Non-technical summary

Introduction

Following negotiations with the European Commission, conducted at the stage of preparing the *2014-2020 Operational Programme for Eastern Poland*, it was agreed that it would be necessary to develop a transportation plan for the Eastern Poland macroregion, as part of the Programme.

As a result of the diagnostic, analytic and urban planning works conducted by the Ministry of Economic Development, in cooperation with local authorities of Eastern Poland voivodeships, a draft has been prepared of the *Transportation Plan for the 2014-2020 Operational Programme for Eastern Poland* (hereinafter: Plan).

The document sets the framework for the execution of undertakings with possible environmental impact[1]. For this purpose, before adopting the Plan, in accordance with the binding law, it is necessary to conduct a strategic environmental assessment (hereinafter: SEA).

The essence of the environmental assessment process is to identify all possible; hypothetical and probable; positive and negative; lasting and temporary, synergistic and cumulative environmental effects.

The result of the strategic environmental assessment is a summary report referred to as the Environmental Report, with one of its elements being a summary compiled in non-technical language.

Contents, main objectives of the Plan and its relation to other documents

The draft of the Plan subject to assessment is a document whose implementation will contribute to the implementation of the goal determined at higher levels of state administration, involving the creation
of a cohesive, sustainable and user-friendly transportation system.

The focus of the document is on undertakings in the area of expanding the road infrastructure network. Due to the necessity of distributing funds provided as part of external subsidies, during the development of the Plan a diagnosis was conducted of the existing state and needs analysis regarding the transportation network of urban functional areas (hereinafter: UFA) of voivodeship cities from the Eastern Poland macroregion - UFA Lublin, UFA Białystok, UFA Rzeszów, UFA Kielce, UFA Olsztyn. In the end, as a supplement to undertakings planned as part of other adopted plans and programs, a list of road projects has been indicated in the document, whose execution is justified by the identified needs of the Eastern Poland macroregion, its voivodeships and the areas of five UFAs, and which ranked highest on the list created based on project selection criteria adopted for the needs of the Plan.

[1] The term ‘environment’ should be understood as the totality of natural elements, including also those transformed as a result of human activity, especially the earth surface, minerals, waters, air, landscape, climate and other biodiversity elements, as well as the mutual impacts between those elements.

