There is a great probability that the implementation of the measure will significantly affect the highly vulnerable aquifer; therefore, an assessment of the hazard to groundwater must be prepared during the drafting of project documentation. The assessment must also include an appropriate way of bridging such an area in accordance with groundwater protection.
3.a	In R.1, R.5, Ro.12 and U.4 (railway), the following must be considered: There is a great probability that the implementation of the measure will significantly affect a highly vulnerable aquifer; therefore, an assessment of the hazard to groundwater must be prepared during the drafting of project documentation. The assessment must also include an appropriate way of bridging such an area in accordance with groundwater protection. In R.1, the following must be considered: Appropriate technical solutions must be planned to prevent negative impacts on bathing waters of bathing areas in the wide area of Koper during construction and operation as well as in case of extraordinary events (e.g. spillages of hazardous substances).
3.b	In Ro.16, the following must be considered: There is a great probability that the implementation of the measure will significantly affect the highly vulnerable aquifer; therefore, an assessment of the hazard to groundwater must be prepared during the drafting of project documentation. The assessment must also include an appropriate way of bridging such an area in accordance with groundwater protection.
3.c	In R.1, the following must be considered: There is a great probability that the implementation of the measure will significantly affect the highly vulnerable aquifer; therefore, an assessment of the hazard to groundwater must be prepared during the drafting of project documentation. The assessment must also include an appropriate way of bridging such an area in accordance with groundwater protection. In R.1 and Ro.17, the following must be considered: Appropriate technical solutions must be planned to prevent negative impacts on bathing waters during construction and operation as well as in case of extraordinary events (e.g. spillages of hazardous substances).

## **10.5 Nature**

### **General guidelines and mitigation measures to attain environmental objectives 6 and 7**

To permanently conserve the natural environment and biodiversity, the selection of measures should be carried out in the following order:

- the reconstruction of existing connections has priority over the construction of new traffic routes;
- the construction of parallel connections with existing roads and railways has priority over integration in naturally preserved areas;
- if activities in the pristine environment cannot be avoided, activities in protected areas, IEAs and areas of valuable natural features should be avoided;
- priority should be given to variants with less impact on migration routes of wild animals (variants which pass more through tunnels, cut-and-covers, and variants which interrupt fewer migration routes);

appropriate passages for wild animals must be provided, which are in line with best practice in the European Union. Prior to planning each ecoduct construction, a study must be carried out or the results of existing studies must be summarised, which will facilitate the integration of a facility in a suitable place and manner (shape, size, and arrangement of the facility and its surroundings). Plans must also anticipate passages for small animals (amphibians, small mammals, reptiles) on the basis of existing studies or, if necessary, additional research.

In the spatial integration of transport infrastructure, the integration of facilities in areas of valuable natural features must be avoided. Consideration of the guideline will facilitate the preservation of types and characteristics of valuable natural features.

In the spatial integration of transport infrastructure, the integration of facilities in protected areas must be avoided. If activities in such areas cannot be avoided, and if this is permitted under the act on the protection of individual area, the guidelines, bases and conditions for protecting protected areas of nature which are provided in protection regimes adopted with acts on protection must be taken into account. Consideration of the guideline will facilitate the protection of protected areas.

In the spatial integration of transport infrastructure, the integration of facilities in Natura 2000 sites must be avoided. Consideration of the guideline will facilitate protecting the connection and integration of Natura 2000 sites.

If the electrification of a railway line is planned in an area of flight and migration routes of birds, appropriate technical solutions to prevent collisions of birds with power lines must be anticipated. Consideration of the measure will reduce the loss of individual birds and increase the probability of attaining or preserving a favourable state of populations. The probability of attaining the objective of biodiversity conservation will be higher.

The period for implementing activities must be adjusted to the life cycles of animals and plants, i.e.:

- adjusting to animals by activities not, or to a lesser extent, coinciding with periods when animals need peace or cannot move away, especially during the period of reproduction, breeding, development, and wintering;
- adjusting to plants by facilitating seed production, natural planting and other forms of reproduction.

Observing the measure will reduce disturbances to the life cycles of animals and plants and increase the probability of attaining or preserving a favourable state of the populations. The probability of attaining the objective of biodiversity conservation will be higher.

In accordance with the objective of the Resolution on National Environmental Action Plan 2005–2012 (Official Gazette of the Republic of Slovenia, no. 2/06): ‘Increasing the share of different categories of

protected areas by 10 per cent – to 22 per cent of Slovenian territory by 2014' which has not yet been attained, the area of protected areas is expected to increase. Therefore, the spatial integration of transport infrastructure in areas proposed for protection should be avoided in order to prevent potential conflicts and negative impacts on the attainment of the environmental objectives of nature conservation.

Transport infrastructure should not be integrated in coastal land. Such activities may significantly impact the ecological status of watercourses, and reduce retention areas, and produce cumulative impacts on the biodiversity of the area and ecosystem services of the area. According to Article 37 of the Waters Act, an exception is possible only on the basis of expert argumentation stating that the facility cannot be integrated elsewhere without disproportionately high costs. The costs of the reduction of ecosystem services in the case of activities in the coastal area must also be included in the cost calculation. Consideration of the aforementioned guideline will make the calculation of costs more accurate and adequately balanced. Less integration is expected to take place in the coastal areas, which will prevent significant negative impacts on the biodiversity of these areas.

General measures in road and rail transport must be supplemented with a measure to more adequately protect individual species of wild animals against collisions with vehicles. A new measure with the following title should be added to the Strategy: Provision of migration corridors for wild animals and safety against collisions with wild animals. The content of the measure should be as follows:

- Reduce the fragmentation of habitats of species by establishing passages for wild animals on existing traffic routes (especially for mammals and amphibians). For this purpose, initially, a study must be conducted or data from existing monitoring of roadkill summarised. Then, based on the study findings, facilities for the migration of wild animals will be established. Within the measure, a priority list of black spots where amphibians are run over will be prepared where passages are arranged, including redirecting fences. To improve traffic safety (prevent collisions with large mammals), it is possible to set up chemical deterrent devices, acoustic warning devices, light reflectors or combined devices on unfenced traffic routes, depending on the location and traffic density..
- On newly planned traffic routes, the preservation of existing migration routes with the construction of proper facilities and other arrangements to prevent the movement of wild animal (especially carnivores, roe deer, red deer, bats and amphibians) must be provided. For planning needs, a purpose study will be prepared in the first phase (or the results of already conducted studies, if available, will be summarised) which includes data on species the migration of which will be affected by the activity, and guidelines for the project designer to plan the facility or arrangement (location, shape, size, greening of the facility and surroundings, etc.).

The measure will facilitate the connectivity of habitats (re-establishing or preserving migration routes) of species and the attainment of the environmental objectives related to nature protection.



