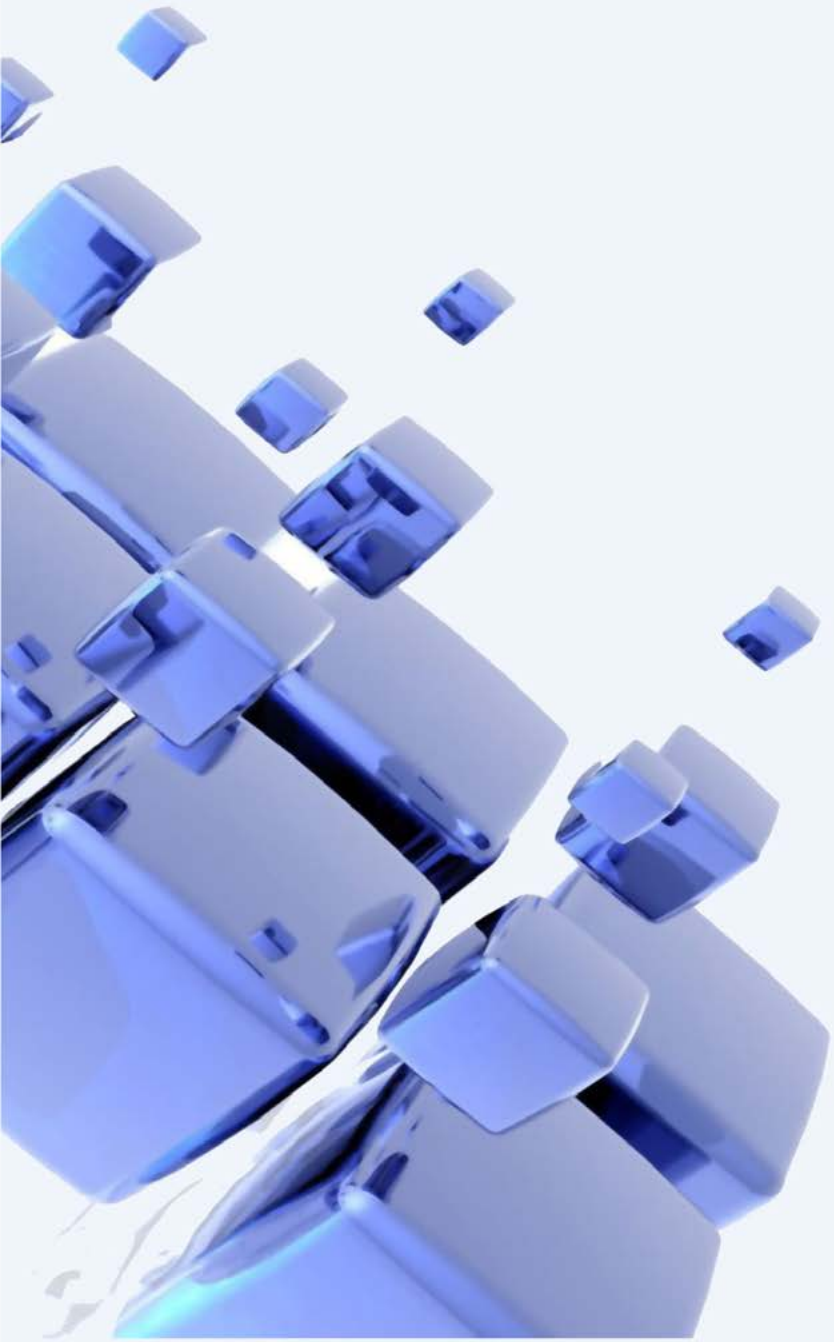
STATE OF ENVIRONMENT REPORT 2013



Ministry of Environment and Physical Planning

Republic of Macedonia

STATE OF ENVIRONMENT REPORT

2013

Macedonian Environmental Information Center

Skopje, Year 2014

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INTRODUCTION

"We do not inherit the Earth from our ancestors; we borrow it from our children" - Old Indian saying

In many occasions, through wide public discussion and through their elected representatives, the citizens of the Republic of Macedonia have demonstrated that they are united in their commitment to the universally accepted concept of sustainable development. The concept of sustainable development promoted as a term in 1992 in Rio de Janeiro at the World Summit for Environment and Development, circulates throughout the world every day and intensively, and represents in essence the present concept of Green Economy, the purposes of which are improved man's wellbeing and social benefits, as well as reduced risks to the environment and shortages of natural resources. The concept of Green Economy does not replace the sustainable development, but it recognizes sustainable development as a far reaching objective to be achieved only through economy greening.

With the same outlook, the Republic of Macedonia, through the Ministry of Environment and Physical Planning, has been pacing towards the European Union with its status of collaborating country to the European Environmental Agency (EEA) as one of the key Agencies of the Community allowing equal participation of relevant experts from our country in numerous activities concerning different environmental media.

Our citizens already have the possibility to follow the activities and the achievements of the Republic of Macedonia through EEA's modern interactive web portal, where as a result of the efforts towards EU membership, integrated planning and sustainable development, our results represent information available on the country's progress and success in reporting on several environmental thematic directions.

Through the activity of the Macedonian Environmental Information Centre (MEIC) Department, the Republic of Macedonia stands shoulder to shoulder with all European partners in their efforts to provide timely, targeted, relevant and reliable information for policy makers and public.

For the same purposes, MEIC contributes to the key European environment state and outlook reports (SOER2015) and to the effective thematic assessments through adoption and application of the European operational and qualitative principles and clearly defined methodologies.

Our participation in numerous thematic workshops and meetings has made the Republic of Macedonia equal in the observation of the best available techniques enabling us to apply modern methodologies as tools for timely information of our public and business sector with regard to the state and the trends of different environmental media. In this way and at the same time, the key objectives of timely, relevant and reliable information reflecting the state and the outlook of the environment are achieved and provide guidance for the planned sectoral policies, as well as possibilities for economic growth and development in the context of green economy.

The Report of Processed Environmental Quality Data of the Macedonian Environmental Information Centre is a tool for Ministry's activities planning and for environment protection policy making, on the basis of relevant database of its status.

We owe our success to uninterrupted cooperation with MEPP departments and offices, as well as cooperation with other relevant ministries and institutions, especially Public Health Institute of the Republic of Macedonia and regional Public Health Centers, State Statistical Office, Hydrometeorological Administration, Hydrobiological Institute, industrial facilities, etc. Extending our appreciation of the past cooperation, we reaffirm our commitment to its intensification in the coming period.

Nurhan Izairi

Minister of Environment and Physical Planning

BASIC DATA OF THE REPUBLIC OF MACEDONIA

BASIC DATA OF THE REPUBLIC OF MACEDONIA

1. Geographical position

Republic of Macedonia is situated in South Eastern Europe, in the central part of the Balkan Peninsula and covering an area of 25.713 km2. The country's capitol and biggest city is Skopje holding the role of administrative, political, economic, cultural, academic and scientific centre.

Positioned in the heart of the Balkan Peninsula, the country borders Serbia (102 km) and Kosovo (179 km) on north, Bulgaria (173 km) on east, Greece (256 km) on south and Albania (186 km) on west, or its overall border is 896 km, of which 835 km overland, 14 km over river and 47 km over lake.

Two of the Republic of Macedonia's neighbouring countries (Greece and Bulgaria) belong to EU, and this adds to its favourable geo-political position. The Republic of Macedonia does not have access to sea, but it is located along transit roads for goods delivery from the Balkans to Eastern, Western and Central Europe and is connected to the nearest ports which provide possibilities for development of economic cooperation with neighbouring countries.

Figure 1. Geographical position of the Republic of Macedonia

2. Administrative division

Officially, Macedonia is divided into 8 (eight) planning regions adopted by the Assembly of Macedonia, which serve statistical, economic and administrative purposes. Besides regions, the first level administrative division of Macedonia is municipality. According to the latest territorial division of 2004, Macedonia is divided into 84 municipalities.

The biggest region by area Pelagonia covers 18.9% of Macedonia's area and has highest number of populated places, around 343, though it is characterized with low density of population of 49.4 inhabitants per square kilometer. The smallest region, Skopje, covers 7.3% of the area of Macedonia, has rather dense population of 336 inhabitants per square kilometer and absorbs more than one fourth (29.6%) of the total population in Macedonia. Rural municipalities are represented considerably in almost all regions, but most of the population lives in major urban centers, which indicates uneven concentration of the population in the regions.

Polog and Southwestern regions are distinctive by the high share of population living in rural area, while rural areas in other regions are less densely populated.

3. Structure of the relief

Relief is mainly hilly and mountainous, characterized with big and high mountain massifs between which vast valleys and plains spread, the average altitude being 829 m.

Mountains are big relief forms covering 79% of the country's territory. They are part of the old Rhodopian group of mountains in the eastern and young Dinaric group in the western part of the country. Rhodopian group is made of mountains lower than 200 meters, with the highest peak of Ruen of 2.252 meters on Osogovo Mountains. Dinaric ones are much higher and reach over 2.500 meters, including the highest peak in Macedonia Golem Korab - 2764 meters. Vardar zone is situated between these two mountain groups, along both banks of Vardar River and Pelagonia horst anticlinoria in the central part of the country.

Valleys and larger fields are cut by mountainous relief structure covering 19.1% of the national territory. The most impressive are the valleys extending along Vardar River, including Skopje Valley (1.840 km2), while the largest plain is Pelagonia highland in the southwestern part of the country, covering around 4.000 km2, with average altitude of 600 meters. Wetlands occupy 1.9% of the total territory of the country.

4. Climate characteristics

Despite relatively small area size of Macedonia, climate is diverse, changing significantly from south to north, from west to east and from lower parts to valleys. We may distinguish the following climate areas:

- Submediterranean area (50 - 500 m)
- Moderate-Continental-Submediterranean area (up to 600 m)
- Hot Continental area (600 - 900 m)
- Cold Continental area (900 – 1.100 m)
- Submontane-Continental-Mountainous area (1.100 – 1.300 m)
- Montane-Continental-Mountainous area (1.300 – 1.650 m)
- Subalpine Mountainous area (1.650 – 2.250 m)
- Alpine Mountainous area (hs >2.250 m).

Figure 2. Republic of Macedonia

As far as temperature in Macedonia is concerned, sea influence from south (Vardar, Strumica and Crn Drim River Valleys) confronts the colder continental intrusions from north. The mean annual temperature of the air in the Republic of Macedonia is 11.5°C and ranges between around 0°C on high mountains and 15°C in southern areas around Dojran and Valandovo. The warmest month is July with mean temperature of 22.2°C, and the coldest month is January with mean temperature of 0.3°C. The lowest temperature of air measured so far is in Berovo amounting -32°C, and the highest one of 48°C in Demir Kapija.

The annual average precipitations in the Republic of Macedonia amount 680 mm, which is relatively low value. The greatest amounts of precipitation occur in the western part of the country, especially along Radika River (around 1.200-1.400 mm/year). The reason is the proximity of Adriatic Sea and high mountains averting wet air masses. Precipitations decline towards east to reach less than 500 mm per year in the central part of Vardar, Tikvesh and Ovche Pole areas. Owing to low cloudiness and precipitation level, the longest sunlit period of around 2.500-2.600 hours per year occurs here. Precipitation level rises slightly again towards east.

Winds are frequent phenomena in the Republic of Macedonia, especially during winter period. Yet, they are not as strong as in other parts of Europe and world. The best known winds are Vardarec and South. Vardarec is dry and cold wind blowing from north to south, mostly during winter period.

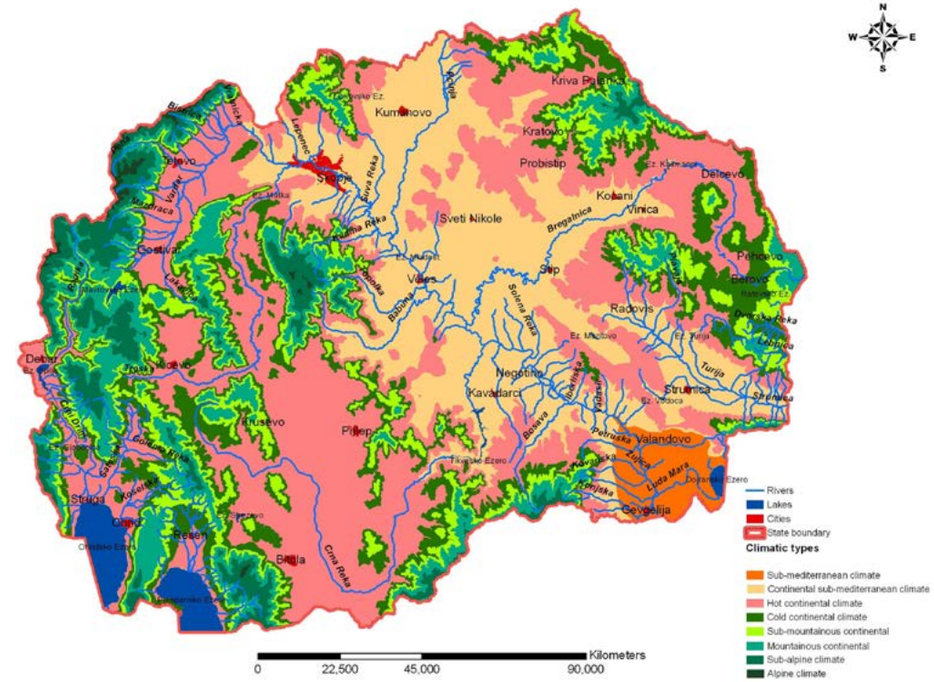


Figure 3. Climate areas

5. Hydrography

Hydrographic area of Macedonia is unique basin on the Balkans and beyond, as 84% of available water resources originate from domestic sources and only 16% from external waters. According to hydrographic conditions in the country, there are four river basins, namely: Vardar, Crn Drim, Strumica and Juzhna Morava. The areas of the basins of Vardar and Strumica rivers belong to Aegean Sea and cover 86.9% of the overall territory.

Vardar is the biggest river with around 80 % of the entire water outflow from Macedonia, with a total length of 388 km, of which 301 km run through Macedonia, and the rest of it is in Greece.Larger right tributaries to Vardar River are Crna Reka (207 km in lengthe) and Treska River (138 km), while the longest left ones are the rivers Bregalnica (225 km) and Pchinja (135 km).

As a country with no access to sea, Macedonia is proud of its natural and artificial lakes. From among natural lakes, the following tectonic lakes are the most attractive: Ohrid, Prespa and Dojran Lakes, which lay on the southern border of the Republic of Macedonia.

Ohrid Lake (349 km^2) is divided between the Republic of Macedonia (230.1 km^2) and Republic of Albania (118.9 km^2)

Prespa Lake (274 km^2) is divided between the Republic of Macedonia (176.8 km2), Republic of Albania (49.4 km^2) and Republic of Greece (47.8 km^2)

Dojran Lake (43 km^2) is divided between the Republic of Macedonia (27.4 km^2) and Republic of Greece (15.6 km^2).

There are 15 artificial water accumulations and 25 glacial lakes on the territory of Macedonia, situated in the highest parts of mountain massifs formed as early as during ice age.

Annual water resources per inhabitant amount around 3.150 m^3/year, placing the country in the middle category of European countries by available resources per inhabitant. This value is close to the limit value for water resources required for sustainable development.

6. Demography

According to the last Census of populations, dwellings and households (2002), Republic of Macedonia has 2.022.547 inhabitants, which is by 3.9 % higher compared to the previous census (1994), and by 43.0 % higher compared to 1948. According to population estimates made by the State Statistical Office, the overall number of population on 31 December 2012 was 2.062.294 inhabitants.

According to data from the last Census, the biggest portion of the population is made of Macedonians (64.18%), followed by Albanians (25.17%), Turks (3.85%), Roma (2.66%), Vlachs (0.48), Serbs (1.78%), Bosnians (0.84%) and other ethnic groups (1.04%)

Most of the population is concentrated in urban areas. The average density of population in 2002 was 78.7 inhabitants per km^2, and according to population assessment for 2012, population density raised to 82.7 inhabitants per km^2. Out of the total population, around 60 % live in urban settlements, and 25% of the total population lives in Skopje.

Skopje region is the most densely populated with 336 inhabitants per km^2, followed by Polog region with 131.2 inhabitants per km^2. As opposed to those, Vardar region is the least densely populated (with 38 inhabitants per km^2).

The above regional differentiation raises the issue of regions sustainability in terms of their population, population structure, as well as their economic and social conditions.

Life expectancy for the period 2010-2012 is 74.98 years, 72.97 years for men and 77.05 years for women. The average age of the population in the country in 2012 was 37.7 years. Natural population growth per 1000 inhabitants in 2012 was 1.7 inhabitants. Mortality rate was 9.8 deceased per 1000 inhabitants.

SUSTAINABLE DEVELOPMENT

SUSTAINABLE DEVELOPMENT

1. Introduction

The sector of environment is one of the supporting pillars in sustainable development establishment in the Republic of Macedonia, but also in the process of fulfilling the requirements and achieving the standards of the European Union. Within these processes, integration of environmental protection into other sectoral policies leads to a more sustainable development of different sectors in efficient and economic way.

The establishment of sustainable development remains the strategic approach towards stable economic growth, along with social improvements and environment protection. The Republic of Macedonia has also traced its way through environmental issues settlement, endeavoring to contribute to the reduction and settlement of global environmental issues, while fulfilling the obligations under the signed multilateral agreements.

The Constitutions contains articles related to fundamental principles upon which the sustainable development is founded. The Law on Environment, besides other principles, includes the principle of sustainable development and the requirement to develop Strategy for Sustainable Development (Article 186 paragraph 2). The Law on Environment also offers the possibility for preparation of Local Agenda 21 as a tool on local level.