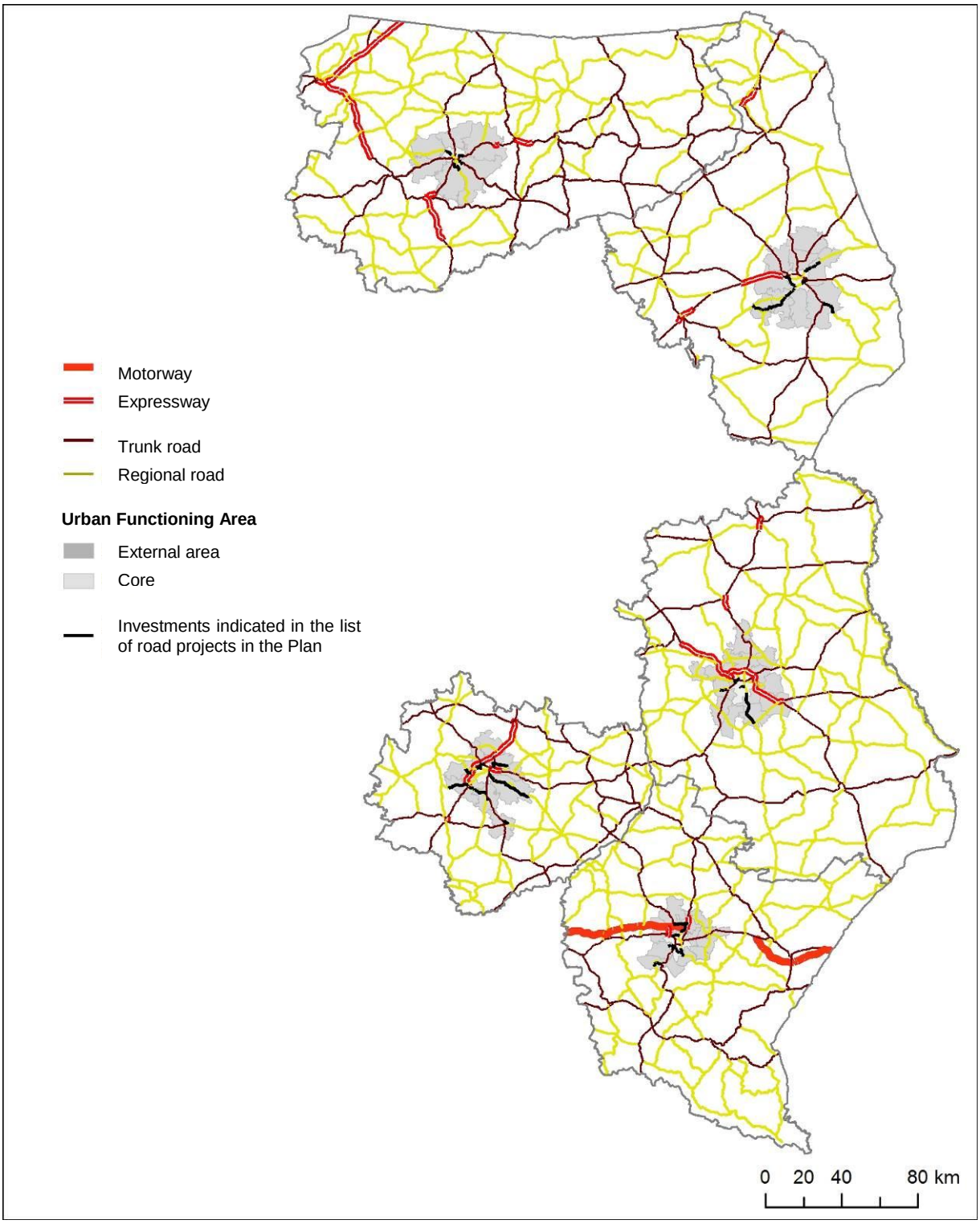

Fig. Spatial distribution of existing and planned road infrastructure as part of the Transportation Plan

Source: Compilation of Environmental Report authors based on the Plan

The designed intervention is one of the forms of executing the objective of strengthening the development and competitive position of the Eastern Poland macroregion by increasing the accessibility of voivodeship cities and their functional areas. The undertakings indicated in the Plan, related to the expansion or reconstruction of existing national or voivodeship roads, as well as to building new roads in the case of some projects - a total of 41 road projects - have been assessed using criteria with regard to:

- relieving the burden on the existing transportation network, as a result of renovating high-density traffic sections (on access roads to voivodeship cities) and creating beltway solutions within city borders and concentric ones outside central districts;
- eliminating road network bottlenecks (places of congestion);
- a positive impact on the transportation management of large traffic generators (including centers of labor concentration) located in UFAs of regional centers, such as: production plants, universities, hubs integrating with other transportation branches, retail and wholesale centers, fair sites, tourist attractions;
- the impact on improving daily commute to work in voivodeship cities;
- suitable significance in the communication system of a voivodeship city with main national metropolises, other voivodeship cities, sub-regional centers and with district and commune centers;
- complementarity regarding other thematically linked operational programs and previous program perspectives;
- the degree of advancement (preparing an investment for implementation).

The objectives that will be executed as a result of the Plan's implementation are coherent with the development directions specified in strategic documents - both EU and national, and are cohesive and/or supplementary (complementary) with regard to document provisions adopted at the regional and local level. These documents point to the necessity of eliminating differences and making up for infrastructural ‘gaps’ regarding roads, especially those sections which ensure the integrity and comprehensibility of the TEN-T[2] transportation network, significant on a European scale.