## Specific mitigation measures

Sub-objectives	Specific mitigation measures
1a	<p>In measure R1, the following must be considered: appropriate passages for wild animals must be provided in the area between Vrhnika and Logatec, which will be planned according to best practice in the European Union.</p> <p>Measure R.3 should be designed to keep the impact on the integrity and functionality of protected areas low or eliminate it completely (special attention must be paid to the Šmarna Gora area).</p> <p>In measure R.8, the following must be considered: appropriate technical solutions (e.g. the implementation of bridging in box-shape construction) must be anticipated to prevent the collision of birds with electric lines spanning the Drava River.</p>
1b	<p>In measures R.5 and R.10, Ro.12, the following must be considered: appropriate passages for wild animals across transport infrastructure must be provided which are in line with best practice in the European Union.</p> <p>In measure Ro.12, the following must be considered: the priority is to invest in measures of public passenger transport. If the completion of the motorway network is necessary, existing traffic routes should be extended, if possible, while activities in the pristine environment must be avoided to the greatest possible extent.</p> <p>Measures R.3 and Ro.12 must be designed to keep the impact on the integrity and functionality of protected areas low or eliminate it completely (special attention must be paid to the Šmarna Gora area and the Ljubljana Marshes).</p> <p>In measure R.8, the following must be considered: appropriate technical solutions (e.g. the implementation of bridging in box-shape construction) must be anticipated to prevent the collision of birds with electric lines spanning the Drava River.</p> <p>In measures A.3, the following must be considered:</p> <ul style="list-style-type: none"> <li>- the expansion of the airport is permissible only if the number of airport operations decreases, while the number of passengers increases;</li> <li>- activities in the protected area of the Sečovlje salt pans must be avoided to the greatest extent possible;</li> <li>- the negative impact on the characteristics of the Sečovlje salt pans area, on the basis of which the Ramsar locality, Natura 2000 and landscape park are defined, must be prevented;</li> <li>- the airport must not be expanded to habitats important for the conservation of biodiversity in the Sečovlje salt pans area.</li> </ul>
1c	<p>In measures R.1, R.5 and R.10, the following must be considered: appropriate passages for wild animals across railway tracks must be provided which are in line with best practice in the European Union.</p> <p>In measure R.8, the following must be considered: appropriate technical solutions (e.g. the implementation of bridging in box-shape construction) must be anticipated to prevent the collision of birds with electric lines spanning the Drava River.</p> <p>In measure Ro.12, the following must be considered: the priority is to invest in measures of public passenger transport. If the completion of the motorway network is necessary, existing traffic routes should be extended, if possible, while activities in the pristine environment must be avoided to the greatest possible extent.</p> <p>Measures R.3 and Ro.12 must be designed to keep the impact on the integrity and functionality of protected areas low or eliminate it completely (attention has to be paid to the Šmarna Gora area and the Ljubljana Marshes).</p>
2.a	<p>In measures R.5 and Ro.14, the following must be considered: appropriate passages for wild animals across rail and road infrastructure must be provided which will be in line with best practice in the area of the European Union.</p>
2.b	<p>In measure Ro.4, the following must be considered: appropriate passages for wild animals across transport infrastructure must be provided which are in line with best practice in the European Union.</p> <p>Measure R.3 should be designed as to keep the impact on the integrity and functionality of protected areas low or eliminate it completely (special attention must be paid to the Šmarna Gora area).</p>
2.c	<p>In measure Ro.7, the following must be considered: appropriate passages for wild animals across road infrastructure must be provided which are in line with best practice in the European Union.</p>



	<p>In measure Ro.15, the following must be considered: the priority is to invest in measures of public passenger transport. If new construction is necessary, the existing traffic routes should be extended, if possible. Activities in the pristine environment should be avoided to the greatest extent possible.</p> <p>Measure R.3 should be designed to keep the impact on the integrity and functionality of protected areas low or eliminate it completely (special attention must be paid to the Šmarna Gora area).</p>
2.d	-
2.e	<p>In measure Ro.9, the following must be considered: appropriate passages for wild animals across transport infrastructure must be provided which are in line with best practice in the European Union.</p>
2.f	<p>In measures R.1 and Ro.18, the following must be considered: appropriate passages for wild animals across rail and road infrastructure must be provided which are in line with best practice in the European Union.</p> <p>In measure Ro.18, the following must be considered: the road should be planned outside the Škocjan Caves Regional Park (the area is under UNESCO protection and defined as a Ramsar wetland). If the route passes through the area of influence of the Škocjan Caves Regional Park, appropriate technical measures must be provided to facilitate the efficient prevention of district groundwater pollution in the area of Škocjan Caves.</p>
2.g	<p>In measures R.1, R5, Ro.10, Ro.11, Ro.12 and Ro.14, the following must be considered: appropriate passages for wild animals across transport infrastructure must be provided which are in line with best practice in the European Union.</p> <p>In measure Ro.15, the following must also be considered: the priority is to invest in measures of public passenger transport. If new construction is necessary, existing traffic routes should be extended, if possible. Activities in the pristine environment should be avoided to the greatest extent possible.</p> <p>Measure R.3 should be designed to keep the impact on the integrity and functionality of protected areas low or eliminate it completely (special attention must be paid to the Šmarna Gora area).</p>
2.h	<p>In measures Ro.7, Ro.9 and Ro.11, the following must be considered: the priority is to invest in measures of public passenger transport. If new construction is necessary, existing traffic routes should be extended, if possible. Activities in the pristine environment should be avoided to the greatest extent possible.</p> <p>In measures Ro.7, Ro.9, Ro.10 and Ro.11, the following must be considered: appropriate passages for wild animals across transport infrastructure must be provided which are in line with best practice in the European Union.</p>
3.a	<p>In measures R.1, R5 and Ro.12, appropriate passages for wild animals across transport infrastructure must be provided, which are in line with best practice in the European Union.</p> <p>Measures R.3 and Ro.12 must be designed to keep the impact on the integrity and functionality of protected areas low or eliminate it completely (special attention must be paid to the Šmarna Gora area and the Ljubljana Marshes).</p>
3.b	<p>In measure R10, the following must be considered: appropriate crossings for wild animals across railway tracks must be provided according to best practice in the European Union.</p> <p>In measure R.8, the following must be considered: appropriate technical solutions (e.g. the implementation of bridging in box-shape construction) must be anticipated to prevent the collision of birds with electric lines spanning the Drava River.</p>
3.c	<p>In measure R1, the following must be considered: appropriate passages of wild animals must be provided in the area between Vrhnika and Logatec which are in line with best practice in the area of the European Union.</p>
4.a–g	-

## **10.6 Human health**

### **General guidelines and mitigation measures to attain Environmental objective 8**

#### **10.6.1 Air quality**

The planning of the transport policy in areas of excessive ambient air pollution, the following must be considered with regard to transport management on the existing transport network and to its maintenance:

- Ordinance on the air quality plan in Kranj Municipality (Official Gazette of the Republic of Slovenia, no. 108/13)
- Ordinance on the air quality plan in Celje Municipality (Official Gazette of the Republic of Slovenia, no. 108/13)
- Ordinance on the air quality plan in Novo Mesto Municipality (Official Gazette of the Republic of Slovenia, no. 108/13)
- Ordinance on the air quality plan in Maribor Municipality (Official Gazette of the Republic of Slovenia, no. 108/13)
- Ordinance on the air quality plan in the Zasavje area (Official Gazette of the Republic of Slovenia, no. 108/13)
- Ordinance on the air quality plan in Murska Sobota Municipality (Official Gazette of the Republic of Slovenia, no. 88/13)
- Ordinance on the air quality plan in Ljubljana Municipality (Official Gazette of the Republic of Slovenia, no. 24/14).