The National Strategy for Sustainable Development is based on the principles of sustainable development recognized on global level and defined at the UN Conference on Environment and Development (Rio de Janeiro, 1992) in order to make Agenda 21 functional, then Declaration and Implementation Plan from Johannesburg 2002 adopted at the World Summit for Sustainable Development, the principles of UN Millennium Declaration incorporated in the Millennium Development Goals and principles developed in the revised EU Strategy for Sustainable Development, adopted by the Council of Europe in 2006. The Strategy is an important element among priorities set in the European Partnership, also in terms of fulfilling the obligations defined in the "Strategy of the Republic of Macedonia for EU integration". The Strategy should ensure broad acceptance and be firmly incorporated in all spheres of life in the Republic of Macedonia.

By implementing the Project "Preparation of National Strategy for Sustainable Development in the Republic of Macedonia" and adopting the Strategy for the period 2010-2030, the Republic of Macedonia has not only demonstrated its strong and full commitment to the Strategy for Sustainable Development of the European Union, but joined the global movement for sustainable development. The National Strategy for Sustainable Development (NSSD) in the Republic of Macedonia consists of two parts: Part I, outlining the entire strategic framework, and Part II, containing the strategic grounds for support, while its implementation should serve the purposes of acquiring economic development which is socially responsible and fair, environmentally acceptable and relying upon the basic postulates of the civil society.

The implementation of NSSD is a great challenge, primarily in terms of strengthening the structures and providing a solid platform and financial resources. The establishment of the National Council for Sustainable Development in 2012 and support from donor and international financial institutions are good signal of initiation of the process of sustainable development establishment in the Republic of Macedonia.

2. Goals of the Policy of Sustainable Development in the Republic of Macedonia

2.1. Goals, guidelines and guiding principles towards sustainable development achievement in the Republic of Macedonia

The segment which identifies and formulates goals, guidelines and guiding principles for achievement of sustainable development in the Republic of Macedonia is based on prior diagnosis for sustainable development and identification of the key challenges under the NSSD, Part II, Strategic basis and analysis. As already mentioned, far reaching goal and guideline for achievement of sustainable development is the sooner membership in the European Union.

Goals and guidelines as starting point should take the rich and relatively undistracted natural and cultural resources of the Republic of Macedonia. Hence, the goal will be mainstreamed towards sustainable integration of tourism, forestry, agriculture and industrial sector with sustainable support from energy sector, infrastructure and transport sectors. The sector of environment will be cross-cutting in the above integration. It is important to note that sustainable development is a continuous process requiring constant adaptation, monitoring and improvement.

For the purpose of as feasible as possible NSSD, it has been founded on the following three common guiding principles of support:

Guiding principle no. 1:

- The Government should have innovative, supportive and leading role in relation to municipalities and private sector, which in turn have operational role in the achievement of sustainable development in the Republic of Macedonia.

Guiding principle no. 2:

- E-management should be introduced on national and local levels. This would ensure greater transparency and efficiency and would be a good way of faster and more efficient acquisition of the sustainable development.

Guiding principle no. 3:

- Short-term focus should be placed on work force with university level of education in order to prevent further "brain drain" and, if possible, attract Macedonians living abroad, who are highly qualified, well educated and possess strong potential. Further on, the latter should be the driving force fostering the development, as described in detail in NSSD, Part II: Strategic basis and analysis.

2.2. Objectives and strategic determinations towards sustainable development achievement

The main obstacles to the achievement of sustainable development in the Republic of Macedonia, according to NSSD, could be summarized as follows:

- Insufficient understanding, awareness of and commitment to the concept and the principles of sustainable development.
- Partially developed framework in support of the policy of sustainable development.
- Partially developed legal and regulatory framework to support sustainable development.
- Weak capacity for cross-cutting and integrated approach necessary to achieve sustainable development.
- Weak capacity for strategic working based on sustainable development – planning, administering and implementing.
- Lack of domestic and foreign funds to support projects and activities for sustainable development, as well as insufficient support by banking sector for projects aimed at sustainable development.

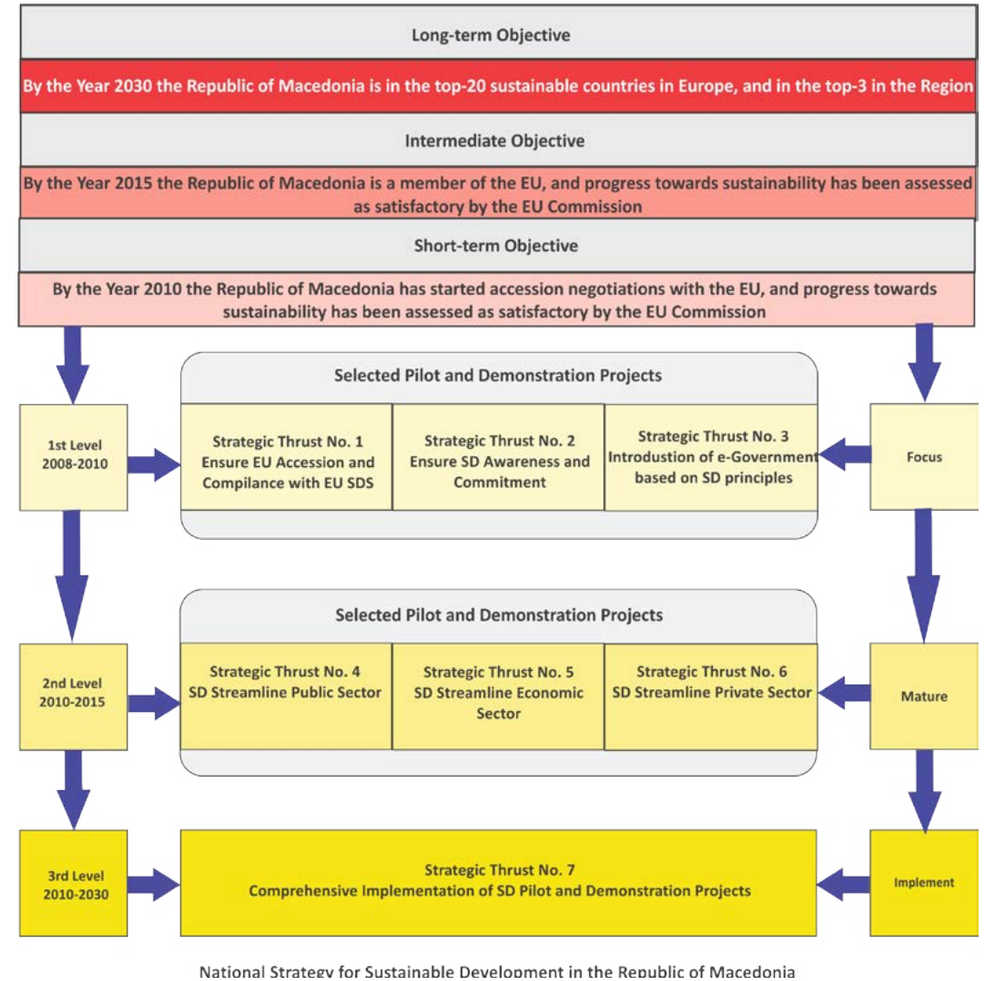
BThe table below shows schematic overview of the Strategy, which reflects clearly the main goals being connected with the EU membership. The Strategy, as shown on the next table, consists of these two main parts:

- Long, medium and short-term goals concerning the important issues of EU membership, as well as acquisition of sustainable development in the Republic of Macedonia.
- Seven strategic commitments, based on the three guiding principles mentioned in the previous chapter which prioritize the issues on which the Republic of Macedonia should focus. In order to attain sustainable development, these should incorporate the following three main areas: economic sustainability, social sustainability and environmental sustainability.

I level- by 2010, topic Focusing, should encourage and initiate the process of sustainable development with focusing on the important issue of EU membership and in this context provision of understanding of the overall process and commitment thereto. Further on, the e-management as an important instrument in ensuring greater transparency and efficiency and support in the process of sustainable development achievement in the Republic of Macedonia. Besides this, certain number of pilot and demonstration projects should be implemented.

II level- from 2010 to 2015, topic Maturity concerns the issue of maturity gaining by public, economic and private sectors towards sustainable development. This has been already identified as one of the key obstacles to sustainable development. Hence, mainstreaming of the mentioned sectors is a precondition to sustainable development of the Republic of Macedonia. At this level, pilot and demonstration projects will be selected and implemented.

III level- 2015 to 2030, topic Implementation, concerning more comprehensive selection and implementation of pilot and demonstration projects, based on experience gained through implemented pilot and demonstration projects from the first and the second level, where as many as possible stakeholders should be involved at all levels.



National Strategy for Sustainable Development in the Republic of Macedonia

Seven strategic commitments have been proposed and these should utilize the potentials of the country and overcome the obstacles to the achievement of the main goals, based on the Three guiding principles. The main idea behind the Seven strategic commitments is that the Republic of Macedonia gets prepared and mature for sustainable development, as main precondition for implementation of the actions and the projects for sustainable development.

In the context of the above, the Seven strategic commitments relate to:

1. The important issue of providing EU membership.
2. Rising the awareness of and the commitment to sustainable development, covering all spheres of life in the Republic of Macedonia.
3. Introduction of E-management as strong tool in sustainable development supporting and implementation.
4. Mainstreaming the public sector through organizational development and institutional strengthening on the

basis of the concepts and the principles of sustainable development, as well as cross-cutting and integrated strategic and participatory working.

5. Mainstreaming the banking and financial sector towards provision of resources to fund projects and activities for sustainable development.
6. Mainstreaming the private sector towards development based on the principles of sustainable development.
7. Implementation of demonstration and pilot projects in the early phase of NSSD implementation.

2.3. Strategic actions towards sustainable development achievement in the Republic of Macedonia

The part hereunder elaborates the main strategic actions required to achieve each of the Seven strategic commitments.

I level by 2010 - Focusing

Strategic commitment no. 1:

- Ensuring membership in EU and compliance with the EU Strategy for Sustainable Development

Strategic action number 1.1:

- Preparation of comprehensive assessment of the existing and establishment of appropriate organizational framework to enable the implementation of the NSSD.

Strategic action number 1.2:

- Implementation of several selected pilot and demonstration projects that would have great impact and serve as examples that could be replicated further on.

Strategic commitment no. 2:

- Rising awareness of and commitment to sustainable development

Strategic action number 2.1:

- Preparation of comprehensive assessment of the awareness of and commitment to sustainable development that would incorporate all spheres of life in the Republic of Macedonia.

Strategic action number 2.2:

- Based on the above, preparation of comprehensive plan and programme, with limited time and allocated resources, for raising the awareness of and commitment to sustainable development.

Strategic action number 2.3:

- Implementation of the plan and programme for raising the awareness of and commitment to sustainable development and initiation of the implementation of several selected pilot and demonstration projects that would have great impact and serve as examples that could be replicated further on.

Strategic commitment no. 3:

- Introduction of E-management as incentive to sustainable development

Strategic action number 3.1:

- Consideration and implementation of National Strategy and Action Plan for Information Society Development by April 2005 and Pool for use of computers and Internet in the Republic of Macedonia by April 2007.

Strategic action number 3.2:

- Preparation of comprehensive assessment of capacities and qualifications for communication and information technology to cover public and private sectors, domestic resources and Macedonian resources abroad, as well as consulting companies, research and development organizations and universities.

Strategic action number 3.3:

- In close cooperation with the newly established Ministry of Information Society, inter-sector working group should be established to cover the above mentioned resources and aim at implementing this strategic commitment. To that end, the working group should have bifold focus. First, to implement the e-management in the Republic of Macedonia in practice and second, to acquire commercial benefits from this process by establishment of public private partnerships. All this could provide competitive advantage to the Republic of Macedonia and contribute to the development of advanced communication and information system in support of decision makers from public and private sectors towards sustainable development.

Strategic action number 3.4:

- Programming and implementing selected pilot and demonstration projects that would have great impact and serve as examples that could be replicated further on.

II level 2010-2015: Maturity

Strategic commitment no. 4:

- Mainstreaming the public sector to sustainable development

Strategic action number 4.1:

- Based on the existing analyses, comprehensive organizational and institutional assessment of the capacities for sustainable development will be prepared, to cover all horizontal and vertical levels of the public sector. In order to accomplish this within limited timeframe and with limited public resources, this assessment should be based on the concept and the principle of self-assessment.

Strategic action number 4.2:

- Based on the above, the most significant gaps and especially the direction of movement in terms of organizational development and institutional strengthening will be identified.

Strategic action number 4.3:

- Preparation of Draft Programme for organizational development and institutional strengthening of the public sector in relation to sustainable development. There is great probability that such project is financed by the EU as an integral part of the process of approximation and therefore the prospects for its initiation should be considered as soon as possible.

Strategic action number 4.4:

- Establishment of inter-sectoral implementation framework and implementation of the Programme for organizational development and institutional strengthening in relation to sustainable development, including a number of pilot and demonstration projects that would have great impact and serve as examples that could be replicated further on.

Strategic commitment no. 5:

- Mainstreaming the financial sector to sustainable development

Strategic action number 5.1:

- Based on the existing data, comprehensive assessment of the preparedness and capacity of the financial sector to finance sustainable development will be prepared. This

assessment should cover public and private sectors, as well as international financial institutions and EU.

Strategic action number 5.2.:

- Action Plan for enhancement of the financial sector capacity for projects for sustainable development with defined deadlines and allocated resources will be prepared, in close cooperation with all key actors in the economic sector. There is great probability that part of this action plan is financed by the EU as an integral part of the process of approximation and therefore the prospects for its initiation should be considered as soon as possible.

Strategic action number 5.3:

- Covering of costs for public services of water supply, wastewater treatment and solid waste disposal is a precondition for approximation in the process of EU accession. To this end, overall assessment of economic ability for public services cost covering should be prepared, supplemented with socio-economic analysis.

Strategic action number 5.4:

- Establishment of inter-sectoral implementation framework and implementation of projects and activities for sustainable development, including significant number of pilot and demonstration projects that would have great impact and serve as examples that could be replicated further on.

Strategic commitment no. 6:

- Mainstreaming the private sector to sustainable development

Strategic action number 6.1:

- Based on the existing analyses, comprehensive assessment of the capacity for sustainable development of the private sector will be prepared, in close cooperation with leading proponents of the economic development in the country.

Strategic action number 6.2:

- In close cooperation with private sector, the main gaps will be identified and define the direction of movement in terms of required capacity for sustainable development in the private sector.

Strategic action number 6.3:

- Based on the above, Action Plan for enhancement of the private sector capacity for projects and activities for sustainable development with defined deadlines and allocated resources will be prepared, in close cooperation with all key actors in the private sector.

Strategic action number 6.4:

- Establishment of inter-sectoral implementation framework and implementation of the Action Plan for enhancement of the private sector capacity for projects and activities for sustainable development, including significant number of selected pilot and demonstration projects that would have great impact.

III Level 2010-2030: Implementation

Strategic commitment no. 7:

- Implementation of pilot and demonstration projects for sustainable development

Strategic action number 7.1:

- Based on set criteria and selection model for demonstration and pilot projects for sustainable development that are feasible under Macedonian conditions, projects should be implemented that will include:

Covering of the three pillars: environmental, social and economic impacts.

Definition of timeframe giving priority to projects that are easy to implement and have effect on sustainable development.

Prioritization of projects that would be replicated further on in the Republic of Macedonia.

Strategic action number 7.2:

- Identification of as many as possible demonstration and pilot projects in a draft form for implementation. Significant number of potential demonstration and pilot projects has already been identified under NSSD project.

Strategic action number 7.3:

- Elaboration of list of priority demonstration and pilot projects.

Strategic action number 7.4:

- Elaboration of finally selected demonstration and pilot projects to the level of feasibility studies, including definition of organizational setup and manner of their funding.

Strategic action number 7.5:

- Strengthening the capacity of existing organizations for implementation and monitoring of pilot projects for sustainable development.

Strategic action number 7.6:

- Upon completion, the effect of projects on sustainable development will be assessed.

3. Recommendation

Achievement of sustainable development in the Republic of Macedonia and implementation of NSSD is a process of changes in the whole country. Progress in the implementation has to be enabled by the environment and capacity for implementation.

Favourable environment in essence includes what is realistic and feasible to accomplish within the given context. It covers widely diverse issues like political consciousness, will and capacity, institutional will and capacity, domestic and external investing will and capacity. Favourable environment also determines ongoing check of the reality of conditions for sustainable development enabling and introduction.

Implementation capacity covers the current practical capacities for tangible implementation and consequently represents practical application of favourable environment.

3.1. Favourable environment

3.1.1. Relevance of political consciousness and capacity

The main factor that enables achievement of great change in any strategic context is the confidence.

The vision and the overall new development direction of the Republic of Macedonia is set in line with the EU policy of sustainable development. Considering that sustainable development fosters improved quality of life, it should only stimulate initial confidence in future. Besides the NSSD Project, the National Council for Sustainable Development (NCSD) should be politically responsible for NSSD implementation, including support to the process aimed at increasing the confidence in the future, as integral part of the further public awareness and activity for public participation. By encouraging public participation, citizens of the Republic of Macedonia will gain powerful tool for changes that begin from bottom towards top and initiatives of Local Agenda 21.

The second main factor of enabling is the political awareness of the need to make great changes and more importantly, political will to motivate and implement these changes. This process will certainly encounter very strong resistance by certain parts of the Macedonian society. Nevertheless, if political will and political capacity for sustainable development are not developed up to the required level, introduction of sustainable development could end only as an academic endeavour of limited effect.

As first step, assessment of the Republic of Macedonia's commitment to sustainability concepts and principles was prepared by national experts based on comparison

with the EU Revised Strategy for SD. This assessment covered all the points in the Strategy, as presented in Annex no. 3. As it is shown by this assessment, the process of approximation with EU SD has already been initiated in Macedonia, but it should pass a long way before full harmonization is achieved. An assessment like this, which will be made constantly throughout this process, could be used as strong monitoring tool for political consciousness.