Methods used in the preparation of the Environmental Report, together with an indication of difficulties met

The Environmental Report was drawn up in accordance with binding legal provisions and arrangements with environmental protection authorities competent in the field of impact on the environment and human health, i.e. with the General Director for Environmental Protection and the Chief Sanitary Inspector.

The main objective of the Environmental Report involved an environmental impact assessment of the execution of the Transportation Plan for the 2014-2020 Operational Programme for Eastern Poland.

As part of this objective, the following was performed:

- an assessment of the degree and way of including environmental aspects in the Plan's draft, together with an analysis of the possibilities of applying pro-environmental alternative solutions and their types;
- identification of problematic areas; risks, places and areas of natural-spatial and social conflicts, together with a proposal of possible solutions which would prevent, limit or compensate for the identified negative environmental impact.

Analyses conducted as part of the SEA encompassed three fundamental stages:

The first stage involved the identification of:

- documents related to the Plan and the degree of correlation between document provisions;
- impact sources which may appear as a result of the Plan's execution as well as impact types;
- places of specific impact concentration (significant impact areas);
- the environmental condition in a place of anticipated concentration of impacts and foreseeable trends of changing that condition, together with the diagnosis of existing environmental protection problems;
- the main environmental protection objectives resulting from provisions of national and EU strategic documents.

[2] Trans-European Transport Network.

The second stage - the forecast - pertained to the analysis of cause and effect relations between sources of impact, receptors (environment components) and anticipated environmental impacts. The analyses included also an assessment of the nature (positive/negative, direct/indirect/secondary, short-term/long-term, permanent/temporary, cumulative) of those impacts and their significance (significant/insignificant).

The third stage involved an assessment which summed up the previously conducted diagnostic and analytical works, presenting conclusions regarding anticipated environmental effects of the Plan's implementation as well as the proposed methods of preventing or limiting the risk of identified probable negative impacts. The application part included also the formulation of conclusions regarding possible to apply and recommended methods of environmental analyses and social effects of executing the provisions of the draft document.

Current environmental condition and problems with its protection, significant from the point of view of the Plan's execution

The areas affected by significant environmental impact included road sections for construction, expansion or reconstruction (together with their direct surroundings), indicated on the list of road projects in the Plan.

Thus, these are areas within the borders of analyzed UFAs, constituting sites already characterized by:

- high level of urbanization, generally leading to:
  - increased emission of pollutants[3] related to human presence and the fulfillment of their needs, including with regard to increasing mobility and access to various types of resources.
- distortion of spatial order, typical for urban areas, resulting in:
  - high level of natural landscape degradation;
  - impoverished natural wealth and limited potential of its improvement;
  - increased flood risk as a result of increasing the area of paved areas and decreasing the possibility of rain and snowmelt water retention;
- high level of air pollution concentration (nitric oxides, carbon dioxide and heavy metals, including lead, as well as dusts), caused by road transport, among other major sources;
- progressing degradation of soil and flora in the strips surrounding the roads, caused by the concentration of the above-mentioned dust and gaseous pollutants;
- a microclimate standing out among the areas surrounding the highly urbanized areas, with the accompanying phenomenon of ‘urban heat island’;
- high levels of noise emission, and in many cases exceeding the permissible noise levels in acoustically protected areas mainly due to road transport.

The above-mentioned elements describing the environmental condition are accompanied by phenomena of a larger impact scale, such as: climate changes, loss of biodiversity, anthropogenic transformations of the land resulting in the progressing degradation of the quality of soils and natural landscape.

Possible impacts and environmental effects resulting from the implementation of the Plan

The impact sources identified in the Environmental Report involve especially investment (infrastructure) undertakings indicated in the Plan and, indirectly, socio-economic side-effects of developing and improving the quality of the transportation system (including urbanization, intensification of extraction activities, etc.). Both at the stage of execution as well as subsequent operation, they constitute a source of a number of pressures, of which the majority is generated in a continuous way and may lead to environmental effects which are irreversible or hard to reverse.