In accordance with the ordinances, a detailed programme of measures to reduce pollution with PM(10) particulates will be prepared for problematic areas. The programme will have to be observed when planning transport policy for the broader problematic area. The priority in the selection procedure should be given to variants which provide the greatest improvement of ambient air quality.

When preparing spatial acts for new infrastructure activities or for extending the existing transport network, the following general guidelines must be observed in order to attain the objective of reducing ambient air pollution in areas of influence of the respective activities:

- measures to reduce pollutant emissions (prevent congestion, provide smooth traffic flow at moderate travel speeds between 60 and 90 km/h, traffic detours) must be provided to the greatest extent possible;
- measures to prevent increased traffic flow on individual sections of the road network, and measures to prohibit the entry of motor vehicles (especially cargo vehicles) which do not meet environmental standards for new vehicles must be implemented in areas with excessive ambient air pollution;
- the integration of measures in populated areas which are especially sensitive to ambient air pollution (residential buildings, health care facilities, tourist areas) should be avoided.

**Specific mitigation measures**

Sub-objectives	Specific mitigation measures
1a	-
1b	In relation to measure Ro.12 (Motorway network around Ljubljana), the implementation of the following mitigation measures must be provided in the area of the Ljubljana agglomeration to reduce the number of days with levels of ambient air pollution with particulates: <ul style="list-style-type: none"> <li>- control of road vehicle speed limits during the highest levels of ambient air pollution with particulates in the area of the Ljubljana agglomeration;</li> <li>- regular maintenance of motorway surfaces with cleaning or other substances to reduce re-suspension to the greatest extent possible; and</li> <li>- to improve ambient air quality in the wider motorway network area around Ljubljana, other measures of the detailed programme of measures to reduce pollution with PM(10) particulates must also be considered; these will be prepared for the transport sector and other sources of pollution on the basis of the Ordinance on the air quality plan in Ljubljana Municipality (Official Gazette of the Republic of Slovenia, no. 24/14).</li> </ul>
1c–2f	-
2.g	In relation to measure Ro.12 (Motorway network around Ljubljana), the implementation of the following mitigation measures must be provided in the area of the Ljubljana agglomeration to reduce the number of days with levels of ambient air pollution with particulates:

	<ul style="list-style-type: none"> <li>- control of road vehicle speed limits during the highest levels of ambient air pollution with particulates in the area of the Ljubljana agglomeration;</li> <li>- regular maintenance of motorway surfaces with cleaning or other substances to reduce re-suspension to the largest extent possible; and</li> <li>- to improve ambient air quality in the wider motorway network area around Ljubljana, other measures of the detailed programme of measures to reduce pollution with PM(10) particulates must also be considered; these will be prepared for the transport sector and other sources of pollution on the basis of the Ordinance on the air quality plan in Ljubljana Municipality (Official Gazette of the Republic of Slovenia, no. 24/14).</li> </ul>
2.h	-
3.a	<p>In relation to measure Ro.12 (Motorway network around Ljubljana), the implementation of the following mitigation measures must be provided in the area of the Ljubljana agglomeration to reduce the number of days with levels of ambient air pollution with particulates:</p> <ul style="list-style-type: none"> <li>- control of road vehicle speed limits during the highest levels of ambient air pollution with particulates in the area of the Ljubljana agglomeration;</li> <li>- regular maintenance of motorway surfaces with cleaning or other substances to reduce re-suspension to the largest extent possible; and</li> <li>- to improve ambient air quality in the wider motorway network area around Ljubljana, other measures of the detailed programme of measures to reduce pollution with PM(10) particulates must also be considered; these will be prepared for the transport sector and other sources of pollution on the basis of the Ordinance on the air quality plan in Ljubljana Municipality (Official Gazette of the Republic of Slovenia, no. 24/14).</li> </ul>
3.b	<p>In accordance with the Ordinance on the air quality plan in Maribor Municipality (Official Gazette of the Republic of Slovenia, no. 108/13), a detailed programme of measures to reduce pollution with PM(10) particulates will be prepared for the Municipality of Maribor. This Programme will have to be observed when planning transport policy in order to attain sub-objective 3b. Priority should be given to measures which improve ambient air quality to the greatest extent.</p>
3.c	-
4.a–g	-

## 10.6.2 Noise pollution

### General guidelines and mitigation measures to attain Environmental objective 9

When planning policy on transport infrastructure development, in order to reduce noise pollution in the environment in accordance with Directive 2002/49/EC, respective Slovenian legislation, the Noise Action Programme, and in accordance with Regulation (EU) No 1315/2013 on Union guidelines on developing the trans-European transport network, it is necessary to ensure measure that contribute to:

- reducing external transport costs and environmental protection;
- reducing the exposure of urban areas to negative impacts of transit road and rail transport.

Noise pollution in Slovenia is highest along the road and railway networks, and especially higher in urban centres and in the area of more important transport hubs. Pursuant to the Environmental Protection Act, excessive noise polluters must take measures to reduce environmental pollution. The implementation of measures is necessary in areas with excessive noise pollution in the existing state, while mitigation measures must also be taken in all new transport corridors planned in the Strategy.

The implementation of mitigation measures on the transport network which is the subject of the policy on transport infrastructure development must be harmonised with the Noise Action Programme. The Noise Action Programme was adopted in December 2012 and consists of a strategic part which defines the general conditions for implementing anti-noise measures for existing and new infrastructural sources, and of an implementation part which defines measures anticipated for the 2012–2017 period to improve the most exposed areas.

When preparing spatial acts for infrastructure activities, the following guidelines to attain the objective of reducing noise pollution must be observed:

- measures to reduce noise emissions at source (measures on the network, vehicle fleet, logistics measures, temporary or permanent rerouting of transit transport, reducing speeds in noise-exposed areas) must be provided to the greatest extent possible;
- in areas where pollution ceilings are exceeded, measures must be taken to prevent the expansion of noise in the environment (noise barriers and embankments, covered galleries, etc.) and to provide good living conditions in buildings (passive protection);
- the integration of measures in quiet populated areas and/or in areas which are defined under noise protection legislation as especially noise sensitive (residential buildings, health care facilities, tourist areas) should be avoided;
- the integration of measures in quiet open areas (protected areas in accordance with the regulations on nature conservation) should be avoided.