3.1.2. Relevance of legal and regulatory instruments

The third main factor concerns legal and regulatory framework. As one can conclude from the 11 Reports on assessment and analysis, most of this framework is available as a result of the process of accession to EU. Consequently, this should not be the most problematic issue with regard to SD because the process of accession to EU is in progress aiming at the Republic of Macedonia's start of negotiations. Besides this, many of the new laws and bylaws support SD directly. However, the key issue will most probably be the will and the capacity for adoption of legal and regulatory framework and general administrative and organizational capacity for laws and regulations implementation. Furthermore, the status of legal and regulatory framework is relevant with regard to investments that make the fourth and the last basic factor and these are described in the last part of this chapter. For more comprehensible and detailed explanation, the Framework Report on Sustainable Development (FRSD) has been used as reference.

According to FRSD, legislation related to economic sector needs to be upgraded further. The Republic of Macedonia will need to make significant and continuous efforts to implement the legislation. This requires significant investments (e.g. regarding waste management and water treatment) and great commitment by administration. Certain progress could be done with regard to legal framework strengthening, though progress with regard to enforcement is limited, especially in areas requiring huge investments. Yet, selected activities with relatively low costs that would be implemented immediately could improve the situation significantly.

Need for implementation and investment climate to support sustainable development. The fourth and the last basic factor of enabling concerns investment climate and potential for investment, which is naturally the main preconditions for all projects and activities in sustainable development.

3.2. 2. Implementation capacity

The following analyses and assessments have as their goal the capacity for implementation of important and realistic projects and activities of SD. It is based on the 11 Reports on assessment and analysis, the six main block issues[1], elaborations presented in the platform of knowledge of the Framework Report on Sustainable Development and elaborations in previous chapters on favourable environment.

3.3. Availability of the required technical and professional capacity

The main factor of implementation capacity in Macedonia. This factor includes technical and professional capacity for

1 Policy and legal framework (cross-cutting)
Environment (cross-cutting)
Energy (cross-cutting)
Rural development (involves agriculture, forestry and tourism)
Social issues (involves employment, social welfare, health and education)
SME (involves industry, SME, infrastructure and transport)

identification, formulation, designing, planning, programming and implementing the required projects and activities. However, it seems there are problems where this capacity applies in cross-cutting and strategic issues. Weaknesses also occur in relation to SD concepts and principles and their application by technical and professional capacity.

3.4. Weak institutional and organizational capacity

As far as the second basic factor is concerned, namely institutional and organizational capacity for adoption, application and putting into effect of laws, bylaws and regulations, great weaknesses are noted. Public sector seems to lack the required capacity in terms of human resources, knowledge and systems, and procedures for processing and approving SD related projects and activities in a qualified and timely manner. This is the current situation, although there are ongoing activities in certain institutions aimed at this problem overcoming.

It is questionable whether private sector has the required number of companies in the required technical fields and other

fields to design and develop/implement SD projects and activities.

3.5. Further strengthening of the capacity for investment and financing

The third and the last basic factor is the economic and financial capacity. In this regard, the capacity of the banking sector and its ability to process applications for SD projects and activities financing is of interest. Domestic and foreign investors should invest more in the Republic of Macedonia. This will be also reflected in potential financing of SD projects and activities.

This process is further aggravated with the limited domestic capacity for participation in activities of cost recovery, that is precondition for numerous externally financed SD projects, especially in water, wastewater and solid waste sectors.

SPACE PLANNING

SPACE PLANNING

1. Introduction

The Spatial Plan of the Republic of Macedonia is implemented through preparation and adoption of spatial plans of regions, spatial plans of areas of special interest, spatial plan of municipality, of the City of Skopje, as well as urban plans and other documentation for space planning and development specified in the Law on Spatial and Urban Planning.

Monitoring of the implementation of the Spatial Plan of the Republic of Macedonia is a complex activity involving high number of entities of diverse profile and level of authority, technical and professional, that are familiar with conditions, occurrences, terms, mutual relations, disorders, advantages and prospects in certain parts of the space, and it enables initiation and preparation of proposals towards selection of new planning determinations and solutions in the relevant areas of the spatial system, by way of application of the procedure for amendment of the Spatial Plan of the Republic of Macedonia. The monitoring of the implementation of the Plan as an activity is inseparable from the activities of space development management which confirms the Plan appropriateness.

Within the planning process, space is not only a resource matching up earth area, land and landscape, but also everything that exists beneath and above land cover as integral and active components of space planning and development.

Within the planning and management of spatial development in the Republic of Macedonia, space is a value characterized by three attributes:

- space is limited, given or ultimate;
- space is non-renewable; and
- space is shared by many users.

2. Status and trends

2.1. Demographic development

Investigations indicate presence of certain unfavorable demographic trends that can be influenced only through active population policy, such as: well expressed regional disparity in population growth, natural increment of the population higher than in more developed European countries, changes in age structure with an aging trend, net reproduction rate of the total population differing among existing socio-economic and other structures, well expressed differences between urban and rural environments, etc.

Taking as starting point the determination that population policy should, through a system of measures and activities, have an impact on natural increment, the assessment is that provision of planned development and escaping the status of underdevelopment require active population policy in line with the possibilities of socio-economic development of the country. Within this frame, central population policy should with approach and measures differentiated for individual areas should be implemented in order to achieve optimal use of space and resources, humanization of conditions for family and social living of the population, reduction of migrations, as well as establishment of conditions for a more balanced regional development of the country.

Population should primarily accept the necessity for change in reproduction behavior and establishment of new norms in biological behavior as precondition for achieving more prominent effects in the coming period.

Unbalanced distribution of the population in individual regions and tendency of further polarization is a notable negative phenomenon. Namely, eastern parts are characterized with demographic stagnation, while western with demographic explosion.

2.2. Land use

Taking into consideration the criteria for agricultural land use, expected possibilities for capital investment in primary production, as well as the trend in the past development, it has been assumed that optimum use of agricultural land will be achieved under the planning determinations contained in the Spatial Plan of the Republic of Macedonia by 2020.

According to data available for 2010, the Republic of Macedonia has 1.121.000 ha agricultural land. The share of arable areas is 509.000 ha that is 45.4%, pastures 611.000 ha or 54.5% and 1.000 ha marshes, reed marshes and fish ponds or 0.1% of the total agricultural land. These proportions correspond with the specified planning broadcasts for 2020 according to which the ratio between arable land areas and areas under pastures has been estimated at 45.4% versus 54.5%.

The structure of arable land is dominated by ploughed land and gardens with 415.000 ha or 81.53%, orchards occupying and area of 14.000 ha or 2.75%, vineyards 21.000 ha or 4.13% and the rest of 59.000 ha or 11.59% of the total arable land area is land under meadows. At European level, the country belongs to the group of countries with medium availability of agricultural and arable land, or an inhabitant has 0.25 ha arable land or 0.20 ha ploughed land areas at an average.

According to prior published data, agricultural production in 2010 relative to 2009 increased by 8%.

In the field of urbanization, we may conclude that overall activities move towards higher level of space organization and development or higher degree of urban development. The most dynamic changes occur at contact areas of urban settlements and outside rural settlements favorable for industry, tourism and other activities development that may be grounds for investment attracting.

Dynamics and development of planning documentation are still at the level that does not have major impact on development, which is primarily due to inability to secure sufficient investments for such activities.

Urban development is still centralized to a great extent, with its main feature being high population concentration, concentration of public functions and highest extent of infrastructure development in the national center. During the last several

years, the state policy has been aimed at decentralization of certain functions in the area of education from national to other major urban centers (Tetovo, Shtip, Bitola, Kumanovo, Ohrid, and Sv.Nikole). This trend is expected to continue in the forthcoming period as well.

Other urban centers have not practiced notable activities towards development acceleration through selective mainstreaming. In the coming period, significant progress is expected through adoption and implementation of the programmes for planning regions development, under which development of economically less able regions is stimulated, including less developed areas within the regions themselves.

Expansion of urban building land and overall building land in settlements defined as planning range is still ongoing and takes place to the detriment of productive agricultural land. Units of local self-government should in future focus on more efficient utilization of building land within already defined areas covered by planning documentation.

In the coming period, urbanization is expected to evolve in conditions in which private initiative and market economy will have even more important position and role in the long-term spatial development. The process of urbanization will remain the main framework for the future organization, development and use of the space in the country, but in line with the changes encountered and future long-term development demands of the socio-economic system.

2.3. Environmental impacts

Analyses of the extent of environmental media pollution on annual level, including measures undertaken to protect them, provide insight in the connection between industrial development, status and quality of environment, i.e. effects on human health, active monitoring of possible changes in environmental media and areas, and establish solid grounds for sustainable environmental protection policy and improved quality of living in future.

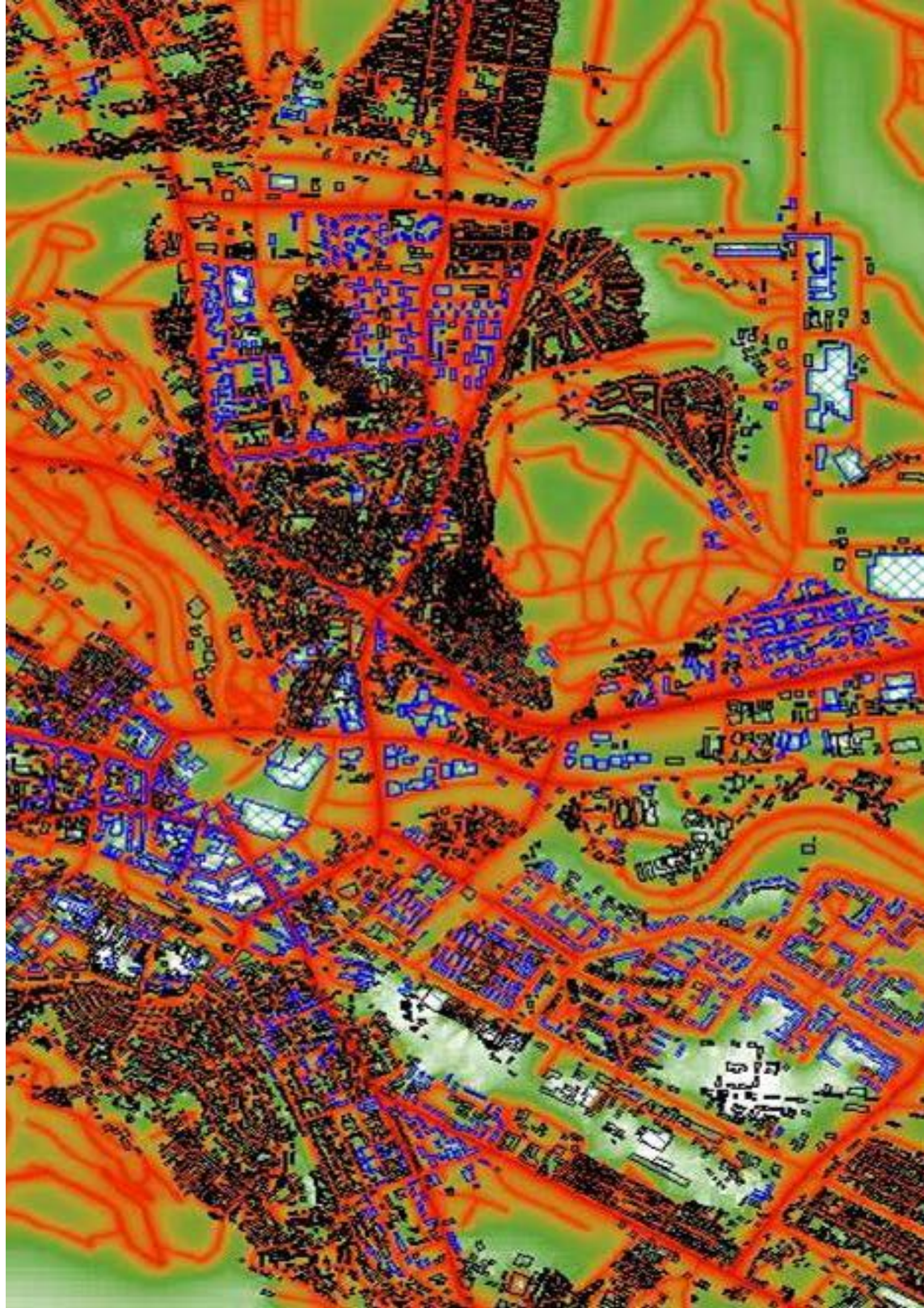
3. Brief assessment and possible development

3.1. European framework for space planning

The Republic of Macedonia has recognized the finalization of the process of integration into the European Union as its strategic goal. The current status of candidate country for EU membership poses many tasks to our country, aiming not only at the achievement of the expected effects expressed through macroeconomic performances towards higher rates and level of economic development, political and security stability, more advanced technological level, higher educational and scientific levels, but also adoption of novelties in the area of spatial planning and involvement in the process of transferring and application of the guidelines and determinations of the spatial and regional policy practiced in Member States.

The new political constellation, technical and technological development and global interconnection are important factors of significant impact on spatial organization and creation of new contours in Europe.

Rapid development of global economy determines the new network of links and establishes new relationships among corporations, citizens and regions throughout the world. The ongoing process of European integration poses



tasks to spatial planning and urban policy at supranational level that need to be implemented within the current and forthcoming process of space planning and organization in our country.

3.1.1. Main European policies

To understand the European policy in the area of spatial planning as a partial policy, it is important to understand its relation to the main European policies. Under the Unity, Solidarity and Diversity for Europe, its Residents and Territory, 2011, the main European policies are as follows:

- Competition Policy,
- Common Agricultural Policy,
- Employment, Human Resources, Development and Cohesion,
- Environmental Policy,
- Regional Policy,
- Research and Development Policy,
- Transport Policy,
- Energy Policy,
- Small and Medium Entrepreneurship Policy,
- Common Fishery Policy..

From among all above listed policies, three have the strongest influence on spatial planning, development and territorial arrangement of the European Union, namely: environmental policy, regional policy and transport policy.

Europe's Spatial Development Perspective (ESDP) and European regional projects in the area of spatial development planning

ESDP was adopted in 1999 by special resolution. It is the first formal document in the area of spatial development planning of the Union after 1989, when the decision to prepare European strategic framework in the domain of spatial development planning was adopted, i.e. when the European Union and the European Commission started cooperation in this area.

ESDP is a strategic policy framework aimed at promoted cooperation between European Commission, Member States and their regions and cities, or harmonization of different policies. This document defines a spatial vision for the development of the Union's territory, by which ESDP was promoted as a policy framework and reference document in the sphere of sustainable spatial development (thus insisting that all principles of sustainability – environmental, economic, social and cultural - are observed). Although not binding, it defines policy options and "guide/guidelines" for decision making at all governance levels (from supranational or European, on one end through national/ state and regional to local, on the other) that would lead to sustainable and balanced development.

European Spatial Planning Observatory Network (ESPON) and other information and statistical backups

ESDP implementation is supported by parallel statistical, information and research backup under the name European Spatial Planning Observatory Network, initiated by the European Commission and governments of EU Member States 1998 and then implemented during the follow-up two years of research. This programme continued in the period 2002-2006 in the frames of INTERREG III B.

The Programme was initiated in order to identify possible institutional, legal, administrative and financial parameters for a network of research institutions to gather within ESPON. Researches are based on the use of tens of indicators that should provide comprehensive, detailed and reliable insight in diversity of components of the unique European space (regions, cities, spatial axis, etc.), made of the following seven groups: 1. Geographical position, 2. Economic potential, 3. Social integration, 4. Spatial integration, 5. Land burden, 6. Natural heritage, and 7. Cultural heritage.

ESDP and major regional programmes

Regional spatial development initiatives and schemes that cover also individual EU Member States and individual candidate countries for EU membership have special role in the achievement of the last among listed ESDP missions. As early as during ESDP preparation, in 1996, the European Commission raised regional initiative under the name INTERREG III C, in order to continue with the transnational cooperation in the spatial planning of European countries and regions (namely, not limited to EU Member States).

The multiannual cooperation under different regional and alike programmes and projects has continued under the name INTERREG III B, which is also implemented through series of individual projects in the frames of five major programmes that need to reflect predominating geographical leitmotifs of the European territory:

- CADSES/VISION PLANET (Strategies for an integrated spatial development of the Central European, Adriatic, Danubian and South-Eastern European Space), covers regions of Central and Southeastern Europe, Danube Belt and Adriatic Basin, of four EU Member States, seven candidate countries for EU membership and seven non-EU countries;
- NORTH-WESTERN EUROPE covers regions of Northwestern Europe from seven EU Member States plus Switzerland;
- BALTIC SEA REGION covers areas of four EU Member States, Norway and six other countries (six candidate countries for EU membership and Baltic parts of Russia and Belarus);
- ALPINE SPACE covers regions in four EU Member States plus three countries (Lichtenstein, Slovenia and Switzerland);
- NORTH SEA REGION covers areas of six EU Member States plus Norway.