Receptors (‘collectors’) of impacts generated by transport infrastructure involve:

[3] Pollutants should be understood as emissions which may pose a threat to human health or the environment, may cause damage to material goods, deteriorate aesthetic values of the environment or collide with other, justified ways of using the environment.

- the abiotic environment: air, water and groundwater environment and
- the biosphere, including: flora, fauna and people.

Stressors (substance and energy emissions, mechanical impacts (collisions with vehicles) and other interferences in the state of environmental components, including changes of morphology and ways of spatial development) impact the condition (resources, quality, access) of abiotic components of the environment (natural and cultural) in which humans function (climate, acoustic climate, natural resources, earth surface, landscape, material and cultural goods), the health condition, comfort of life of biotic elements (man, fauna, flora) as well as the sustainable, non-distorted functioning of entire ecosystems (aqueous, water-dependent and forest ecosystems, protected area systems).

There are direct or indirect cause and effect relations between pressure factors, biotic and abiotic environment elements, sources of pressure and identified, anticipated environmental effects, which create a specific chain of interrelations and interactions.

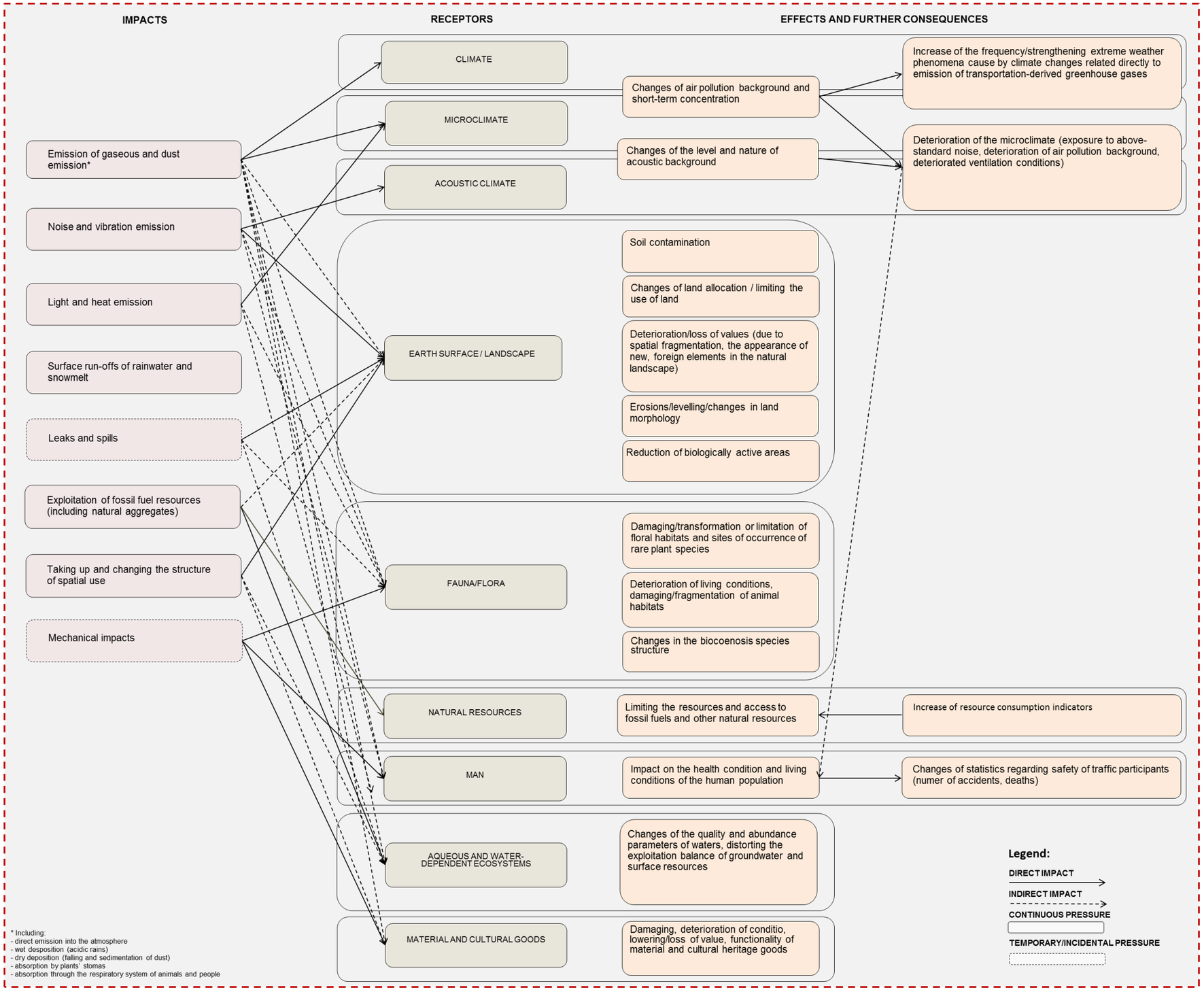

Fig. Chain of identified mutual relations between pressure factors, receptors and environmental effects

Source: Compilation of Environmental Report authors based on the Plan

Negative impact

The execution of road projects indicated in the Plan may locally (mainly in the places of newly constructed road sections) lead to:

- permanent transformation of the earth surface and, in the longer run, changes in the structure of land use;
- temporary, and in some cases also permanent, change of hydrographic conditions, resulting in the change of habitat conditions;
- the risk of water quality deterioration;
- the deterioration of the acoustic climate and air quality;
- the degradation of the surrounding landscape values;
- the deterioration of existing or yet undiscovered of cultural heritage traces.

Both the construction phase as well as the stage of exploitation of linear infrastructure will be accompanied by the fragmentation of ecosystems and the related risk of disturbing natural connections and creating obstacles impossible to cross by biotic organisms migrating through wildlife corridors, especially those of special, European significance.