According to the Noise Action Programme and noise protection legislation, measures for environmental noise protection on the transport network must focus primarily on measures to reduce noise emissions at source, measures to prevent noise expanding into the environment, and, if necessary, measures to provide appropriate living conditions in overexposed buildings.

Measures to reduce noise emissions at source are the most efficient. Reduced noise emissions from transport sources may be achieved mainly through the modernisation of the vehicle fleet (road, rail, air and maritime transport), and additionally through the redirection of traffic flows, with an emphasis on rerouting long-distance traffic to the railway, and through greater efficiency of public passenger transport by improving the technical characteristics of road and railway surfaces and logistics measures in transport management (temporary rerouting, lowering of speeds, etc.). According to the guidelines at the EU level, emissions from individual noise sources are regulated in accordance with the requirements and guidelines of the following programming documents:

- limitation of emissions produced by railway rolling stock and infrastructure network according to Directive 2008/57/EC and TSI guideline C(2011) 658;
- reduction of noise emissions produced by motor vehicles and infrastructure to the lowest possible level (COM (2011) 321);
- limitation of noise emissions from air transport in accordance with Directive 2002/30/EC.

In the Strategy, the reduction of noise emissions from rail transport is provided with measures R.22 (electrification), R.34 (improvement of railway passenger rolling stock) and R.35 (improvement of railway cargo rolling stock). The measures are harmonised with Commission Decision 2011/229/EU on the technical specifications for interoperability relating to the sub-system 'rolling stock – noise' of the trans-European conventional rail system (TSI-noise). The guideline applies to new and existing rolling stock, while the TSI specification regulates emissions from rolling stock (traction and hauled vehicles) and also the characteristics of railway infrastructure (track roughness). The implementation of the guideline will significantly improve the state of the environment on the railway network.

The Strategy will provide for the reduction of road vehicle noise emissions with general measures which enable a more efficient shift of long-distance transport to the railway and the disburdening of road network in areas of large urban centres. Measures to reduce noise emissions from road transport are partly captured in the programme of environmental policy under measures Ro.33 (environmental protection and traffic safety), Ro.36 (internalisation of external costs) and Ro.37 (restrictive parking policy), and include especially:

- use of porous wearing course of the road;
- use of vehicles with alternative energy (private and public traffic);
- shift of transit transport and reduction of speeds in noise-sensitive areas.

Measures to prevent the spread of noise into the environment (noise barriers and embankments) are used mainly to protect the environment against noise from road and railway infrastructure. Measures are suitable mainly for the protection of densely populated areas along railway lines and along the road network, while the implementation of these measures along existing roads passing through settlements with an already formed and distinguished urban structure is reasonable only in exceptional cases. Measures to provide appropriate living conditions (improvement of noise insulation of windows in overexposed buildings with protected spaces) are suitable in areas where other measures are not technically implementable or economically viable. Both measures of noise protection (noise barriers/embankments and passive protection) are included in the Strategy under general measures of transport policy no. R.39 (reduction of impacts on the environment along railway infrastructure) and Ro.33 (environmental protection along road infrastructure).

Increased impacts of the pollution are also expected during the implementation of infrastructure activities. Impacts the construction phase will be short-term and reversible. The following mitigation measures in particular must be taken to reduce impacts during the implementation of activities:

- use of equipment and construction machinery manufactured in accordance with emissions norms for noise from construction machinery in accordance with the Rules on noise emissions from machinery used in the open and according to Directives 97/68/EC, 2004/26/EC, 2006/105/EC, 2010/26/EC, 2011/88/EC and 2012/46/EC;
- observing the time limits on construction near populated areas;
- construction plateaus and transport routes must be selected so that noise pollution from transporting material, the operation of devices at sites and the construction of facilities do not exceed the limit values in the closest buildings;
- implementation of temporary anti-noise measures to protect populated areas near construction plateaus and transport routes where limit values are exceeded.

### Specific mitigation measures

Sub-objectives	Specific mitigation measures
1a	-
1b	<p>Measure Ro.12: Motorway network around Ljubljana: in measure Ro.12, the reconstruction of a greater number of areas with exceeded ceilings will be necessary. The measure is important for protection, since noise pollution in the environment from the national motorway network in the existing state is highest in the area of the northern Ljubljana bypass and also along the remaining section of the Ljubljana motorway ring. In addition to legislative measures, it is estimated that a shift of transit cargo transport from the Ljubljana northern bypass will be necessary, while in the Ljubljana ring area, the speed limit will have to be adjusted accordingly.</p> <p>Measures A.2 and A.3 (Maribor and Portorož Airport): The reduction of noise from air transport with the exception of providing internationally adopted standards for aircraft emissions and logistics measures of transport management is not feasible. The reduction of emissions and pollution in the environment caused by air transport is regulated by Directive 2002/30/EC on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Community airports.</p> <p>Increased pollution in the environment is expected mainly in the area of Portorož Airport, where an additional mitigation measure is possible of purchasing and changing the intended use of buildings in which the legally prescribed level of noise pollution is exceeded. The variant mitigation measure to reduce the impact of Portorož Airport on the increased level of noise pollution in the environment is the provision of multimodal transport connections to other airports in the wider vicinity (Ljubljana, Trieste, Rijeka, Pula) where the capacity of passenger and cargo transport is provided already in the existing state.</p>
1c	<p>Measure Ro.12: Motorway network around Ljubljana: in measure Ro.12, the reconstruction of a larger number of areas will be necessary. The measure is important for noise protection, since noise pollution in the environment from the national motorway network in the existing state is highest in the area of the northern Ljubljana bypass and also along the remaining part of the</p>

	Ljubljana motorway ring. In addition to legislative measures, it is estimated that a shift of transit cargo transport from the Ljubljana northern bypass will be necessary, while in the Ljubljana ring area, the speed limit will have to be adjusted accordingly.
2.a–2.f	-
2.g	Measure Ro.12: Motorway network around Ljubljana: in measure Ro.12, the reconstruction of a larger number of areas will be necessary. The measure is important for noise protection, since noise pollution in the environment from the national motorway network in the existing state is highest in the area of the northern Ljubljana bypass and also along the remaining part of the Ljubljana motorway ring. In addition to legislative measures, it is estimated that a shift of transit cargo transport from the Ljubljana northern bypass will be necessary, while in the Ljubljana ring area, the speed limit will have to be adjusted accordingly.
2.h	-
3.a	Measure Ro.12: Motorway network around Ljubljana: in measure Ro.12, the reconstruction of a larger number of areas will be necessary. The measure is important for noise protection, since noise pollution in the environment from the national motorway network in the existing state is highest in the area of the northern Ljubljana bypass and also along the remaining part of the Ljubljana motorway ring. In addition to legislative measures, it is estimated that a shift of transit cargo transport from the Ljubljana northern bypass will be necessary, while in the Ljubljana ring area, the speed limit will have to be adjusted accordingly.
3.b–4.g	-

## **10.7 Population and material assets**

### **General guidelines and mitigation measures to attain Environmental objective 10**

Measure A.3 Portorož Airport will increase the capacity of the airport and facilitate arrivals of larger aircraft, which could result in an increase in noise pollution in the wider surroundings (including a transboundary impact). The natural protection area of the Salina Landscape Park is in the vicinity. To avoid a deterioration of the living environment in the wider area of the airport, a guideline to verify the possibility of developing Portorož Airport in subsequent phases from the aspect of providing a multimodal connection with other major airports in the wider region should be added to measure A.3.