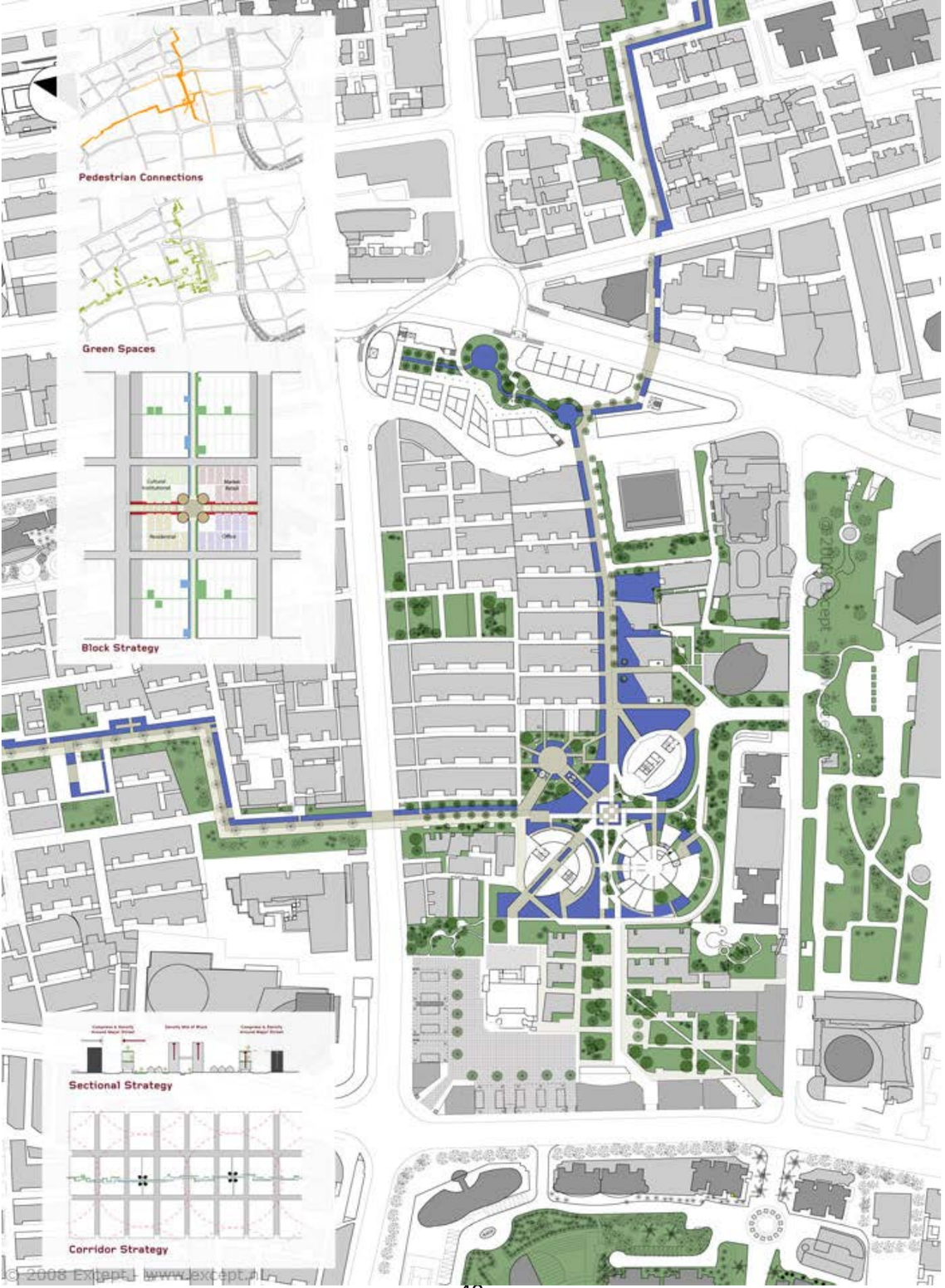
Regional initiatives ESTIA and OSPE

ESTIA and OSPE are the two most important regional initiatives in the area of spatial and urban development and environmental policy of the Balkans:

- ESTIA (European Space and Territorial Integration Alternatives, Spatial development strategies and policy integration for the South-East Europe). This project involves Albania, Bulgaria, Greece, Macedonia, Romania and FR Yugoslavia;
- OSPE (Observatory of Spatial Planning and Environment in South-East Europe), is a project which is complementary to the previous one. It involves the same countries, though it emphasizes stronger the aspects of information backups of decisions drafting, adoption and implementation in the area of sustainable development and accompanying institutional and organizational arrangements.

4. Recommendations

Preservation, protection and rational use of agricultural land are the main planning determination and main precondition for



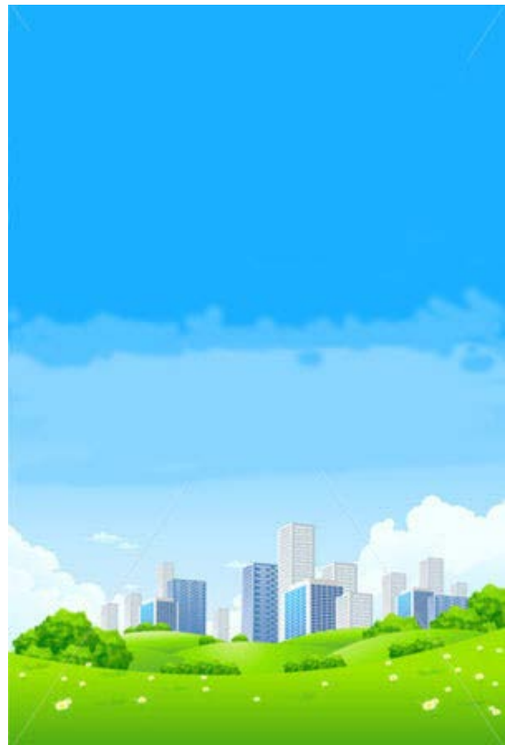
efficient application of production and other functions of agriculture. Conflict situations deriving from the development of other economic and social activities are settled on the basis of criteria for global socio-economic sustainability and justifiability. Determinations of the Spatial Plan of the Republic of Macedonia in the area of agricultural land protection and use envisage prevention of degradation of the paedological layer and improvement of its productive properties, enlargement of arable land area on terrains possessing appropriate conditions, as well as maximum possible intensification of agricultural production to contribute accordingly to strategic goals of sustainable development of the overall economy and economic prosperity of the Republic of Macedonia by 2020.

The concept of sustainable development of a country is conditioned by its natural resources and their rational use. Water can be distinguished as specific prerequisite for development, given that it is unsubstitutable resource without which no survival can be secured. The extent to which water can be regarded a resource in certain area will depend on the possibility for implementation of certain water management solutions. The water as a resource is much less available than the available waters. The water use plans should take into account that the demands will only increase in future and this will only decrease the available waters as resource.

In order to achieve maximum protection of water as a resource that cannot be substituted, water management infrastructure development should be targeted at waters protection and use.

One of the long-term goals of energy sector is increased utilization of renewable energy sources in accordance with the available domestic resources, technological development and overall economic development. Renewable energy sources are represented by hydro power, solar, wind geothermal power and biomass (heating wood). The total primary energy obtained from renewable energy sources in 2010 amounted 16.622 TJ which was by 65.4% more than in 2009. Hydro energy, besides electricity produced by large and small hydro power plants, also includes electricity produced by preferential producers.

The coverage of the territory of the Republic of Macedonia by planning documentation is still insufficient. One of the main reasons for this situation is the lack of investments at local level, as well as long duration and complexity of procedures for plans adoption. With regard to the implementation of the planned solutions, we may conclude that the level of planned solutions implementation is low and there are deviations therefrom.



CLIMATE CHANGE AND OZONE LAYER PROTECTION

CLIMATE CHANGE AND OZONE LAYER PROTECTION

1. Introduction

Having recognized the problem of climate change and necessity to undertake effective activities towards mitigation of the problem of climate change negative impacts, the Republic of Macedonia ratified the UN Framework Convention on Climate Change (UNFCCC) on 4 December 1997 (Official Gazette of the Republic of Macedonia no. 61/07) and became Party to the Convention on 28 April 1998. The Ministry of Environment and Physical Planning (MEPP) was designated a National Focal Point for UNFCCC, i.e. the key body of the Government responsible for policy making with regard to the implementation of the UNFCCC provisions ("Official Gazette of the Republic of Macedonia no." бр. 61/97). As of the moment of Convention entry into force in 1994 until present, the Convention has been one of the most universally accepted multilateral agreements with membership counting more than 190 countries, to which it is internationally binding document.

Further more, National Committee for Climate Change was established as advisory body for policy making with regard to climate change issues in the Republic of Macedonia (Official Gazette of the Republic of Macedonia no.) 44/00, 79/03 и 4/04). The Republic of Macedonia, through the Ministry of Environment and Physical Planning, has acted on several levels for more than ten years:

- it has prepared the required legal framework for climate change combating
- it has set the necessary strategic and planning framework
- it has been cooperating on bilateral, regional and international levels within common efforts towards climate change combating

Adoption of EU climate change related legislation is particular challenge for the country and requires significant strengthening of the capacity at all levels. Introduction of legal obligations through different segments of the legislation requires detailed assessment of the potential for emission reduction in different sectors (energy, waste, agriculture, industry, transport), as well as estimates of related costs. The potential for greenhouse gas emissions reduction will need to be compared with the share of such activities in gross domestic product. This would mean binding of development paths of the national economies to integrate climate change mitigation measures.

Further on, gradual capacity building is required for future involvement in emission trading and mechanism for greenhouse gas emissions monitoring, reporting and verification that would require introduction of a set of technical, administrative and institutional measures for data collection, management and reporting.

Intensification will be needed of private and public financial flows for measures undertaking towards climate change abatement and adaptation, as well as technology transfer and capacity strengthening.

For the purpose of gradual addressing of climate change issues from EU perspective, project activity is carried out with the support of the Government of the Kingdom of Norway for enabling the future implementation of the European Emission Trading Scheme. In meantime, using the Bulgarian experience and their allocation as developed country obligation after the Climate Summit in Copenhagen, the development of the Roadmap for implementation of EU Directives on emission trading and monitoring mechanism 2003/87/EC and 2009/29/EC has been supported.

Drafting of the Law on Climate Action and long-term strategy for climate has been planned under the IPA TAIB 2012 (for the purpose of which terms of reference will be developed under IPA TAIB 2011). The country is expected to determine the so called contributions to the Paris Summit in 2015 concerning greenhouse gas emissions reduction. Preliminary analyses have been made in the frame sof the Third National Communication on Climate Change , in line with the National Programme for EU Acquis Adoption, and preparation of policy paper has been envisaged to be developed with the support of the Centre for Energy, Information and Materials at MASA, also supported by UNDP.

The country has taken active part in the work of the regional environment and climate network (ECRAN) established under IPA Multi-beneficiary.

2. Status and trends

2.1. National greenhouse gas inventory

The National greenhouse gas inventory has been prepared for the period 2003 to 2009. For the first time, country specific emission factors were specified for the key emission sectors, thus enabling estimates of emission from certain sectors to be carried out by applying higher Tier 2 methodology. The main five key emission sectors identified for the Republic of Macedonia are as follows: CO2 emissions from energy industry (coal, lignite); CO2 emissions from mobile sources – road traffic; N2O (direct and indirect) emissions from agricultural soils; CH4 emissions from landfills for solid waste; and CH4 emissions from enteric fermentation of domestic animals.

The overall direct greenhouse gas emissions in Macedonia, for 2009 amounted 10.252 kt CO2-eq and these included land use and land use and forestry change. In that year, national emissions per capita amounted 5.6 t CO2-eq. Emissions originate mainly from energy sector (73%, ranging between 8.500 and 9.000 kt CO2-eq per year), followed by agriculture (13%, this percentage reduces every year along with the reduction in the number of domestic animals) and waste (7%, increases due to population growth). Industry sector contributes 7% to the national greenhouse gas emissions. Land use and land use and forestry change are responsible for 3–10% of emissions depending on forest fires, soils management (application of artificial fertilizers) and land use conversion in the specific year.

Analyzing the direct greenhouse gas emissions, we may note that CO2 emissions contribute 75–80% to overall emissions for the covered period (mostly from fuels combustion from energy sector), CH4 emissions contribute 12–14% (mostly from agriculture and waste sectors), N2O emissions contribute 7–9% to the overall emissions (from fuels combustion and emissions from soils) and 1–2% are emissions of HFCs from industry sector. With regard to indirect greenhouse gases, most of NOx emissions (7% of the overall

indirect greenhouse gas emissions in the covered period) and CO emissions (32%) come from energy sector, transport and industry for energy production (coal, lignite), combustion in agriculture (residues from crops) and land use sector, land use and forestry change (forest fires). Emissions of NMVOC (25%) originate from industry, especially production processes and minor part from the sectors of transport and solvents use, while the biggest part of SO2 emissions (36%) come from energy, construction and transport.

In order to provide sustainability of the process of preparation of greenhouse gas inventories, new institutional system was introduced and applied. Besides this, the Law on Environment was amended to establish national system for collection and management of data necessary to develop national greenhouse gas inventories. As part of this process, National Committee for Climate Change (NCCC) was established and regularly involved in the process of preparation of the Third National Communication. Determination of country specific emission factors was enabled as data was provided from the private sector, installations and other national and governmental institutions, including Economic Chamber and State Statistical Office. This enabled introduction of several subsectors for the first time, such as aviation, as well as introduction of improved methodology for emission estimates in many subsectors, such as cement production, air navigation and railway transport.

Табела 1: Direct emissions of greenhouse gases/removal from sectors in the period 1990–2009 [kt CO2-eq]

	1990	2000	2003	2004	2005	2006	2007	2008	2009
Energy	9.940	9.227	9.059	8.732	9.456	8.543	9.035	9.146	8.761
Industrial processes	889	886	598	971	1.076	784	944	975	434
Agriculture	1.908	1.380	1.734	1.788	1.581	1.677	1.496	1.403	1.321
Waste	786	844	833	839	840	852	862	872	881
LULUCF	-33	-1.450	-977	-989	-1.093	-927	8	-718	-1.146
Total CO_2-eq without LULUCF	13.524	12.336	12.231	12.330	12.953	11.857	12.337	12.397	11.399
Total CO_2-eq with LULUCF	13.193	10.886	11.255	11.341	11.861	10.929	12.344	11.680	10.252

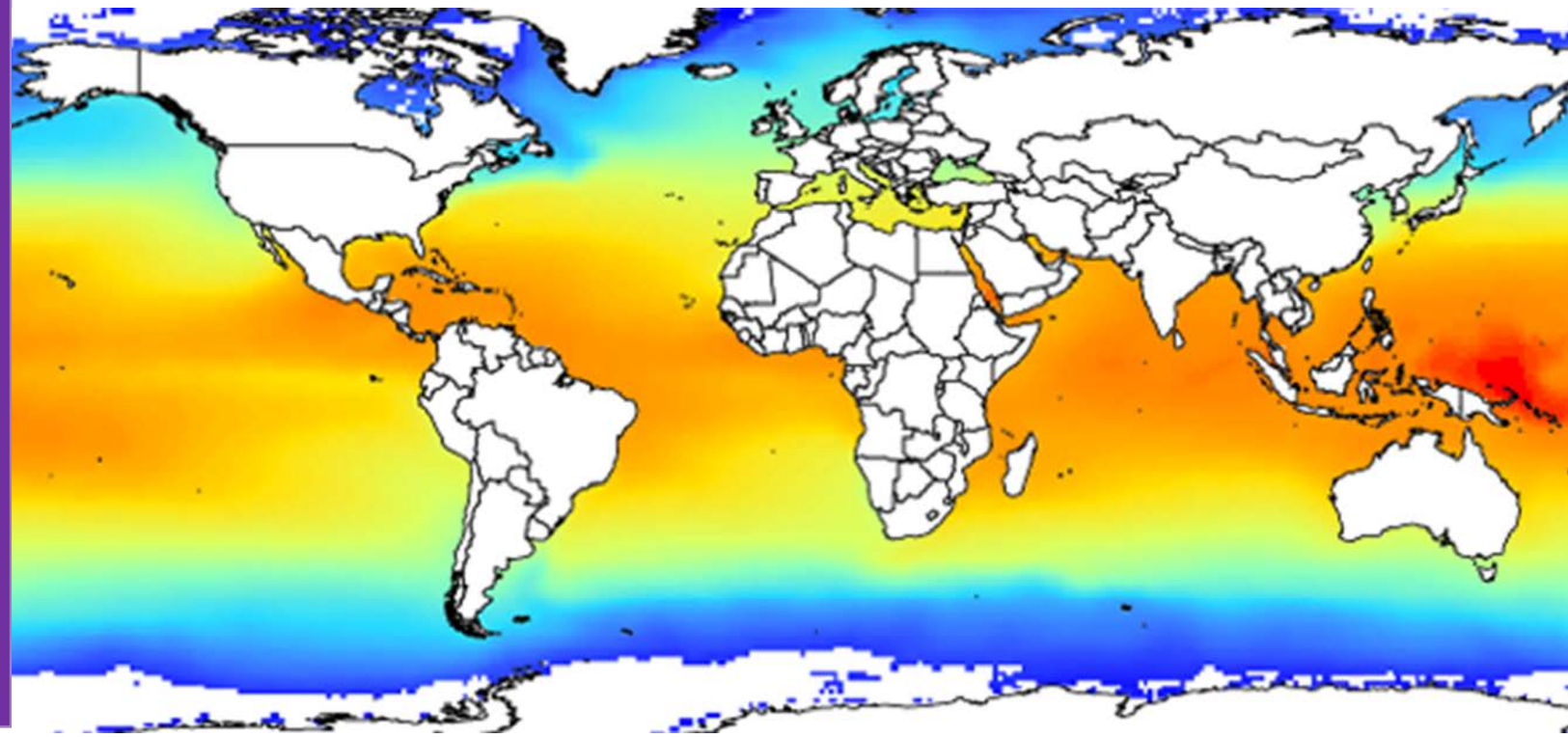
Direct emissions of greenhouse gases

75-80% CO_2

12-14% CH_4

7-9% N_2O

1-2% HFC_s



2.2. Climate change mitigation

The analysis of the possibilities for climate change mitigation was built on the analysis made in the frames of the Second National Communication, but it took into account other changes as well, as candidate country for EU membership and as member of the European Energy Community. It also included detailed analysis of numerous nationally adequate activities for climate change mitigation (NAMAs) submitted as part of the contribution to the Copenhagen Accord. As member of the Energy Community, the Republic of Macedonia has been already obliged to harmonize its legislation with the EU acqui communitaire concerning energy, which means, for example, renewable energy utilization, standards for energy efficiency in buildings and equipment, integration of energy efficiency criterion in public procurements and reduction of certain pollutants (e.g. SOx and NOx) in power plants. Besides the above, if the Republic of Macedonia enters the EU by 2020, it will have to implement the EU policies for climate change mitigation and be part of the EU efforts of emission sharing as part of the scheme for emissions reduction by 20% until 2020. This will assume measures as those for the Energy Community and additional measures concerning, for example, EU Emission Trading Scheme (EU-ETS). In case the country fails to become EU Member, it will probably continue with the transposition of climate change related Directives, though with slower rate. Then, Macedonia will have a choice whether to join Annex (QELRC) or stay in the position of non-Annex I countries and propose target as deviation from the baseline development scenario. In any case, the same policies and measures will be probably implemented, but with different pace and intensity. As part of the elaboration of climate change mitigation measures, NAMAs are also prepared for the City of Skopje, transport and energy sectors.