Based on the analysis of information available at the stage of compiling the Environmental Report, no risk of the occurrence of significant negative impacts was identified, especially such which would distort the objective or Natura 2000 sites under protection, the cohesion or integrity of the network and which would thus exclude the possibility of adopting the Plan.

Impacts on expanded or reconstructed road sections will have the same characteristics, but on a smaller (than in the case of activities related to the construction of new road sections) scale because most of the above-mentioned interferences are already occurring, and their effects are already observed in the surroundings.

Positive impacts

Besides the pressures identified on a local scale, the Environmental Report often stresses the anticipated positive, in terms of environmental issues, aspects of implementing the Plan, such as:

- routing traffic to low population density areas and its limitation in places of special human concentration;
- decreasing the traffic burdens and intensity on existing road sections;
- traffic facilitation (reducing the number of ‘bottlenecks’);
- planning the implementation of technical and organizational solutions which increase traffic safety;
- planning the implementation of solutions which mitigate and/or compensate for anticipated negative impacts generated through planned investments;

and, as a consequence, the anticipated limitation of the acoustic burden, decreasing the load of pollutants infiltrating the ground with road run-offs, improvement of aerosanitary conditions of developed lands, previously at risk of experiencing negative effects caused by traffic from vehicles moving on existing roads.

In the longer perspective, the execution of the Plan will contribute to the sustainability of the transport structure in the Eastern Poland macroregion, at the same time limiting the increase of unfavorable impacts of that economy sector. The anticipated increase of pressures on non-urban areas will be accompanied by a local improvement of the urban situation related with the reduction of nuisances typical for that sector (noise, air pollution, ozone precursors). Together with the gradual execution of investment projects anticipated in the Plan as well as undertakings included in other urban planning documents, the concentration of transport infrastructure investments within specific UFAs will lead to a general improvement of residents' living conditions.