The modernisation of the vehicle fleet, primarily the purchase of new vehicles with lower greenhouse gas emissions (for example, electricity or gas), depends on the financial means of individuals. Measures should anticipate financial incentives for purchasing vehicles powered by environmentally-friendly motor fuel (amendments to measures in Group 4).

General measures on the road and railway networks (measures in Group 4) must be supplemented with a measure that provides adequate availability of infrastructure to all users. The measure is expected to encourage more active involvement in terms of infrastructure adjustments in order to make it more accessible to less mobile persons, such as: arranging access from pavements to roads; application of disabled-friendly means of public transport; setting up public charging stations; adjustments to wheelchair use, etc.

Individual sub-objectives may be improved by supplementing them with measures anticipated in the Strategy. It was proposed to additionally study measures to attain sub-objectives 2a, 2b and 2d, i.e.:

- Sub-objective 2a: to attain the sub-objective, measures focused on developing the NE traffic-gravitational areas (for example, measures R.7, R.8, R.9 and R.10).
- Sub-objective 2b: Measure R.3 does not focus on the development of the Posavska region and SE Slovenia.
- Sub-objective 2d: In the group of measures for roads, a measure to facilitate accessibility from the Soča River Valley to the regional centre of Nova Gorica and Central Slovenia is missing (measure Ro.7).

When planning transport policy, priority should be given to the improvement of transport connections to less developed areas (e.g. sub-objective 2b (measure Ro.4) and sub-objective 2c (measure Ro.7)),



since the accessibility of these areas with peri-urban transport cannot be improved. The implementation of the measures will improve accessibility and thus contribute to speedier economic development in less developed areas.

#### Specific mitigation measures

Sub-objectives	Specific mitigation measures
1a	-
1b	Measure A.3 – Portorož Airport: the measure should be planned only for activities which are shown to have no impact on the living environment (noise), or on the development of tourism at the local level and in the Sečovlje Salina Landscape Park.
1c–4g	-

### 10.8 Cultural Heritage

#### **General guidelines and mitigation measures to attain Environmental objective 11**

The development of transport infrastructure may impact units and areas of culture especially in terms of the degradation of landscape features of the surroundings of cultural heritage units, damage to cultural heritage facilities, and the destruction of archaeological remains during the construction of facilities by vibrations which could cause damage to buildings of cultural heritage. To avoid these impacts, the following must be considered:

- infrastructure corridors should not be placed in areas of cultural heritage as a priority.
- from the aspect of preserving archaeological remains, activities in the environment are considered destructive acts (e.g. excavation). Extensive preliminary archaeological research will have to be carried out, their results will have to be taken into account when positioning transport infrastructure, and measures to preserve archaeological remains will have to be implemented.
- when integrating transport infrastructure into the environment, upgrading within the existing transport corridor has priority over new construction.

### Specific mitigation measures

Sub-objectives	Specific mitigation measures
1a	In the spatial integration of measures R.1, R.3, R.8 and Ro.1, locations outside units of cultural heritage must be sought. Especially the integrity and features of cultural landscapes, areas of influence of architectural heritage and archaeological remains must be preserved.
1b	In the spatial integration of measures R.1, R.3, R.6, R.7, R.8 and Ro.1, locations outside units of cultural heritage must be sought. Especially the integrity and features of cultural landscapes, areas of influence of architectural heritage and archaeological remains must be preserved.
1c	In the spatial integration of measures R.1, R.3, R.5, R.8, R.10 and Ro.12, locations outside units of cultural heritage must be sought. Especially the integrity and features of cultural landscapes, areas of influence of architectural heritage and archaeological remains must be preserved.
2.a	In the spatial integration of measures R.5, Ro.1, Ro.13, Ro.14, Ro.16, Ro.19 and Ro.20, locations outside units of cultural heritage must be sought. Especially the integrity and features of cultural landscapes, areas of influence of architectural heritage and archaeological remains must be preserved.
2.b	In the spatial integration of measures R.3, Ro.4, Ro.5 and Ro.14, locations outside units of cultural heritage must be sought. Especially the integrity and features of cultural landscapes, areas of influence of architectural heritage and archaeological remains must be preserved.
2.c	In the spatial integration of measures R.3, R.4, Ro.6, Ro.7, Ro.8, Ro.13, Ro.15, U.1, U.2 and U.4, locations outside units of cultural heritage must be sought. Especially the integrity and features of cultural landscapes, areas of influence of architectural heritage and archaeological remains must be preserved.
2.d	In the spatial integration of measure Ro.21, locations outside units of cultural heritage must be sought. Especially the integrity and features of cultural landscapes, areas of influence of architectural heritage and archaeological remains must be preserved.
2.e	In the spatial integration of measure Ro.9, locations outside units of cultural heritage must be sought. Especially the integrity and features of cultural landscapes, areas of influence of architectural heritage and archaeological remains must be preserved.
2.f	In the spatial integration of measures Ro.17, Ro.18 and Ro.9, locations outside units of cultural heritage must be sought. Especially the integrity and features of cultural landscapes, areas of influence of architectural heritage and archaeological remains must be preserved.
2.g	In the spatial integration of measures RR.1, R.3, R.5, Ro.10, Ro.11, Ro.12, Ro.13, Ro.14 Ro.19, U.1, U.2, Ro.11, Ro.15, and U.4 – railway, locations outside units of cultural heritage must be sought. Especially the integrity and features of cultural landscapes, areas of influence of architectural heritage and archaeological remains must be preserved.
2.h	In the spatial integration of measures Ro.7, Ro.9, Ro.10, Ro.11, Ro.19, Ro.20 and Ro.21, locations outside units of cultural heritage must be sought. Especially the integrity and features of cultural landscapes, areas of influence of architectural heritage and archaeological remains must be preserved.
3.a	In the spatial integration of measures R.1, R.3, R.5, Ro.12, U.1, U.2 and U.4 – railway, locations outside units of cultural heritage must be sought. Especially the integrity and features of cultural landscapes, areas of influence of architectural heritage and archaeological remains must be preserved.
3.b	In the spatial integration of measures R.8, R.10 and Ro.16, locations outside units of cultural heritage must be sought. Especially the integrity and features of cultural landscapes, areas of influence of architectural heritage and archaeological remains must be preserved.
3.c	In the spatial integration of measures R.1 and Ro.17, locations outside units of cultural heritage must be sought. Especially the integrity and features of cultural landscapes, areas of influence of architectural heritage and archaeological remains must be preserved.
4.a–g	-