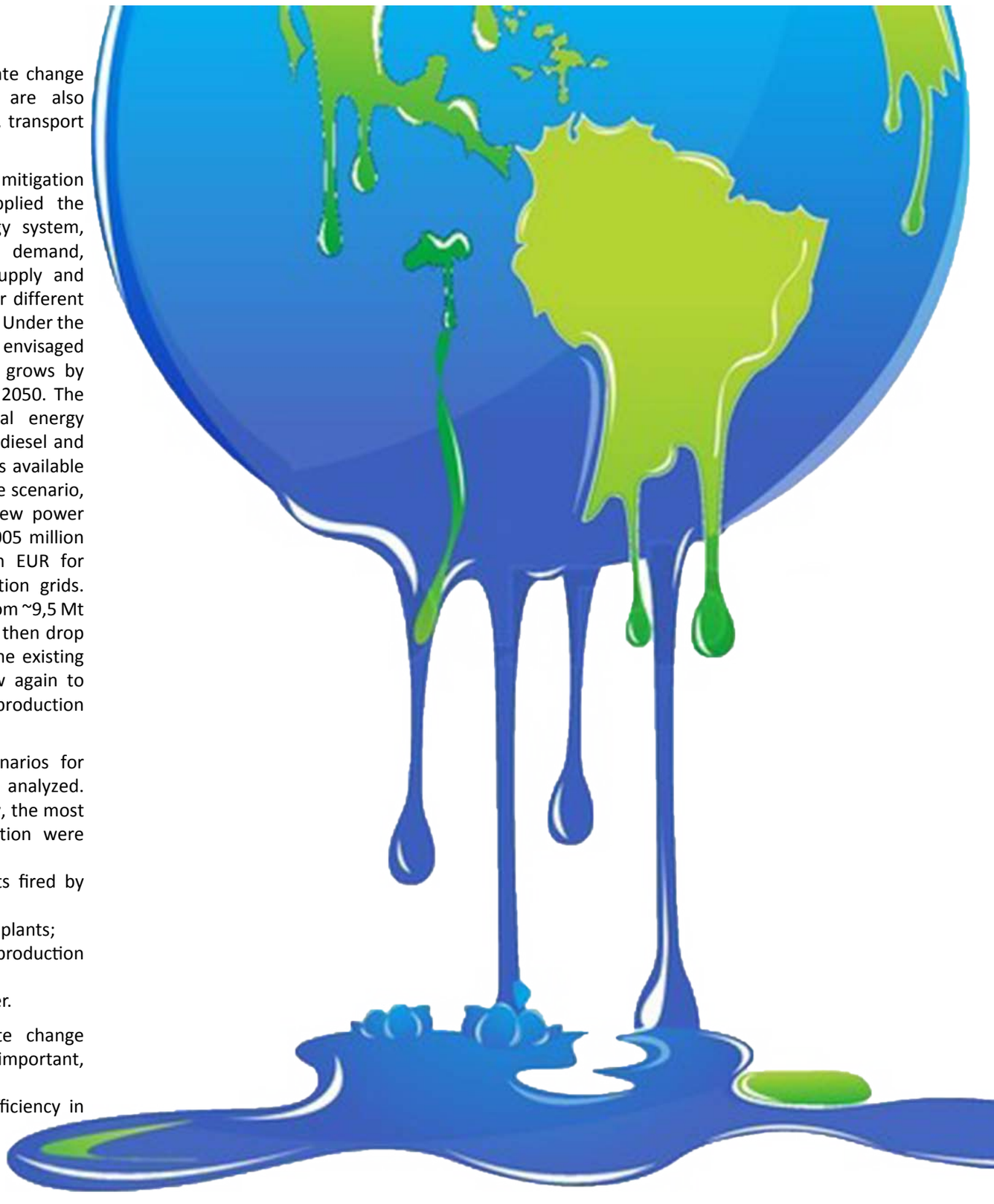
The analysis of climate change mitigation potential in energy sector applied the model MARKAL for the energy system, in order to project energy demand, costs for demanded energy supply and greenhouse gas emissions under different development scenarios by 2050. Under the baseline scenario, it has been envisaged that final energy consumption grows by 48% by 2032, and by 102% by 2050. The most significant share in final energy consumption belongs to use of diesel and electricity, as well as natural gas available from export. Under the baseline scenario, the expected investment for new power plants and devices is around 4005 million EUR plus additional 95 million EUR for new transmission and distribution grids. Emissions of CO2 will increase from ~9,5 Mt in 2011 to ~14 Mt in 2032, and then drop sharply due to the closure of the existing thermal power pants and grow again to ~14 Mt in 2050, and electricity production will have the biggest share.

Three different groups of scenarios for climate change mitigation were analyzed. With reference to energy supply, the most cost-effective areas for mitigation were identified, these being:

- Installation of power plants fired by natural gas instead of coal;
- Installation of hydro-power plants;
- Development of energy production from wind; and
- Increased use of solar power.

Besides energy supply, climate change mitigation measures are also important, especially those that include:

- Improvement of energy efficiency in building sector;



- Different measures in transport sector for low carbon fuels use, increase of public awareness of more efficient driving, improvement of travelling habits, improvement of vehicle fleet, as well as improvement of the equipment in vehicles; and
- Improvement of industrial processes for higher energy efficiency.

In the sector of waste, under the baseline scenario, it was envisaged that emissions will rise by 2030 due to the growth of population and economic growth. While considering different scenarios with activities that can be undertaken for municipal solid waste, the most cost-effective scenario including also significant reductions in greenhouse gas emissions is the one involving closure and reclamation of existing landfills and combustion of the gas from the landfills (to cause very low marginal costs for mitigation), introduction of mechanical biological treatment with composting and fuel production from waste.

Increase is expected in agricultural activities due to increased demand for food that will in turn increase greenhouse gas emissions in this sector. In the frames of the preparation of this Communication, detailed analysis was made of climate change mitigation potential in agriculture:

- Increase of organic agriculture
- Livestock breeding management to achieve less intensive enteric fermentation which is significant source of greenhouse gases
- Improved management of wheat crops residues
- Improved irrigation with sparkling and dropping
- Changing ploughing techniques
- Improved fertilizer management
- Improved manure management
- Production of biogas in agricultural holdings

The analysis concluded that the potential for technical mitigation of climate change in agriculture is extremely great, especially with regard to emissions from this sector. With regard to costs for mitigation, the sector is particularly attractive, with many options for mitigation that do not induce cost and some that create profit (increased production as economic justification to adopt certain activities for climate change mitigation), with low capital investments.

We may conclude that under the baseline scenario, emissions of greenhouse gases are envisaged to change from around 12.100 kt CO2-eq to around 16.150 kt CO2-eq or to increase by around 33% (Figure 1 1). In the period between 2014 and 2023, total emission is almost the same, but after this period significant increase will occur in emission from energy sector and the level of total emissions will progressively grows. The sector of greatest growth of emissions is the sector of households with 60% growth, followed by transport with 56% and waste with 54%.

The sector of electricity production has the highest contribution to overall greenhouse gas emissions with around 58% during the whole planning period, followed by transport sector with contribution of 12%-14% and industry with contribution of around 10%.

Combination of the most aggressive mitigation scenarios in energy, waste and agriculture will result in significant reduction of greenhouse gas emissions – from 11.200 kt CO2-eq to 8.250 kt CO2-eq. Introduction of price for CO2 from 2020 will induce closure of the current thermal power plants fired on lignite, by which the level of greenhouse gases in energy sector

will drop by more than 65%. Total emission of greenhouse gases under the climate change scenario for the period between 2014 and 2017 will reduce by around 8%, and after this period reductions will become progressive and in 2030 emissions would be lower by 50% compared to those under the baseline scenario (Figure 1 2).

2.3. Trends of temperature and precipitations in the Republic of Macedonia

2.3.1. Climate change scenarios by 2100

By application of the software MAGICC/ SCENGEN version 5.3, projections have been made for future possible climate change. In this process, six scenarios were used under IPCC SRES/AR4: A1B-AIM, A1FI-

Projections of greenhouse gas emissions under the baseline scenario (kt CO2-eq)

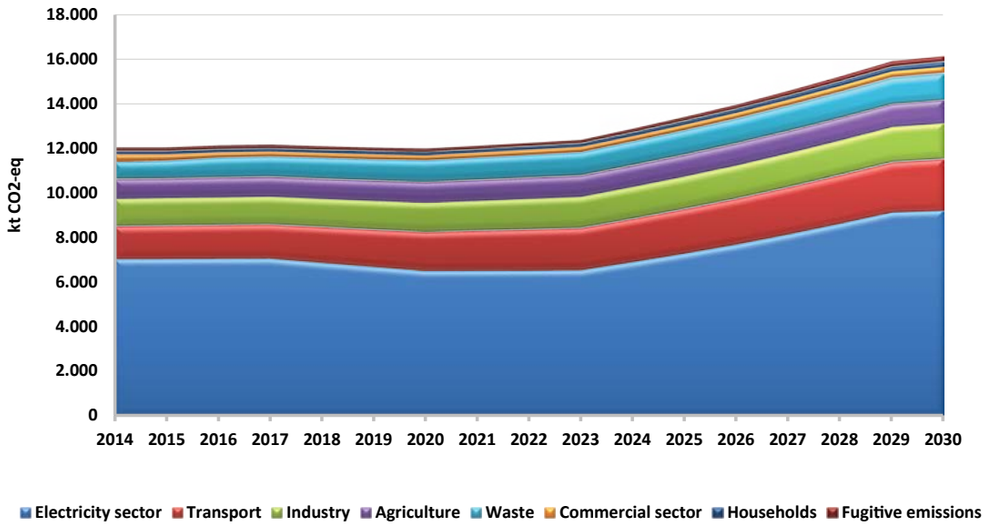


Figure 1

Total emissions under baseline and climate change mitigation scenarios (kt CO2-eq)

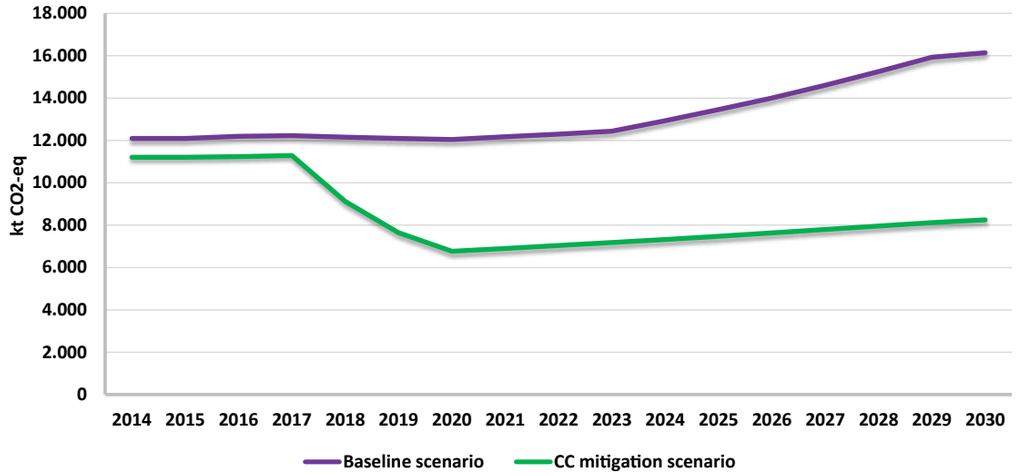


Figure 2

MI, A1T-MES, A2-AS, B1-IMA and B2-MES, and for the period between 2025 and 2100 (reference period: 1961–1990) air temperature and changes in precipitations were estimated. Estimates relied on data from 18 models, which generated results for two central geographical points. Scenarios were generated for four specific years, for each central point, for each of the three values of climate sensitivity and each of the six scenarios. Monthly and seasonal values were obtained for temperature and changes in precipitations.

On the basis of modeling results, we may conclude the following:

1. It is probable that there will be constant increase in temperature in the period between 2025 and 2100;
2. Compared to the period between 1961 and 1990, changes envisaged for the period between 2025 and 2100 will be the most intensive in the warmest period of the year;
3. Average monthly temperatures at the transit between winter and spring

might equalize for this period;

4. For the period between 2025 and 2100, drop in precipitations is envisaged in all seasons and at annual level, and greatest reduction will occur during summer;
5. Intensity of changes will be greatest in the warmest part of the year (July and August might be without precipitations at all); and
6. During cold period of the year, reduction in precipitations is envisaged by as much as 40% of the average monthly amounts.

3. Recommendations

Recommendations for future inventory improvement are as follows:

- Development of inventories at local level;
- Development of emission factors for different fuels and types of combustion for road and railroad transport;
- Establishment of national system for greenhouse gas emissions reporting in industry;
- Collection of detailed information required to determine emissions of CH4 from enteric fermentation from cattle by using methodology under Tier 2;
- Development of forest inventory to enable greater accuracy in determining greenhouse gas emissions from land use and land use changes and forestry (LULUCF); and
- Undertaking of additional measures to improve the capacity for data obtaining from the waste sector.

AGRICULTURE

AGRICULTURE

1. Background

Agriculture is important economic activity which at the same time makes pressures on the environment. Long-term efforts aimed at establishment of sustainable agricultural practices through reducing agricultural practices that are detrimental to environment and increasing positive impacts of agricultural activities on environment may also have positive economic and social impacts.

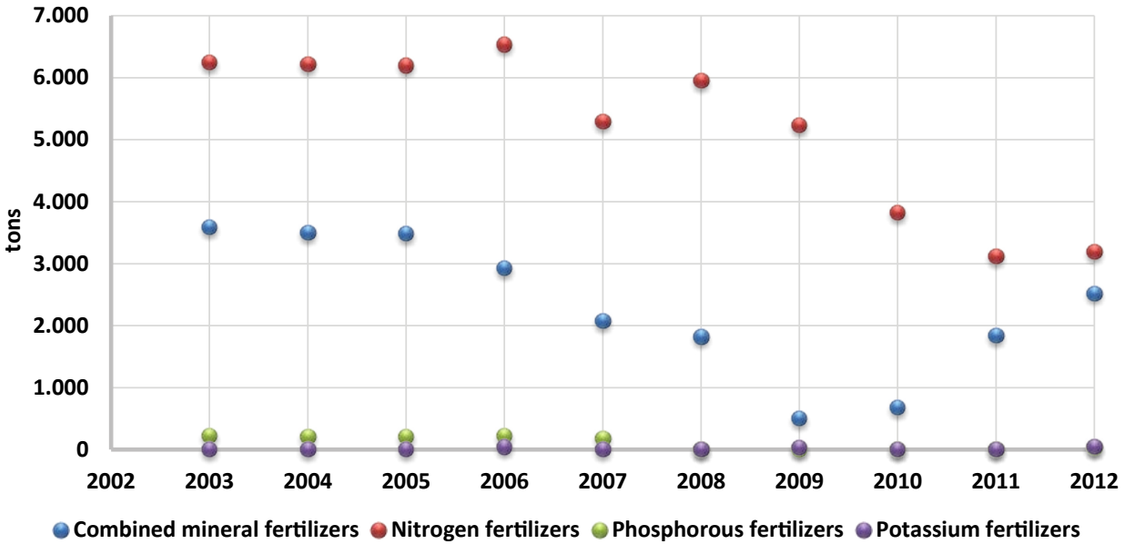
The Annual Report has been prepared on the basis of data deriving from environmental indicators and data from the Ministry of Agriculture, Forestry and Water Economy has been used for elaboration of this Report, too.

2. Status and trends

2.1. Use of mineral fertilizers

Mineral fertilizers are substances containing chemical elements necessary for plants growth and development, especially nitrogen, phosphorus and potassium. This indicator shows the overall quantities of used mineral fertilizers in tons, as well as their application per hectare cultivated land area.

Used mineral fertilizers *



*Data on used mineral fertilizers concerns quantities of fertilizers used by agricultural companies and agricultural cooperatives

Diagram 1

Mineral fertilizer consumption in agriculture noted a falling trend in the period from 2003 to 2012. Consumption of nitrogen mineral fertilizers dropped by 48.8%. Consumption of potassium fertilizers dropped by 84.18%. Consumption of combined mineral fertilizers from 2003 to 2009 dropped by 86.09%, while in the period from 2009 to 2012 there was gradual increase by 405.81%. The total consumption of mineral fertilizers dropped by 42.33%. Consumption of potassium fertilizers manifested periodical trend of reduction and increase, with consumption increasing again in 2012.

In the period from 2003 to 2012, mineral fertilizer consumption in agriculture dropped from 10.074 tons to 5.809 tons fertilizers, the quantity of applied mineral fertilizers on cultivated land area (agricultural companies and agricultural cooperatives) expressed in kilogram per hectare, increased from 2003 to 2009 from 89.17 kg/ha to 118.76 kg/ha, representing an increase by 33.18 %, and in the period 2009 to 2011 it reduced by 8.21%, and increased again in 2012.

It is difficult to connect the reduction in mineral fertilizers consumption directly with the impact on the quality of the environment. The ultimate effect on the quality of environment depends to a great extent on other factors, such as use of organic fertilizer, yield from crops, soil types, management of agricultural farms, etc.