Cumulative impacts

Cumulative impacts are mentioned in the case of joint occurrence, in a specified time, of similar factors / activities coming from different, often located in close proximity or overlapping sources which cause

the same or similar cumulative environmental effects. The overlapping of similar impacts may lead to a situation in which a specific area is at risk of an inappropriate bigger negative impact as a result of the accumulation of pressure sources with negligible unit impact characteristics.

The problem of cumulative effects in the context of the Plan's execution is especially important because of the planned interference areas which, to a large degree, focus on UFA areas already subjected to strong anthropopressure.

Impacts with the biggest probability of accumulation should include:

- emissions of gaseous pollutants and dust into the air, resulting in the deterioration of the local contamination background and, in consequence, in the deterioration of human, animal and plant life conditions;
- the dry and wet deposition of contaminants emitted into the atmosphere and surface run-offs of contaminants, resulting in the accumulation of contaminants in the soil and in the increase of groundwater contamination;
- noise emissions, resulting in the deterioration of human life conditions in urban areas or in the scaring away and, consequently, deteriorating the life conditions of local fauna in its preying areas or wildlife corridors.

On the other hand, the expansion/reconstruction and the accompanying road modernization, allowing for better organization of road traffic and the introduction of transit traffic out of cities, will improve the traffic flow and reduce the above-mentioned emissions and the pressures caused by them, which, in turn, may limit the probability of cumulative pollution.

The cumulative effect may also be expected as a result of the anticipated increase of surface runoff from hardened newly built surfaces or expanded roads. This may cause sudden limitation of infiltration leading to the change of local soil moisture conditions in the vicinity of the designed roads which, with an occurring accumulation, may lead to effects on a pan-local scale. In the case of improper management of rainwater and snowmelt, as well as the failure to provide suitable conditions for substances entering waters or the ground, accumulation may occur of contaminants in direct water receiving bodies or local flooding near water courses which will serve as receiving bodies, especially if waters from several executed sections will be run off into one body.

Moreover, the anticipated intensification of urbanization processes in the vicinity of expanded road infrastructure sections, in itself constituting a source of a number of impacts pointing to a cumulative tendency, may additionally lead to deepening and increasing the range of the ‘urban heat island’ effect.

Regardless of the above, an analysis of all the conditions related to implementing the Plan (both negative as well as positive) indicates that it is unlikely that cumulative impacts will be significantly increased from the point of view of environmental protection.

Transboundary impacts

From the point of view of assessing the risk of the occurrence of transboundary impacts, the place of an undertaking's execution is of special importance. Investments listed among the Plan's road projects will be executed within UFA areas of voivodeship cities in Eastern Poland, whose distance to Polish borders allows for determining the risk of shifting of pollutant emission and of leading to environmental effects in neighboring cities as negligible.

It should be indicated that only part of the undertakings indicated in the Plan will lead to new impact sources appearing in the place of their planned location. Investments involving the expansion or reconstruction of the existing infrastructure, apart from temporary burdens related to the conducted construction works, will impact during the operation stage only the possible increase (as a result of increasing the capacity and, as a consequence, the traffic volume from transport units) of impacts already occurring in the place of their execution. Moreover, as a result of implementing part of the undertakings, one should expect a counter-tendency, i.e. a decrease of the level of existing pressures.

As a result of executing the Plan, the risk of migration of animals using wildlife corridors, some of them with international rank, may create a certain risk of evoking environmental effects with a scope exceeding the area of a planned intervention and hypothetically leading to consequences for areas outside the country borders. The scope of this phenomenon will be determined by the final manner of implementing undertakings indicated in the Plan, which cut through wildlife corridors, as well

as by their target traffic volume. Thus, the assessment of the risk of negative effects occurring in areas of neighboring cities is of a purely hypothetical nature at the current planning stage.