## 10.9 Landscape

### General guidelines and mitigation measures to attain Environmental objective 12

To ensure the conservation of exceptional landscapes and landscape areas with distinctive features at the national level and a high-quality landscape image, the following guidelines must be pursued:



- infrastructure corridors should not be integrated into exceptional landscape areas or landscapes with distinctive features at the national level;
- proper technical measures must be applied to provide a high-quality landscape image, especially in the case of activities in naturally preserved and culturally rich landscape units.
- when integrating transport infrastructure into the environment, upgrading within the existing transport corridor has priority over new construction.

### Specific mitigation measures

Sub-objectives	Specific mitigation measures
1a	In the spatial integration of measures R.1, R.3, R.8 and Ro.1, locations outside exceptional landscapes and landscape areas with distinctive features at the national level must be sought (R.1: the Marshes, the Planina Plain, the Brkini Hills with the Vreme Valley, Črni Kal; R.3: Bitnje, the Lipnica Valley and Dobrave, Ro.1: Haloze).
1b	In the spatial integration of measures R.3, R.8, R.10, Ro.1 and A.3, locations outside exceptional landscapes and landscape areas with distinctive features at the national level must be sought (R.3: Bitnje, the Lipnica Valley and Dobrave, Ro.1: Haloze).
1c	In the spatial integration of measures R.1, R.3 and Ro.12, locations outside exceptional landscapes and landscape areas with distinctive features at the national level must be sought (R.1: the Marshes, the Planina Plain, the Brkini Hills with the Vreme Valley, Črni Kal; R.3: Bitnje, the Lipnica Valley and Dobrave, Ro.12: the Marshes, the Planina Plain). Proper technical measures must be applied to measures R.1, R.3, R.8, R.10 and Ro.12 to provide a high-quality landscape image, especially in the case of activities in naturally preserved and culturally rich landscape units.
2.a	In the spatial integration of measures Ro.1, Ro.13 and Ro.14, locations outside exceptional landscapes and landscape areas with distinctive features at the national level must be sought (Ro.1: Haloze, Ro.13: Volčji Potok, Ro.14: Brunk). Proper technical measures must be applied to measures Ro.1, Ro.13, Ro.14, Ro.16, Ro.19 and Ro.20 to provide a high-quality landscape image, especially in the case of activities in naturally preserved and culturally rich landscape units.
2.b	In the spatial integration of measure Ro.14, locations outside exceptional landscapes and landscape areas with distinctive features at the national level must be sought (Ro.14: Brunk). Proper technical measures must be applied to measures R.3, Ro.4, Ro.5 and Ro.14 to provide a high-quality landscape image, especially in the case of activities in naturally preserved and culturally rich landscape units.
2.c	In the spatial integration of measures Ro.6, Ro.7 and Ro.13, locations outside exceptional landscapes and landscape areas with distinctive features at the national level must be sought (Ro.14: Brunk). Proper technical measures must be applied to measures R.3, Ro.6, Ro.7, Ro.8, Ro.13, U.2 and U.4 – railway to provide a high-quality landscape image, especially in the case of activities in naturally preserved and culturally rich landscape units.
2.d	Proper technical measures must be applied to measure Ro.21 to provide a high-quality landscape image, especially in the case of activities in naturally preserved and culturally rich landscape units.
2.e	Proper technical measures must be applied to measure Ro.9 to provide a high-quality landscape image, especially in the case of activities in naturally preserved and culturally rich landscape units.
2.f	In the spatial integration of measure Ro.18, locations outside the exceptional landscape f Prem–Suhorje must be sought. Proper technical measures must be applied to measures Ro.17 and Ro.18 to provide a high-quality landscape image, especially in the case of activities in naturally preserved and culturally rich landscape units.
2.g	In the spatial integration of measures R.1, Ro.11, Ro.12, Ro.13, Ro.19, U.2 and U.4 – railway, locations outside exceptional landscapes and landscape areas with distinctive features must be sought, especially the Marshes (R.1, Ro.11, Ro.12), the Planina Plain (R.1, Ro.12), the Brkini Hills with the Vreme Valley (R.1), Črni Kal (R.1), Bitnje (R.3), the Lipnica Valley (R.3), Dobrave (R.3), Brunk (Ro.14), the Šmarna gora Hill (Ro.13, Ro.15, U.2 and U.4), Volčji Potok (Ro.13, U.1) and Smlednik (Ro.15, U.1, U.2, and U.4). Proper technical measures must be applied to measures R.1, R.3, Ro.10, Ro.11, Ro.12, Ro.13, Ro.14, Ro.19, U.2 and U.4 – railway to provide a high-quality landscape image, especially in the case of activities in naturally preserved and culturally rich landscape units.
2.h	In the spatial integration of measures, locations outside exceptional landscapes and landscape areas with distinctive features must be sought, especially Labinje and Drežnica (Ro.7). Proper technical measures must be applied to measures Ro.7, Ro.9, Ro.10, Ro.11, Ro.19, Ro.20 and Ro.21 to provide a high-quality landscape image, especially in the case of activities in naturally

	preserved and culturally rich landscape units.
3.a	In the spatial integration of measures R.1, R.3, Ro.12, U.1, U.2 and U.4, locations outside exceptional landscapes and landscape areas with distinctive features must be sought, especially Labinje and Drežnica (Ro.7). Proper technical measures must be applied to measures R.1, R.3, Ro.12, U.2 and U.4 – railway to provide a high-quality landscape image, especially in the case of activities in naturally preserved and culturally rich landscape units.
3.b	In the spatial integration of measures R.8, R.10 and Ro.16, locations outside exceptional landscapes (the Kalvarija Hill–the Piramida Hill) and landscape areas with distinctive features (the Jeruzalemske gorice Hills) must be sought. Proper technical measures must be applied to measures R.8, R.10 and Ro.16 to provide a high-quality landscape image, especially in the case of activities in naturally preserved and culturally rich landscape units.
3.c	In the spatial integration of measure R.1, locations outside exceptional landscapes and landscape areas with distinctive features: the Marshes, the Planina Plain, the Brkini Hills with the Vreme Valley, Črni Kal must be sought. Proper technical measures must be applied to measure R.1 and Ro.17 to provide a high-quality landscape image, especially in the case of activities in naturally preserved and culturally rich landscape units.
4.a -g	-

## 11 MONITORING

Indicators for monitoring the environmental impact of the Strategy were proposed on the basis of the results of the environmental assessment. Indicators that are measurable and whose monitoring has already been established in Slovenia were given priority, i.e. indicators whose results are systematically collected, processed and reported at the national level. When selecting indicators, indicators were used which are already being used to measure the state of the environment in Slovenia as part of the EIONET-SI network, which was emphasised due to Slovenia's obligation to report to the European Environment Agency. If an indicator is already being monitored, its official sequence number is recorded next to it.