Used mineral fertilizers per arable area

Diagram 2

2.2. Livestock breeding

Table no.1: Total number of cattle 2008-2012

Year	Cattle	Pigs	Sheep	Poultry	Bee families
2008	253.473	246.874	816.604	2.226.055	61.705
2009	252.521	193.840	755.356	2.117.890	53.439
2010	259.887	190.552	778.404	1.994.852	76.052
2011	265.299	196.570	766.631	1.944.260	65.277
2012	251.240	176.920	732.338	1.776.297	52.897

As presented in table, we can see that cattle noted gradual increasing trend from 2008 to 2011 by 4%, while in 2012 the status in cattle number dropped again by 5% relative to 2011. Other cattle: pigs, sheep and poultry noted falling trends from 2008 to 2012, while bee families recorded increase from 2008 to 2010 by 23% followed by reduction in 2012 by around 30% relative to 2010.

2.3. Areas under organic agriculture

Organic agriculture is a production system reducing or eliminating the use of GMOs and input of synthetic chemicals such as synthetic chemical fertilizers, pesticides, hormones and growth regulators in agriculture. Instead, the use of good practices in the agro-ecosystem management for crop and livestock production is promoted.

The indicator is presented as sum of area under organic farming and area being converted for organic farming, divided by total cultivated land or total agricultural area, presented in percentages.

Table no. 2: Total cultivated area and total agricultural area

	2005	2006	2007	2008	2009	2010	2011	2012
Cultivated area in ha	546.000	537.000	526.000	521.000	513.000	509.000	511.000	510.000
Total agricultural area in ha	1.229.000	1.225.000	1.077.000	1.064.000	1.014.000	1.121.000	1.120.000	1.268.000

Areas with organic agricultural production

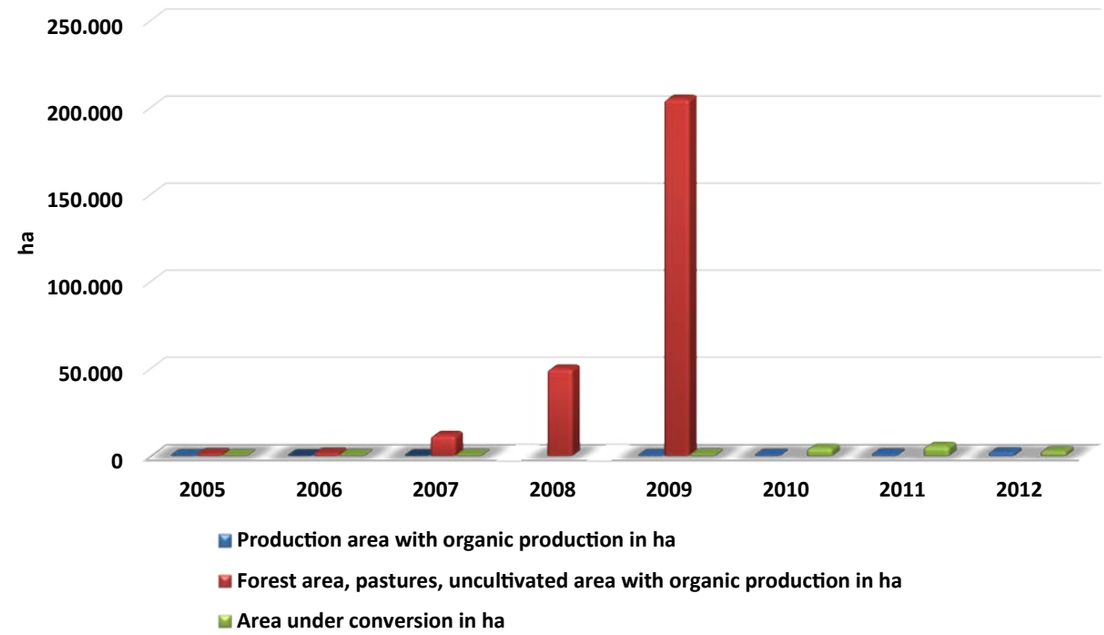


Diagram 3

In the period 2005 to 2011, areas under organic agricultural production and number of organic operators were in constant increase, but in 2012 this trend in areas under organic agricultural production and number of organic operators decreased.

Table no. 3: Areas under organic agricultural production as % of cultivated land area

	2005	2006	2007	2008	2009	2010	2011	2012
Production area under organic production in ha + Area under conversion in ha	593	509	714	1.029	1.372	5.225	6.581	4.663
As % of cultivated land area	0,109	0,095	0,136	0,198	0,267	1,027	1,288	0,914
As % of the total agricultural area	0,048	0,042	0,066	0,097	0,135	0,466	0,588	0,368

In 2012, areas under organic agricultural production amounted4.663,08 hectares. Organic production contributes 0.914% to the total cultivated land area, and 0,368% to the total agricultural area.

The number of certified organic operators increased from 50 in 2005 to 780 in 2011 abd decreased again in 2012 to 576.

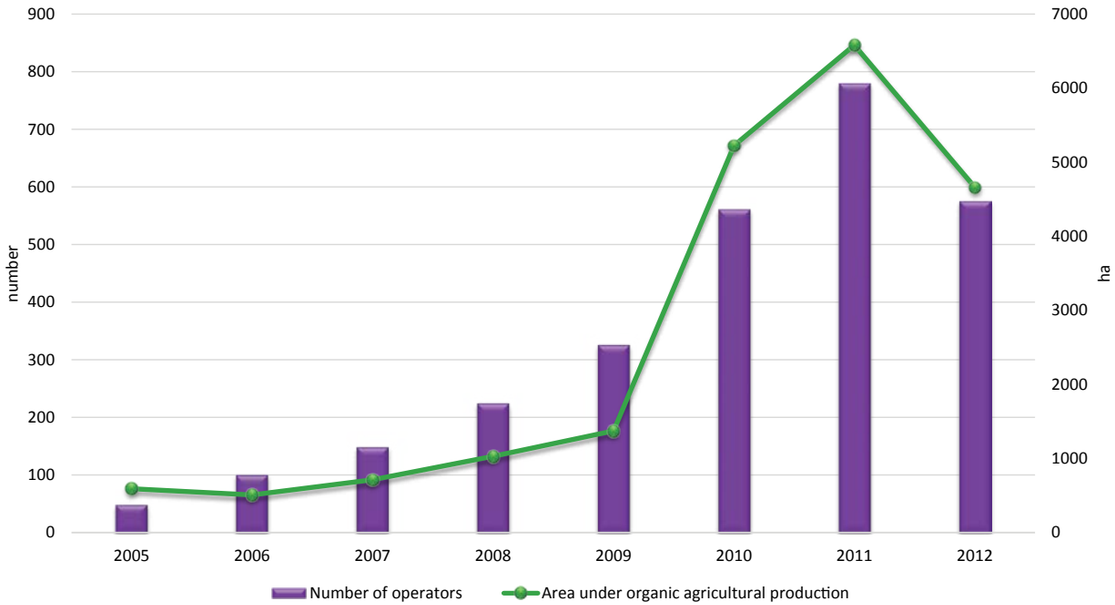


Diagram 4

Organic vegetable production in 2012 in ha

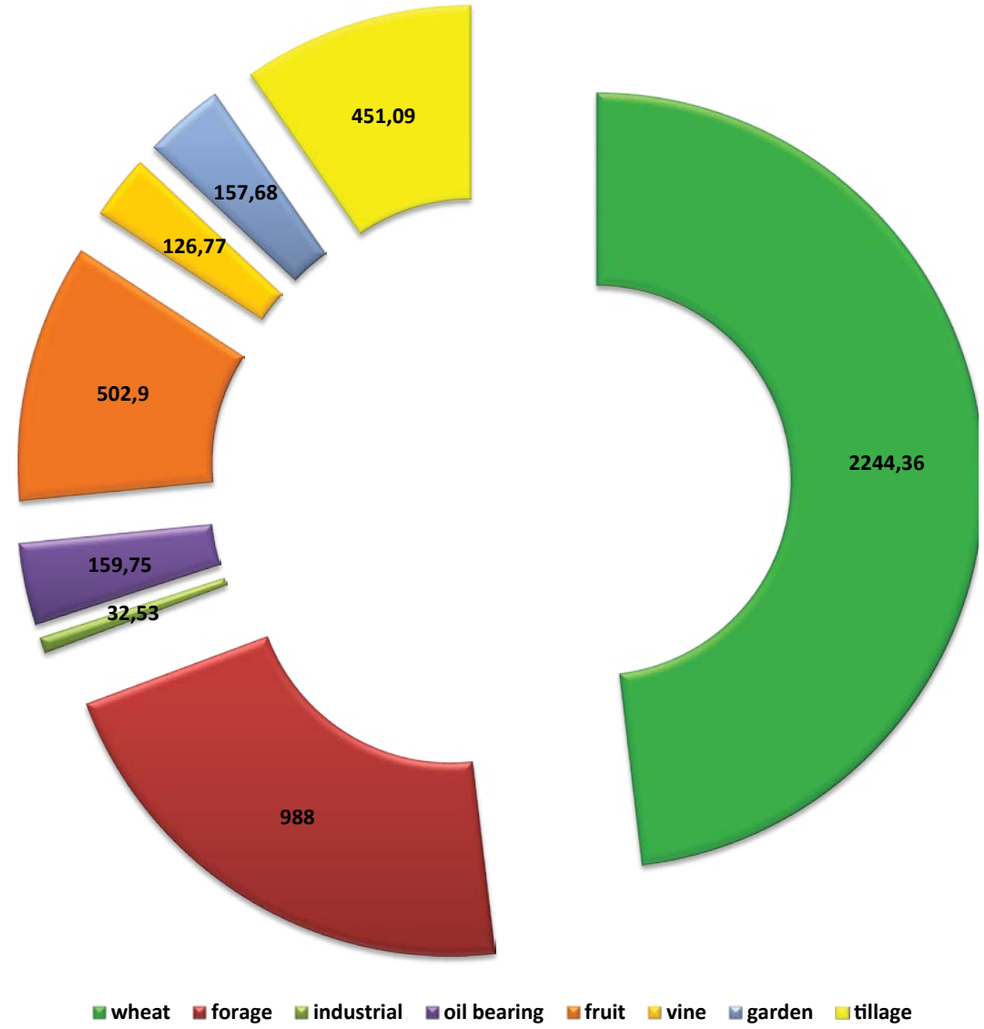


Diagram 5

As we can see on Diagram 5, wheat crops were leading organic crop in Macedonia in 2012 with a share of 48.13%, followed by forage crops with 29.19 % share, while industrial crops had the lowest share of 0.70 % in the overall certified.

2.4. Use of plant protection products

Plants protection products or pesticides are chemical substances which restrain diseases and pests in plants. This indicator shows the quantities of pesticides used for plants protection, such as fungicides, herbicides, insecticides and category of total including, apart from the mentioned ones, other plant protection products.

Upon data processing, total quantities of used substances were presented in tons, as well as proportional share of different pesticide groups and their application per hectare cultivated land area (kg/ha).

Used plant protection products*

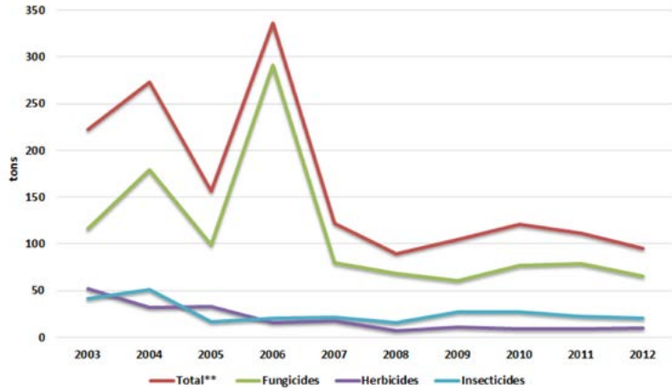


Diagram 6

**In the category total, besides listed fungicides, herbicides and insecticides, includes other plant protection products as well

*data on the use of plant protection products refer to quantities used in agricultural companies and agricultural cooperatives

Application of pesticides in agriculture, including all plant protection products, like fungicides, herbicides, insecticides and total quantity shows a trend of reduction in quantity consumed in the in the period between 2003 and 2005, sharp increase in 2006 and then reduction again by 2012.

Consumption of fungicides from 2003 to 2006 showed a trend of reduction and increase variations, so that reduction was noted from 2006 to 2012 by 77.66%.

Consumption of herbicides reduced by 80%, insecticides by 52%, while the total consumption of pesticides also showed a trend of reduction and increase variations from 2003 to 2006, and from 2006 to 2012, the overall consumption of pesticides in agriculture reduced by 71.72%.

Use of plant protection products in percentage

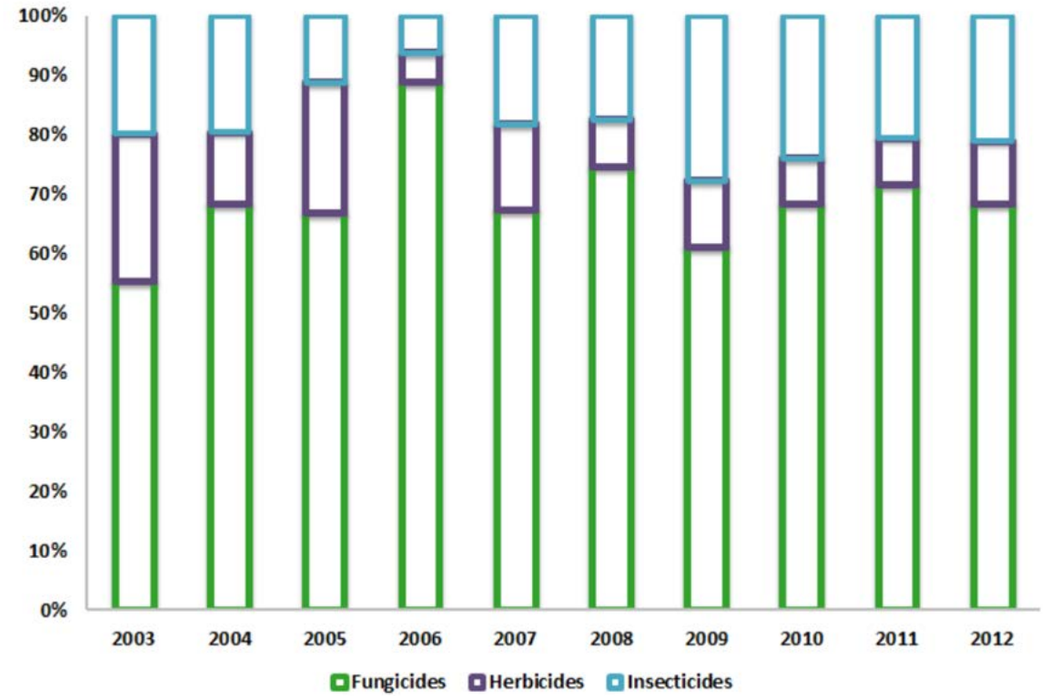


Diagram 7

With reference to proportional share of plant protection products, fungicides were the most used in the period from 2003 to 2012. In 2012, fungicides had the highest share of 68.42%, then insecticides 21% and herbicides 10.52%.

Total used plant protection products per total arable land

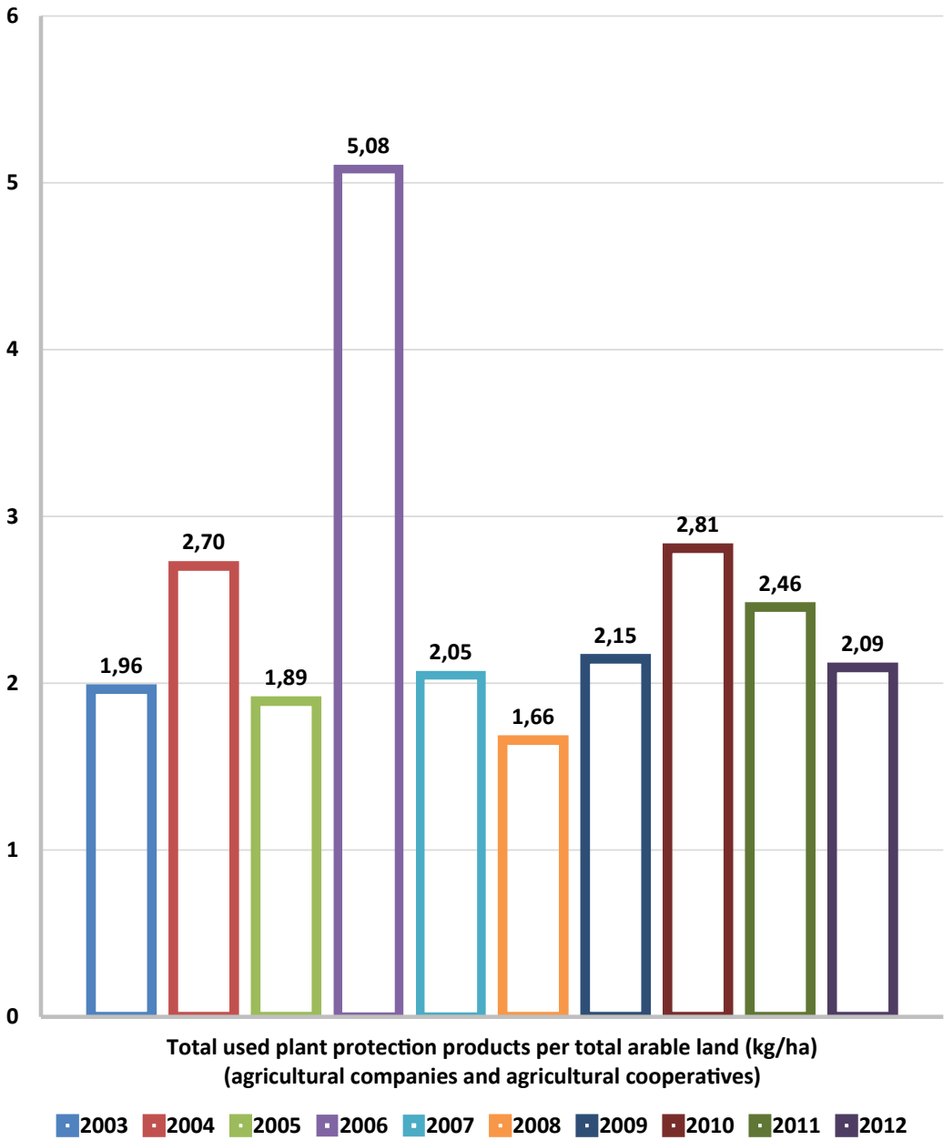


Diagram 8

The total plant protection products consumed per total cultivated land area by agricultural companies and agricultural cooperatives expressed in kilograms per hectare, from 2003 to 2012 increased from 1.96 to 2.09 kg/ha, which is an increase by 6.63%.