Analyses in this respect should be deepened at further stages of implementing the Plan, during the proceedings regarding the environmental impact assessment of specific planned undertakings.

Ways and conditions of the Plan's execution

Possibility of applying alternative solutions to the ones indicated in the Plan

The list and scope of works determined during works on the Plan reflects the objectives specified in national and EU documents. These stress the significance of activities directed at eliminating differences in the road infrastructure of the Eastern Poland macroregion against the remaining part of the country, which at the same time ensure the cohesion of the TEN-T international transport network.

The investments indicated in the Plan have been reflected in spatial development plans of Eastern Poland voivodeships. Moreover, they are coherent with the directions of the transportation network development policy, specified in voivodeship development strategies as well as in regional programs and development plans of the transport sector. At the same time, they fulfill the criterion of complementarity regarding other infrastructure undertakings indicated in simultaneously executed plans and programs.

Taking into account the above, it was decided that presenting optional objectives or directions of the Plan was groundless.

The undertakings have been selected based on an analysis of a number of assessment criteria selected for the purpose of the Plan, whose role was also to guarantee the fulfillment of objectives adopted in the Operational Programme for Eastern Poland, superior to the Plan.

What is more, the indirect consequences of executing the directions regarding:

- construction of road sections which take transit traffic out of UFA core areas;
- reconstruction of existing road sections together with modernization;
- designing technical solutions creating incentives for the development of collective (bus-passes), bicycle (bicycle trails) or pedestrian (convenient and suitably located crosswalks) transport systems;

are a desirable direction of action in the context of limiting the negative impact on the environment. Their role is to relieve transport pressures on the environment in urbanized areas and to increase human safety. Thus, it is not necessary to formulate alternative solutions.

Possible alternative solutions could be proposed for identified sections of collision between the planned road construction and existing forms of natural protection or wildlife corridors.

However, taking into account the required level of detail of assessments conducted for the purpose of conducting such variant analysis, indicating possible alternatives in this respect is suitable and should be conducted at the stage of environmental impact assessment of specific undertakings.

Recommended solutions aimed at prevention, limitation or environmental compensation of negative impacts on the environment

Activities aimed at preventing, limiting or compensating for negative environmental impacts should be undertaken while preserving a suitable hierarchy. First, solutions allowing for avoiding pressure should be planned and implemented. Subsequent steps involve measures aimed at minimizing the scale and reducing effects of such impacts, and - if such measures are found to be impossible to apply or lacking the possibility of achieving the desired results - planning in advance and implementing compensatory measures.

The analysis of information available at the stage of preparing the Environmental Report does not point to the necessity of planning compensatory measures; however, this does not exclude stating the necessity of applying such measures at the stage of performing environmental impact assessment of individual undertakings.

With regard to measures aimed at limiting negative impacts, analyses of specific road projects listed in the Plan indicate that, as part of their implementation, also a number of technical solutions have

been anticipated which increase safety (construction of collision-free cross-roads, correction of non-standard horizontal and vertical arcs, construction of roundabouts, left-turn lanes, creating additional lanes allowing for gradual merging into traffic, construction of parking lots and bays, assembly of safety barriers, replacement of road surface, providing lighting installations, road light markings, assembly of windscreens on bridges and overpasses, construction of footbridges, sidewalks and separate bicycle lanes, fitting pedestrian crossings with lighting installation, building bus stop bays, etc.) and directly contribute to protecting or limiting the impact on environmental deterioration. This includes especially air quality (using low abrasiveness surfaces, planting), acoustic climate (acoustic screens, low-noise surfaces) and fauna and flora (construction of crossings, fencing and passes for animals).

Most of the road projects planned for implementation qualify as undertakings which may potentially or always significantly impact the environment, therefore at the stage of performing individual environmental impact assessment of each of them it will be necessary to identify in advance the methods necessary for limiting impacts, adequate to the diagnosed impacts and local environment sensitivity.