Indicators were also sought among data collected by individual organisations/institutions (the Hunters Association of Slovenia, the Ministry of the Interior, the Ministry of Culture). These indicators do not have sequence numbers.

Monitoring the state of certain environmental objectives is not necessary, as the environmental objective will be attained by observing guidelines and mitigation measures.

Indicators are monitored by the entity preparing the Strategy, i.e. the Ministry of Infrastructure. The timeline is provided with each indicator.

Table 23 shows the connection between the selected environmental objectives and indicators proposed to monitor the state.

**Table 23 Relationship between the environmental objectives and proposed environmental indicators**

Environmental objective	Proposed environmental indicators
Environmental objective 1: Ensure sustainable management of land and protection of soil	<b>Land cover and land use [TP01]</b>
Environmental objective 3: Ensure the attainment of long-term objectives for annual quantities of pollutant emissions determined for the transport sector in the Operational programme for complying with national emission ceilings for atmospheric pollutants	- <b>Emissions of gases that cause acidification [ZR09]</b> - <b>Emissions of particulates in the air [ZR15]</b> - <b>Emissions of ozone precursors [ZR10]</b>
Environmental objective 4: Adapt transport infrastructure to climate change and reduce annual quantities of greenhouse gas emissions below the target values determined for the transport sector in the Operational programme of measures to reduce greenhouse gas emissions by 2020	<b>Greenhouse gas emissions [PS03]</b>
Environmental objective 5: Limit the effects of the pressure of transport infrastructure on surface water, groundwater, brackish water, coastal waters and sources of drinking water	<b>Potential risk to waters in the event of accidents during transport of hazardous substances</b>
Environmental objective 6: Ensure the cohesion of populations and conservation of biodiversity	<b>Collisions with wild animals</b>
Environmental objective 7: Protect areas with nature protection status against activities with considerable impacts	<b>Habitat fragmentation [SEBI013]</b>
Environmental objective 9: Reduce the pollution of the environment by noise from transport and approximate to the levels recommended by the World Health Organisation	<b>Exposure to noise from transport [PR18]</b>
Environmental objective 10: Improve social cohesion, traffic safety and sustainable mobility	- <b>Investment in transport infrastructure [PR03]</b> - <b>Volume and structure of passenger transport and traffic [PR01]</b> - <b>Number of accidents, fatalities and persons injured in road and rail transport [PR10]</b>

Legend:

Official indicators – black letters

Proposed new indicators – blue letters

## **11.1 Soil and mineral resources**

### Land cover and land use [TP01]

The indicator shows the features and development of land cover and land use in Slovenia in 1996, 2000 and 2006 captured according to the CORINE Land Cover methodology. The indicator is prepared every four to six years. Databases are available at the Surveying and Mapping Authority of the Republic of Slovenia. The description of the indicator for 2008 is available, while data for 2012 are being prepared. The Ministry of Infrastructure verifies the data on the state of the indicator every five years.

## **11.2 Air**

Emissions of gases that cause acidification [ZR09]; Emissions of particulates in the air [ZR15]; Emissions of ozone precursors [ZR10]

The database on the state monitoring of ambient air quality is used to monitor the state, which is ensured by the ARSO. Data are collected in accordance with annual monitoring programmes of

ambient air quality (control and operational monitoring), while the assessment of excessive ambient air pollution is carried out after each calendar year. The Ministry of Infrastructure verifies the data on the state of the indicator with the ARSO. The data on the state of the indicator are verified every three years and linked to the implemented measures of the Strategy.

### **11.3 Climate factors**

#### Greenhouse gas emissions [PS03]

The source database or the source for designing the indicators was the record of greenhouse gas emissions, GHG archives, Slovenian Environment Agency. The administrator of the data is the Slovenian Environment Agency. Data on greenhouse gas emissions are presented for the 1986–2011 period and updated annually. The latest data refer to the last two-year period and became available in April of the current year. The Ministry of Infrastructure verifies the data on the state of the indicator with the ARSO every three years.

### **11.4 Water**

#### Potential risk to waters in the event of accidents during transport of hazardous substances

The analysis of potential water risk was prepared within the WMP 2009–2015. The indicator is updated with amendments to the Water Management Plan. The Ministry of Infrastructure verifies the data on the state of the indicator with the ministry responsible for the environment.

### **11.5 Nature**

#### Collisions with wild animals

The record of roadkill of wild animals is kept by the Slovenia Forest Service. The Ministry of Infrastructure verifies the data on the state of the indicator with the Slovenia Forest Service every three years.

#### Habitat fragmentation [SEBI013]

The state of the indicator is monitored by the European Environment Agency. The indicator is based on modifications to the CLC (Corine land cover).

The data on the state of the indicator are verified by the Ministry of Infrastructure every five years.

### **11.6 Human health**

#### Exposure to noise from transport [PR18]

The indicator shows noise exposure along important roads and railway lines, and separately, noise exposure in areas of settlements (Ljubljana and Maribor) from road and rail transport, and important industrial facilities and devices. The entities responsible for preparing data on noise pollution in the environment are managers of individual noise sources (motorway network – DARS d. d., national road network – DRSC and national railway network – Ministry of Infrastructure) and the two settlement areas (Municipality of Ljubljana and Municipality of Maribor). The data on the state of the indicator are verified by the Ministry of Infrastructure every five years.

### **11.7 Population and material assets**

#### Investments in transport infrastructure [PR03] (EEA keeps this indicator as TERM 019)

The data on the amounts invested in the motorway network since 1994 have been published by the Motorway Company of the Republic of Slovenia in its annual reports. The data on the amounts invested in state roads, and rail, maritime and air infrastructure are published annually in the annual financial statement of the national budget by the Ministry of Finance. The Contracting Authority verifies the data on the state of the indicator every three years. Based on the data, it is established

whether any changes in the amount of investments in various types of transport infrastructure have occurred.

Volume and structure of passenger transport and traffic [PR01]

The data on the scope and structure of passenger transport in Slovenia is collected by the SORS and published in the regular annual serial publication 'Statistical Yearbook of the Republic of Slovenia' and on the data portal SI-STAT. The Contracting Authority verifies the data on the state of the indicator every three years. Based on the data, it is established whether any changes in the scope and structure of passenger transport have occurred.