3. Brief assessment and possible development

The Law on Agriculture and Rural Development was adopted in 2007 as basic horizontal law regulating areas of planning and implementation of agricultural and rural development policies, as well as other aspects of agricultural and rural development policies.

The 2010 amendments to the harmonized and integrated the principles of programming, monitoring and implementation of the policy of the Republic of Macedonia for agricultural and rural development with European common agricultural policy.

The Law includes provisions on programming and implementation of the policy for state aid, as well as provisions concerning application of rural development measures.

In 2007, the Government of the Republic of Macedonia adopted the **National Strategy for Agriculture and Rural Development,** where the principles of the policies for supporting measures adjusted to expected changes in legislation, institutions and control systems are set. The Strategy defines the strategic goal as basis for agriculture and rural sector development in the Republic of Macedonia in the period 2007 – 2013, and it reads: "to strengthen agriculture to be competitive at integrated regional markets of the European Union and Southeastern Europe through measures aimed at increasing the efficiency of agricultural production, processing and placement and build appropriate effective public and private institutions; to enhance revenues on the farm; to ensure that consumers have access to safe and healthy food; to optimize the benefit from limited soil, forest and water resources, in environment friendly manner; and to build vital rural communities through sustainable rural development ".

The framework of organic agricultural production is defined in the **Law on Organic Agricultural Production**; a number of bylaws were adopted under this Law in the course of 2010, to regulate production, processing, labeling of organic products, authorization and certification, as well as control systems; Law on Agriculture Development Fostering, Law on Environment and Law on Nature Protection.

In 2007, the Government of the Republic of Macedonia adopted the **National Strategy for Organic Production (2008 - 2011)** establishing the grounds for organic agricultural production introduction and development. This Strategy was accompanied with Action Plan of measures and activities for Strategy implementation and major portion of those have been implemented.

National Plan for Organic Production 2013-2020 was adopted. The goal of the National Plan for Organic Production for the period 2013 – 2020 is the instrument providing basis for further development of organic production in the Republic of Macedonia. Furthermore, this National Plan sets the directions, activities and measures, i.e. policies to be implemented by MAFWE in the period 2013-2020 for the future development of organic production in the Republic of Macedonia and it is also a basis for planning and implementation of the financial support in this sector.

The Law on Agricultural Production stipulates measures for agricultural land fertility increase through undertaking of agro-technical measures, and one of such

measures is fertilization, i.e. use of mineral fertilizers. It is also stated that protection of agricultural land against contamination and infection is accomplished by prohibition, restriction and prevention of direct input of harmful matters in soil, water and air and undertaking of other measures for its productivity maintenance and improvement. It is also set that protection of agricultural land is also subject to regulations for environment and nature protection and improvement.

The Law on Fertilizers regulates the manner of fertilizers use.

The Law on Nature Protection in Article 4 specifies the goals of protection, which include conservation and renewal of existing biological and landscape diversity in condition of natural balance and prevention of harmful activities and disorders in nature.

The Law on Plants Protection regulates protection of plants from diseases, pests and weeds, as well as trade and use of plants protection products.

The Law on Plants Protection Products regulates approval, placement on the market, use and control of plants production products, placement on the market and control of active substances that are products; maximum level of residues, equipment for products use; exchange of information related to products, production, recording of legal and natural persons involved in products production and placement on the market, conditions for authorization of the bodies responsible for implementation, monitoring and control of this Law.

The Law on Plant Health regulates the health of the plants, measures and obligations related to the occurrence of harmful organisms on plants, plant products and other facilities and objects, prevention of their input and spread, measures for eradication, biological measures for plant protection, access to and exchange of information and information system, costs and fees, responsibility of bodies, authorized services, authorities and bodies in the area of plants health.

4. Recommendations

The National Programme for Agriculture and Rural Development for the period 2013-2017 mentions policies and measures for rural development, among which Protection and improvement of environment and rural areas is mentioned as important, being aimed at promoting agricultural production practices for sustainable use of agricultural land, environment and rural landscapes protection and improvement for the purpose of conservation of biological and landscape diversity and improvement of soil, water and air.

Measures applied under IPARD Programme 1 include: Increase of competitive ability of agriculture and forestry sectors; under priority area 3: Improvement of the quality of life in rural areas and fostering diversification of economic activities in rural areas.

For the period 2013-2014, it has been planned to introduce the following measures for funding by IPARD funds, priority area 1: Increase of competitive ability of agriculture and forestry sectors – enhancement of knowledge and promotion of human potential in rural areas, under priority area 2: environment and rural landscapes protection and improvement – Promotion of agricultural production practices for sustainable use of agricultural land for the purpose of conservation of biological and landscape diversity (protection of native species), Organic production.

Measures for technical support will as priority be intended to several areas of support, among which we should mention the following: promotion of agricultural production; support to inventing and implementing innovations in agricultural production; introduction of renewable energy, savings in energy consumption and production in both farming and livestock breeding, introducing practices that do not pollute the environment and conservation of biological diversity and biological specific features in the Republic of Macedonia;

In order to achieve orientation towards improved results and increased agricultural production and higher quality of agricultural products, but at the same time protection

of the environment and optimum use of natural resources and energy, principles of good agricultural and hygienic practice (GAPHP) will be introduced as precondition for acquiring the right to use financial support for agriculture and rural development.

The National Plan for Organic Production 2013-2020 determines the directions, activities and measures, i.e. the policies to be implemented by MAFWE in the period 2013 -2020 for the future development of organic production in the Republic of Macedonia, and it is basis for planning and implementation of financial support in this sector. The Action Plan for organic production for the period 2013 – 2020 identifies several areas for intervention/ goals, namely:

1. **Primary agricultural production**- arable land under organic production should reach a share of 4% in the total arable agricultural land in Macedonia and 4% in the total certified animals in organic livestock breeding (including bee keeping and fishery) of the total livestock in Macedonia – to identify and support strategically significant organic products; to improve accessibility of raw materials allowed in organic production.
2. **Manufacturing industry** – diversify sectors of manufacturing industry included in the processing of organic products- to increase supply and assortment of processed organic products.
3. **Trade**-increase assortment and quantities of organic products;

   - increase demand for and consumption of organic products;

   - increase public awareness of organic food;

   - use possibilities for consumption of organic products through eco-tourism development;

   - increase the placement of Macedonian organic products on export markets;
4. **Control and certification** – increase the competition of supply of controlled and certified services; - institutional strengthening of the system of organic production supervision;
5. **Education and science** – increase the share of education in the area of organic production (in formal and informal education);

   - increase of the number of accredited modules for agricultural production of II and III cycle of studies at university scientific institutions in the country;

   - intensify research in organic agri cultural techniques in the Republic of Macedonia;

   - intensify and extend research in the potential of natural resources in the Republic of Macedonia;

   - initiate market investigation;
6. **Policy and legislation**

   - strengthen institutionally and enable professionally the institutions involved in the system of organic production (knowledge, human resources, infrastructure)

   - increase cooperation and communication between all involved parties and stakeholders;

   - strengthen organic farmers' associations and other non-governmental organizations and support their networking and cooperation with cooperatives.

GENETICALLY MODIFIED ORGANISMS

GENETICALLY MODIFIED ORGANISMS

1. Introduction

According to the national Law on Genetically Modified Organisms (Law on GMO), "genetically modified organism" means any organism, including any micro organism, except human beings, in which genetic material has been changed in a manner that does not occur naturally in the processes of reproduction and/or recombination. GMO combination shall also be regarded as GMO.

According to EU legislation, "GMO means organism means organism, except human beings, in which genetic material has been changed in a manner that does not occur naturally through mating and/or natural recombination" (Directive 2001/18/EC of the European Parliament and of the Council of 12 March 2001 on deliberate release of genetically modified organisms in the environment revoking Council Directive 90/220/EEC – Declaration of the Commission)

Under the international Cartagena Protocol, "living modified organism (LMO) means any alive organism possessing new combination of genetic material obtained by application of modern biotechnology" (Cartagena Protocol on Biosafety to the Convention on Biological Diversity).

Genetically Modified Organisms (GMOs) are organisms such as plants and animals, the genetic characteristics have been modified artificially, in order to obtain new properties. Introduction of GMOs in the environment has two aspects with regard to biosafety of environment and GMO products consumption as food and food.

Techniques of modern biotechnology are considered as new and promising tools for cultures improvement and new modes of plants, animals and micro organisms use. However, the concern related to GMO safety for human health and environment contributes to moderate development and spread of GMO products. For that purpose, National Biosafety Systems are intended to serve as mechanism leading to biotechnological products use without risk to human health and impact on environment.

Establishment of biosafety system has many aspects and challenges and investments are necessary to strengthen the capacity of institutions and persons in charge to implement and manage the system. Rapid development of biotechnology during the last 20 years initiated development of relevant national legal frameworks for biosafety. On one hand, these national legal frameworks are aimed at securing adequate level of human health and environment protection against possible undesired effects deriving from the products of modern biotechnology, and establishing grounds to strengthen the confidence of public on the other, as well as providing legal certainty for research organizations and industry. Unregulated introduction of products of modern biotechnology may lead to loss of wild species and loss of agricultural biodiversity. In this way, operational biosafety framework of appropriate capacity has to secure that possible benefits of modern biotechnology may be covered in fully legal way.

For the above purpose, in the frames of the Ministry of Environment and Physical Planning, UNEP/GEF Project is carried out concerning support to implementation of the national biosafety framework. It has started in 2011 and its finalization has been planned by the end of 2014.

2. Status and trends

The Ministry of Environment and Physical Planning (MEPP) is the competent state body for making and implementing the policy in the area of genetically modified organisms (GMOs).

Administration of Environment (AE), body within MEPP, is competent to perform technical and administrative affairs in the area of GMOs.

Having recognized the importance of biotechnology and biosafety, the Republic of Macedonia signed the Cartagena Protocol on Biosafety on 26 JJuly 2000 and ratified it on 14 June 2005.

Upon the development of international agreements and EU legislation, including adoption of Nagoya-Kuala Additional Protocol for liability and compensation for damage, the Republic of Macedonia has to proceed to harmonize its national legislation with the EU one, such as Decision of the Council of the Nagoya-Kuala Additional Protocol for liability and compensation for damage to Cartagena Protocol on biosafety and Directive for contained use of genetically modified micro organisms.

2.1. Regulations on genetic engineering

Legal framework in the area of genetically modified organisms is set in the Law on Genetically Modified Organisms /GMOs.

The Law has been harmonized with Directive 2001/18/EC of the European Parliament and of the Council of 12 March 2001 on deliberate release of genetically modified organisms in the environment, supplemented by Regulations (EC) 1829/2003 and 1830/2003, Decision 2002/622 EC and 2002/811/EC, as well as Council Directive of 23 April 1990 on contained use of genetically modified micro organisms, supplemented by Directive 98/81/EEC, supplemented by Regulation (EC) 1882/2003 and Decision 2001/2014/E3 and 2005/174/E3.

The Law regulates the management of genetically modified organisms and combination of genetically modified organisms, genetically modified organisms containing products and/or products consistingofororiginatingfromcombination of genetically modified organisms, measures for prevention and reduction of possible negative impacts on human health and environment as consequence from contained use of genetically modified organisms, deliberate release of genetically modified organisms in the environment or release on the market of products, as well as transboundary movement of genetically modified organismsи на производи.

2.2. Deliberate release of GMOs

Deliberate release of GMOs assumes intentional application of GMO outside the system of contained use, i.e. into the environment. In accordance with the step-by-step principle, deliberate release is a binding step in the research from laboratory to practical application.

So far, there has been no case of deliberate release in the Republic of Macedonia. Meantime, by the end of 2013, three bylaws concerning deliberate release of GMO have been published.

2.3. Approval for GMO placement on the market

Placement of GMO and GMO products on the market assumes availability of GMO and GMO containing products or products composed of GMO o the market (e.g. seeds, products after harvest and preparations) of third parties. Depending on the type of application, separate approval is required for seeds and/or food.

So far, there has been no case of release of GMO products on the market in the Republic of Macedonia. According to the Law on Genetically Modified Organisms, Rulebook on information and data delivered together with the notification for export of GMO and GMO products and their characteristics was adopted in 2013 (Official Gazette of the Republic of Macedonia no.18/13).

2.4. Environmental aspect of GMO and risk assessment

For the purpose of GMO introduction and development management, as well as management of trade in GMO, countries are obliged to develop regulations concerning risk assessment, i.e. identification and evaluation of potential harmful impact on conservation and sustainability of biological diversity.

Administrative and technical officers of the competent bodies make to a certain extent the basis of the human resources for the handling of the requirements, assessment and risk management. Without adequate human resources (in quality and quantity), it will be impossible to evaluate notifications adequately and the system will not function sufficiently well, in order to respond to notifications adequately within the specified period.

Effectiveness of the system depends on the good understanding by competent national authorities of the procedures for applications handling, risk assessment, decision making and risk management.

2.5. GMO monitoring

In the context of GMO monitoring and control in the Republic of Macedonia, the systems of food and feed control, systems of seeds and phytosanitary inspection, as well as environmental inspection have been established. However, there is obvious room for improved communication between different institutions and ministries. In the frames of the UNEP/GEF project for Support to the implementation of the national biosafety framework, it has been planned to carry out training on risk assessment and aspects of monitoring. In addition, basic analysis will be made of the capacities for monitoring and risk assessment as basis for GMO management in cases of transboundary GMO movement or GMO placement on the market, in order to define routine control plan.

The resources for biosafety monitoring in the Republic of Macedonia possessed by research institutions are insufficient and this will cause difficulties in keeping the expertise in GMO analysis on high level, without any revenue generated by UNEP/GEF project. Namely, the past project activities have established that it is necessary that the GMO monitoring system involves research institutions as well. During the last several years, several national laboratories in the frames of research institutions have developed analytical services for private clients at fixed rates. However, maintenance of the accreditation under ISO17025, without any form of activity generating revenues is almost impossible in the Republic of Macedonia.

GMO monitoring is currently not included in routine controls and inspection procedures.

2.6. Parallel production of agricultural crops with and without GMO application

For centuries, farmers have been using selective growing in order to improve the properties of agricultural crops. Most of the methods concern saving of seeds, especially for plants achieving optimal yield, or generate otherwise the best combination of desired characteristics. In fact, preventing the spread of diseases through seeds is another great advantage of careful selection of seeds. Development of genetically stable plant varieties which are relatively resistant to diseases is a very long process. Traditional growing of crops and techniques of hybridization has limitations with regard to combinations of excellent crops towards production of crops resistant to certain plant diseases. Techniques of modern genetics provide tools for introduction of auxiliary characteristics in significantly rapid manner, in order to save time and especially save resources.

Plant protection products and other materials that do not contain GMOs, but are prohibited for use in cultivation, are visible. They are usually labeled. GMO seeds are not labeled and it is not possible to recognize and separate traditional seeds. At the moment, the only available way of examination is by seeds grinding and elimination of the possibility to detect the ability for germination. For that purpose, it is necessary to introduce and develop capacities for GMO analysis and testing.

3. Brief assessment and possible development

In 2013, the implementation of the UNEP/GEF project "Support to the implementation of the national biosafety framework of the Republic of Macedonia" continued. The main goal of the project is strengthening of national capacities to fulfil the requirements deriving from the ratified Cartagena Protocol on Biosafety, as well as harmonization of the national legislation with EU legislation on biosafety.

Institutional setup of the system for monitoring and control is well developed, but the need for improvement and exchange of information and communication between relevant competent bodies and other institutions involved in the system is identified. Presently, GMO monitoring is not part of routine control and inspection procedures.

Implementation of the Law on GMO is ineffective due to lack of coordination among relevant national institutions.

Furthermore, risk assessment capacities are insufficiently developed and there are not accredited laboratories in the system of monitoring. All competent institutions are not set coherently. Namely, there is moratorium for GMO for food and feed, though it remains unclear whether this is compliant with the Law on GMO from biosafety point of view.

4. Recommendations

Considering the above presented conclusions, the following recommendations are given:

- In the frames of the proposal for amendment of the Law on GMO (Official Gazette of RM no. 35/08), it has been recommended to include

provisions concerning responsibilities in risk assessment, underlining amendments in scientific bodies for GMO, as well as supplements in the segment regarding monitoring with regard to clarification of the competences for cultivation – seeds, food and feed, transboundary movement of GMO.

- Risk assessment should be carried out in line with the available scientific preparedness in the Republic of Macedonia, to provide information accessible to all parties in the national system of biosafety.
- Continue with the strengthening of the capacities of competent bodies with particular accent on GMO risk assessment and risk management and GMO monitoring, in order to implement fully operational biosafety system. It is recommendable to organize trainings on the challenges in risk assessment and risk management, administrative aspect and GMO monitoring. Namely, in the frames of UNEP/GEF Project, three day workshop has been planned on risk assessment to take place in April 2014, and one two day training on monitoring in September 2014. Trainings involve all relevant stakeholders in the national biosafety system.
- It is necessary to strengthen laboratory capacity for GMO testing. I n the frames of UNEP/GEF Project, support has been planned to laboratory facilities through financial assistance for procurement of additional equipment necessary for GMO detection and implementation of trainings for the person responsible for GMO detection.

WATER RESOURCES MANAGEMENT

WATER RESOURCES MANAGEMENT

1. Introduction

Water resources management is a process that should enable sustainable management of water and water related resources for present and future generations.