It was indicated in the Environmental Report that, in order to limit to a minimum the risk of the occurrence of negative impacts or their scale, subsequent stages of works on preparing infrastructural investments should focus especially on:

- Consciously choosing, as part of a multi-variant analysis, the variant with the lowest environmental collision (bearing in mind the possibilities of changing the routing of most planned linear investments; in cases of colliding with a large number of precious nature areas effort must be made for the planned investments to interfere and 'fragment' precious nature areas in the least possible way);
- In case of a lack of alternatives (e.g. if the investments are executed on existing sites), making an effort to limit to the minimum the anticipated negative environmental impact;
- Taking into account in the detailed schedule of works, deadlines and costs:
  - necessary environmental inventories (taking into account the seasonal nature of such works);
  - the necessity to apply environmental compensations consisting of the creation of a 'new' ecosystem which will take over the functions of the area affected by a significantly negative impact in the Natura 2000 network, with consideration of costs of its maintenance and monitoring of its condition;
  - creating and properly managing devices for mitigating the 'barrier effect' or fragmentation;
  - possible measures related to pro-realization condition monitoring (if such obligation is imposed as part of issuing an environmental decision).

Each time the mitigating measures are selected, an effort should be made to apply measures having the highest priority in the hierarchy of measures, i.e. those eliminating the impacts 'at the source'. Environmental protection measures, including preventive and mitigating measures, should each time constitute an integral element of the construction design.

Proposals of changes aimed at the adaptation and mitigation of climate changes

Emission of greenhouse gases is listed among the main reasons for climate change. Road transport plays a big role in their generation.

The execution of investments indicated in the Plan, related to the construction of new road sections, will lead to a local increase of pollution emission. At the same time, taking traffic out of city centers and improving traffic flow on existing roads as a result of their expansion or reconstruction should reduce emission in areas burdened with such pressures so far.

A number of technical and organizational measures were identified in the Environmental Report, whose implementation may lead to tangible effects with regard to preventing negative impact - reducing the risk of increasing greenhouse gas emissions or limiting emission (which should be equal to mitigating climate changes).

These measures should, in general, lead to:

- Improving traffic flow and eliminating congestion areas[4];
- Creating incentives and favorable conditions for using collective transport, bicycle or pedestrian movement and, as a consequence, gradually changing the structure of passenger transport (limiting the share of individual transportation means).

With the support of simultaneously undertaken organizational and systemic measures, the Plan creates the potential for achieving the above-mentioned results which, in turn, lead to the reduction of greenhouse gas emission.

The Environmental Report also states the possibility of designing the investments listed in the Plan in a way which would increase their resistance (adaptation) to climate changes. Starting with a properly conducted multi-variant analysis (taking into account the risk related to periodic flooding, among other things) at the stage of performing an environmental impact assessment, and finishing with a suitable selection of design and construction solutions (higher-resistance surfaces, reinforced constructions, suitably designed accompanying infrastructure - water retention reservoirs, sewerage system, revetments, planting, etc.), adapted to existing local conditions and anticipated changes (including with regard to temperature conditions, intensity, type and frequency of rain, etc.).

Proposed methods for analyzing the effects of the Plan's decisions and their frequency

The anticipated system for monitoring the Plan's execution does not create conditions for conducting observations regarding environmental changes which constitute the effect of implementing projects from the Plan. For this reason, it is proposed to extend the reports on the progress of works and spending money from EU funds with reports which present information regarding preventive measures applied as part of the realization of a given undertaking, minimization of the risk of unfavorable impacts and their effects, as well as possible proposals regarding possible natural compensations, if such necessity occurs.

[4] The chronic phenomenon of traffic volume being higher than the capacity of the used infrastructure, commonly referred to as ‘traffic jam’.