Number of accidents, fatalities and persons injured in road and rail transport [PR10]

The data on road accidents are reported to the Statistical Office by the Ministry of the Interior. The data are updated annually. The Contracting Authority verifies the data on the state of the indicator every three years. Based on the data, it is established whether any changes in the number of fatalities, victims or persons injured in road and rail transport have occurred.

## 12 HIGHLIGHTS OF THE ENVIRONMENTAL REPORT PREPARATION PROCESS

During the preparation of the Transport Development Strategy in the Republic of Slovenia, the title of this strategic document has changed, which must be taken into account in document traceability. In the preparation of bases, the Strategy was entitled 'Transport Infrastructure Development Programme of the Republic of Slovenia', while upon the submission of the Environmental report in July 24, it was entitled 'Resolution on the National Programme for Transport Development in the Republic of Slovenia by 2020 with a vision by 2030'.

The purpose of the strategic environmental assessment is to provide a high level of environmental protection and contribute to the inclusion of environmental aspects in the drafting of the Strategy. Therefore, the authors of the Environmental Report were included in the process of drafting the Strategy already in the initial phase of document preparation.

The measures defined in the Strategy are strategic and are not spatially integrated or prepared at the project level. Therefore, the strategic environmental assessment for individual infrastructure measures will have to be prepared in the next phases of drafting of project documentation.

The comprehensive assessment of the acceptability of individual measures which could have significant impacts on nature protected areas must be carried out at the level of a detailed plan or activity in accordance with Article 25a of the Rules on the assessment of the acceptability of impacts caused by the execution of plans and activities affecting nature in protected areas.

The selection of environmental fields to be assessed in the Environmental Report was carried out in the scoping phase and shown in the report entitled 'Starting points for drafting the Environmental Report for the programme of transport infrastructure development in the Republic of Slovenia', June 2014. During the preparation of the Environmental Report, minor deviations in the proposed environmental objectives and criteria for evaluating the aforementioned in the report occurred due to subsequent changes in the structure of the Strategy. It must be mentioned that the Environmental Report no longer includes the environmental objective 'Ensure the attainment of the objective of Slovenian energy policy regarding renewable energy sources in transport: the share of renewable energy sources must not be lower than 10 per cent by 2020', since it was established that the supply of liquid biofuels for road transport is regulated by legislation transfer and the implementation of requirements of Directive 2009/28/EC which determines two environmental objectives in the field of renewable energy sources, i.e. a mandatory 20 per cent share of renewable energy sources in total gross final energy consumption in the European Community and a mandatory 10 per cent share of renewable energy sources in transport, which must be attained by all Member States by 2020. The share of renewable energy sources in total gross final energy consumption is defined for each Member State in accordance with the criteria for the suitable distribution and consideration of various starting points and potentials of Member States, while an objective of at least 10 per cent for renewable energy sources in transport is determined at the same level for all Member States. Slovenia does not produce its own liquid fuels; all liquid fuels for road transport are imported for use directly in road transport; therefore, it is understandable that the measures of the Strategy do not refer to the provision of conditions to attain the environmental objective of a 10 per cent share of renewable sources by 2020.

The treatment of human health comprises the assessment of two aspects which may be significantly affected by transport (noise exposure, air quality); therefore, these are assessed as important in the formation of the Transport Development Strategy. It was established in the scoping phase that other factors will not impact human health during the preparation of the Strategy. Taking into account the criteria of the Ministry of Health (March 2013) regarding the content referring to traffic safety, it was established that traffic safety does not directly affect human health. Therefore, this factor was taken into account in the field of population and material assets.

## 13 CONCLUSION OF THE STRATEGIC ENVIRONMENTAL ASSESSMENT

By adopting the Transport Development Strategy in the Republic of Slovenia, transport infrastructure and policy will be planned and arranged in a comprehensive manner. Transport infrastructure will be reconstructed and constructed on the basis of an analysis of needs and options. Due to the aforementioned, transport infrastructure will be planned, which also means less need to construct new road sections. The Strategy anticipates enhancing the capacity of the railway network, due to which cargo transport will be transferred to the railways. Great emphasis was also put on sustainable mobility, especially the comprehensive arrangement of public passenger transport.

The results of the objective compliance assessment of the Strategy in terms of the environmental objectives show that all objectives of the Strategy in principle are compliant with the environmental objectives. The results of the assessment of the internal compliance of the sub-objectives of the Strategy show that none of the sub-objectives of the Strategy was assessed as non-compliant with each other. The results of the assessment of the internal compliance of the environmental objectives show that none of the environmental objectives was assessed as non-compliant with each other.

In accordance with the Decree laying down the content of an environmental report and on the detailed procedure for the assessment of the effects of certain plans and programmes on the environment, the Environmental Report defines, describes and evaluates the impacts of the implementation of the Transport Development Strategy in the Republic of Slovenia on the environment (soil and mineral resources, air, waters, climate factors, nature conservation, cultural heritage, landscape, human health, and population and material assets). The authors of the Environmental Report have established that the Transport Development Strategy in the Republic of Slovenia is acceptable if guidelines and mitigating measures are implemented.

The most important general guidelines for planning the transport policy from the environmental protection aspect are:

- Measures defined in the Strategy are strategic and are not spatially integrated or prepared at the project level. Therefore, the strategic environmental assessment for individual infrastructure measures will have to be prepared in the next phases of the drafting of project documentation.
- The comprehensive assessment of the acceptability of individual measures which could have significant impacts on nature protected areas must be carried out at the level of a detailed plan or activity in accordance with Article 25a of the Rules on the assessment of the acceptability of impacts caused by the execution of plans and activities affecting nature in protected areas.
- When selecting measures, the development of public and rail transport should be favoured over road and air transport, and reconstruction over the construction of new traffic routes to provide sustainable development.
- The need to integrate new rail and road connections should be examined in special studies (from the aspects of landscape, environment, project solutions and economic viability). Credible transport data and the cooperation of experienced experts from individual areas must be provided for the preparation of these studies.
- New infrastructure connections should be planned outside water protection areas, the best agricultural land, protective forests, protected cultural heritage areas, exceptional landscapes and landscape areas with distinctive features at the national level, flood areas and areas with nature protection status; otherwise technical solutions that to ensure that the impact is acceptable from all aspects must be ensured.

Following a positive opinion from the competent ministry, which also includes the opinions of ministries and organisations competent for individual aspects of the protection of the environment, human health, cultural heritage and landscape or for the protection and use of natural assets in the light of the contents of the programme, a public exhibition of the Environmental Report and the Strategy



will be organised. During the public exhibition, a public presentation and a transboundary impact assessment will also be made. Remarks and opinions from the public will be collected during the public exhibition, which are either taken into account in amending the Strategy and the Environmental Report or rejected on a reasoned basis. The strategic environmental assessment will be concluded with a decision on the suitability of the Environmental Report and acceptability of the Strategy.

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