2. State and trends

2.1. Protection against floods

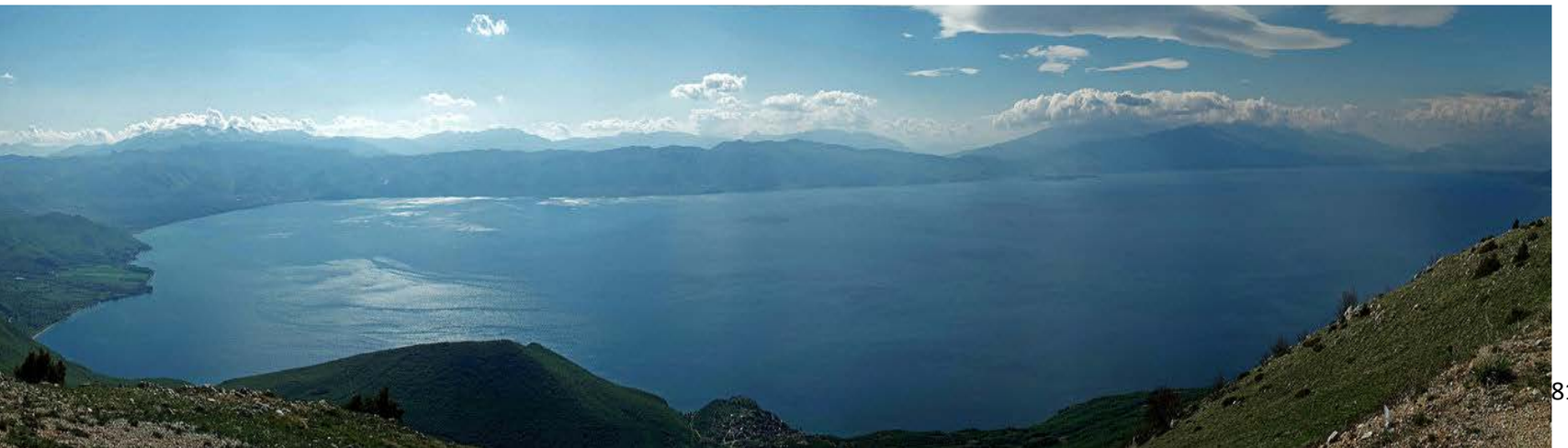
Owing to its geomorphology and climate, Republic of Macedonia is very susceptible to floods. Almost all rivers cause floods and more than 102.000 ha of land may be flooded given a year of return period. As a result of natural conditions and land cover with especially low forests (high portion of degraded forests and scrubs), rare but intensive short lasting precipitations, unbalanced water regime, the number of floods is high. These floods pose risk to infrastructure facilities and cover agricultural land sterile sediments (MEPP, 2005). There are examples of destructive effects of such short lasting precipitations, such as cases with the floods in Negotino, Kavadarci, Valandovo and Strumica.

Table 1: Flood areas in individual river basins

River basin	Flood area (ha)	
	$Q_{5\%}$	$Q_{1\%}$
Vardar	73.000	87.000
Crn Drim	5.000	6.000
Strumica	8.000	9.000
Total	86.000	102.000

2.1.1. The matter of flood protection and individual water management companies

Numerous measures have been undertaken in the Republic of Macedonia in river basins towards state improvement and protection against floods, such as local regulation of riverbeds in urban environments, systematic regulation of rivers on longer sections and control embankments and dams. Regardless of this fact, problematic floods still occur in certain parts. Detailed characteristics of the state of protection against floods and the matter of division of waters management are presented in the National Strategy for Waters.



2.1.2. Flood protection canals

Some of the main canals for flood protection were built on Vardar River in Skopje, dating back after great floods in 1895 and 1897. Since then, control quays and dike walls have been built, permanently extended, especially after the floods in 1935 and during 1950s. At the same time, the drainage system “Skopsko Pole” was built. 1950s and 1960s marked the construction of large hydro systems for irrigation. Generally, good regulation activities were also undertaken on the rivers Treska, Pchinja, Bregalnica, Crna Reka and Crn Drim (Vukelikj et al.).

Large flood control systems have been built for the regions of Skopje, Pelagonia, Strumica and Struga. There are 32.7 km of prepared rivers in Skopje region, 82.3 km in Pelagonia, 79.3 km in Strumica region and 10.9 km in the region of Struga. Recently, the dam Kozjak was built in the Skopje region, having protection against floods as one of its priority purposes, with retention volume of 100 million m^3.

Table 2: Characteristics of large flood protection systems in the Republic of Macedonia (Ministry of Environment and Physical Planning, 2005)

Flood protection system	River	Overall river length treated (km)
Skopje	Vardar	18,7
	Markova Reka	1,5
	Momin Potok with river Serava	10,0
	Lepenec	1,0
	Treska with river Grupchin	1,0
	Treska	0,5
Pelagonia	Crna Reka	58,1
	Dragor	10,7
	Shemnica	12,2
	Elashka	1,3
Strumichko Pole	Strumica	34,5
	Turija	9,05
	Monospitovo canal	10,3
	Vodocha and Butch	20,5
	Trkanja	4,9
Strushko Pole	Crn Drim	10,9

The lines for protection against floods are usually built in combination with systems for irrigation and/or drainage. Insufficient maintenance of the lines for flood protection is one of the main problems in the Republic of Macedonia. Regulated rivers are grown over with riparian vegetation and this reduces the canal water conveying capacity and consequently causes floods.

2.2. Use of water for electricity production

The territory of the Republic of Macedonia is characterized mainly with mountainous and lowland areas which usually gravitate to the main watercourses. Such configuration contributes to significant power potential of rivers, but also their rapid runoff. This means that the space

is ideal for construction of dams and formation of large reservoirs which provide regulation of rivers and multipurpose optimal utilization of waters (for example, production of electricity). The Republic of Macedonia has great potential for energy production from renewable energy sources and thus a possibility to achieve the targets under the Directive concerning promotion of renewable energy sources utilization (Directive 2009/28/EC).

Table 3 presents data on hydro power potential of the rivers on the territory of the Republic of Macedonia and current state of its utilization. At the moment, only 26.6% of the technical useful potential is used.

Table 3: Technical and used hydro power potential (Strategy for Energy Development in the Republic of Macedonia for the period 2008-2020 with vision by 2030)

River Basin	Vardar	Crn Drim	Total
Theoretical potential [GWh]	6.660	2.203	1.150,0
Technical potential [GWh]	4.559,3	964,9	583,0
Used potential [GWh]	1.150,0	5.524,2	1.471,7

Overview of existing hydro power systems (HPSs) and hydro power plants (HPPs) as part of them:

- HPS Mavrovo is situated between the river Mavrovska and river Gorna Radika. It consists of water reservoir Mavrovo and three HPPs of the following types: running water HPP Vrben using waters which enter the water reservoir Mavrovo, derivation HPP Vrutok using outlet waters from Mavrovo reservoir, running water HPP Raven using outlet waters from HPP Vrutok. It has been planned to build water reservoir Lukovo Pole and HPP Crn Kamen in future and these will become part of the HPS Mavrovo. Primary purpose of the water reservoir Mavrovo is to supply water for electricity production, irrigation of agricultural areas in Polog and Skopje and regulation of waters in the upper course of Vardar River.

- HPS Treska is positioned on the river Treska. It consists of three HPP: reservoir based HPPs Kozjak (existing), HPP Sveta Petka (in final phase of construction) and HPP Matka (existing). Water reservoir of HPP Matka is multipurpose, providing primarily protection against floods, water for irrigation of agricultural areas around Skopje, technical water and water for electricity production. Reservoirs of HPP Sveta Petka and HPP Matka, depending on the manner of water releasing from HPP Kozjak, are used to optimize electricity production in HPP and regulation of waters in the lower course of the river Treska.

- HPS Crn Drim, located on the river Crn Drim and the river Radika consists of the following HPPs: reservoir based HPP Globochica (existing), HPP Shpilje (existing) and HPP Boshkov Most (planned for construction). Reservoirs of HPP Globochica, HPP Shpilje and HPP Boshkov Most are intended primarily to supply water for electricity production in HPPs.

2.3. Use of water in agriculture

Favourable climate and paedological conditions in the Republic of Macedonia establish good conditions for intensive agricultural production of certain highly cost-effective agricultural crops. These agricultural crops commonly do not grow in areas where water is limiting factor both in space and time. Due to unequal distribution of precipitation in time and space, irrigation in the country is necessary precondition for successful agricultural production.

Cultivated agricultural areas in the Republic of Macedonia cover around 667 000 ha. If fully constructed, irrigation networks may irrigate around 400 000 ha or 60% of the overall cultivated agricultural areas. So far, 106 smaller and larger irrigation networks have been constructed covering 163 693 ha cultivable fertile agricultural land or 49.9% of the area that can be irrigated. Realistically possible area for irrigation is around 126 000 ha. Irrigation networks were built mainly in the period from 1958 to 1980, meaning that some of them were exploited for more than 40 years. Out of the total irrigated area, 61% of irrigation is by pouring, and 39% of the areas are irrigated by other mode of surface irrigation.

The quantities of water required for irrigation are defined on the basis of the anticipated 126 617 ha areas irrigated and average norm for certain areas irrigation (depending on the type of crops irrigated, climate and soil conditions). The total demand for water for irrigation by river basins are presented in Table 4.

Table 4: Demand for water for irrigation in the Republic of Macedonia (MEPP, 2005)

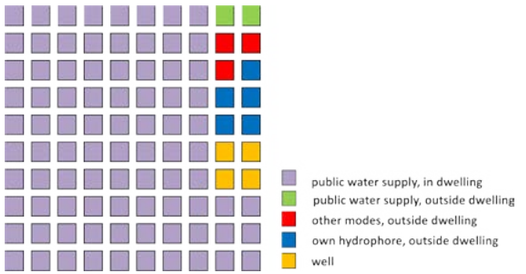
River Basin	Area (ha)	Demand for water for irrigation (m3/year)
Vardar	99.918	731.732.000
Strumica	18.432	117.941.000
Crn Drim	8.267	49.662.000
TOTAL	126.617	899.335.000

2.4. Supply of drinking water

Supply of the population with proper quality drinking water is important priority to each country. The census of the population, households and dwellings as statistical survey covering the whole population also collects data on the manner in which households are supplied with drinking water, as well as equipment of housing units with appropriate installations for drinking water supply.

Besides the data that 88.9% of the overall number of individual households are supplied with drinking water from public water supply systems, which is high statistical indicator, the very fact that in the beginning of the 21st century, in the heart of Europe, some households still drink water which is not controlled biologically or chemically, is an indicator giving rise to concern. Furthermore, the fact that most of the households that are not supplied with drinking water from public water supply systems are concentrated mainly in rural settlements cannot be an excuse for insufficient care of the state to bring good quality drinking water to every dwelling and every household (Diagram 1)

Way of households' supply with drinking water, Census 2002 (State Statistical Water, 2009)



(Diagram 1

In the Republic of Macedonia, there are mainly local water supply systems for cities, settlements and villages. Many of those originally constructed for the city or the settlement have been extended in order to meet the demand for water of local rural areas. There are also regional water supply systems, namely:

- "Studenchica" for Kichevo, Prilep, Makedonski Brod and Krushevo,
- "Lukar" for Kavadarci, Negotino and 13 villages, and
- "Debar" for the town of Debar and several surrounding villages.

According to the Census of 2002, the number of households connected to public water supply systems is 597 014, which makes 86% of all households, while 7% of the households are connected to their own hydrophore or some other resource. The portion of connection to public water supply systems in municipal urban areas is much higher than the average, ranging from 82% (Berovo, Kumanovo) to 100% in Skopje-Municipality of Centar. The total number of population connected to public water supply systems is 1 200 000 inhabitants.

In rural areas, the portion of connection of the households to public water supply systems is variable, from 10% to 100%. According to available data, the average percentage is around 70, while the overall number of population connected to public water supply systems is 250 000 inhabitants.

Drinking water originates from springs, ground waters, surface waters, or some other combination of these resources. Major cities supplied with drinking water from springs are: Skopje, Kichevo, Prilep, Makedonski Brod, Krushevo, Struga, Debar, Gostivar, Tetovo and Kriva Palanka. Ground waters are used for supply of the cities: Skopje, Shtip (upon prior processing), Veles, Kochani, Probishtip, Gevgelia, Ohrid, Demir Hisar, Delchevo and Radovish. Surface waters, upon prior treatment of the raw water, are used in the following towns: Bitola, Kumanovo, Strumica, Veles, Berovo, Vinica, Sveti Nikole and Kratovo. Combined supply with spring and surface water is used in the cities Ohrid, Kavadarci and Negotino, while combination of ground and surface water is used in Delchevo and Vinica. The systems for water supply in rural areas are fed mostly from springs and ground waters, though they often use surface waters as well.

2.5. Treatment of waste waters

The 2002 Census of the population, households and dwellings collected data on the equipment of dwellings with installations for wastewater collection. Data that as many as 40.1% (Table 5) of the total number of dwellings are not equipped with installations for wastewater collection from households in the public sewerage network indicates low level of care for environment protection against waste water in the Republic of Macedonia.

Major part of the constructed sewerage network does not lead to modern sewerage system. In such circumstances, competent institutions and local self-government have to provide certain possibilities to cope with this important issue.

2.6. Use of water for fish breeding and fishery

Fishing is allowed on all natural lakes, accumulations and rivers, including both commercial and sports fishing. Fish species of relevance for commercial fishing include:

Table 5: Equipment of dwellings with installations for urban wastewater collection, Census 2002 (State Statistical Office, 2009)

	Waste water installations				
	Total number of dwellings	Public sewerage network	Septic tanks	Free waste water discharge	No sewerage
Absolute figures	697.520	417.653	143.353	85.007	51.516
In %	100.00	59.88	20.55	12.19	7.39

Ohrid Lake: Anguilla anguilla, Alburnus alburnus, Salmo letnica. The highest share in the total annual fish catch is made of these three species. In the past, the annual level of fishing in Ohrid Lake was 220-240 tons of fish, 50% was trout. At the moment, this quantity is significantly smaller (below 100 tons). Trout catch decreased significantly compared to periods when more than 140 tons of trout were caught on annual level to current only 35.

Prespa Lake: Alburnus belvica and Cyprinus carpio. Annual fish catch in Prespa Lake is 100 tons.

Dojran Lake: Alburnus alburnus, Cyprinus carpio, Perca fluviatilis, Rutilus rutilus, and Scardinius erithrophthalmus. Traditionally, catch of these species is 98% of the overall catch. In the past, the annual fish catch in Dojran Lake was above 500 tons, while presently it ranges around 70-90 tons/ year. The main component of the fish catch today is Carassius carassius, and catch of P. fluviatilis and C. carpio makes minor portion.

There is no valid statistics on fish catch in accumulations. There are estimates that more than 200 tons /year fish are caught in Tikvesh Lake, mainly only R. rutilus, and then carp, European catfish, pearch, and nase.

With regard to sports fishing, besides species mentioned for commercial fishing, also includes the following important species: Barbus barbus (Barbel), B. meridionalis (Mediterranean barbel), Chondrostoma nasus (Nase), Gobio gobio (Gudgeon), Leuciscus cephalus (Chub), L. delineatus (Moderlieschen), Silurus glanis (European catfish), Salmo trutta (Brown trout), and Vimba melanops (Balkan vimba).

Again, there is no relevant data on the total fish catch by sport fishermen. Serious concerns are raised by events of illegal fishing and use of prohibited fishing tools (including certain types of nets, chemicals and explosives).

Using the basic data on the number of water bodies (natural lakes, accumulations and rivers) and their areas, the estimates are that the annual fish catch in the Republic of Macedonia ranges between 800 and 1.200 tons, but still major portion of the catch is not recorded (MEPP, 2003).

2.7. Tourism

Number of tourists in the period January – November 2010 compared to the same period of the previous year decreased by 1.6%. Number of over-night stays in the period January – November 2010 compared to the same period of the previous year decreased by 4.5% (State Statistical Office, 2010).

Tourist facilities are usually connected to sewerage networks. Due to additional load caused by tourists during certain period of the year, some estimates have been derived of the quantities of waste waters discharged by tourists. According to ERWRM, quantities of waste water are estimated on the basis of the number of tourists and the norm of waste water. This norm is 0.280 m3/tourist/day to 0.400 m3/tourist/day for Skopje.

Actually, the norm of waste water is 80% of the norm for water. Furthermore, estimates took into account the duration of tourist season. Depending on the type of tourist activities, duration is between 120 and 270 days, and for Skopje as capital of the country and cultural, economic and trade centre, it is 365 days.

Quantities of waste water discharged by tourists per river basin are presented in Table 6.

Table 6: Waste waters from tourists (ERWRM, 1998)

River basin	Waste waters from tourists m^3/year
Vardar	1.632.800
Strumica	129.600
Crn Drim	3.244.200
Total	5.006.600

3. Recommendations

- it is necessary to analyze the pressure in terms of water abstraction conducted by agriculture sector
- it is necessary to analyze the pressure in terms of water abstraction conducted by industrial sector
- it is necessary to define in more detail the requirements concerning management of floods protection and tourism
- use of water for HPPs is an issue which should be responded not only by water sector, but by all relevant stakeholders (ELEM, EVN, AE, etc.) as the type and extent of issued permits do not reflect the real situation in reality
- use of water for water supply is an issue that will have to be responded to not only by water sector, but all relevant stakeholders (ADKOM, ZELS, SSO, etc.) as the type and extent of issued permits do not reflect the real situation in reality. The same approach should be applied with regard to data on waste waters, fishery sector and all other sectors.

WASTE MANAGEMENT

WASTE MANAGEMENT

1. Introduction

Transposition of the EU management legislation into the national legislation is one of the most important tasks and goals, towards establishment of integrated and sustainable waste management system. The Law on Waste Management adopted in 2004 and its amendments have introduced certain requirements related to waste management, such as implementation of strategies, plans and programmes for waste management, fulfillment of certain conditions and issuance of waste management permits to business entities handling waste, separated collection of certain waste types (hazardous waste, waste of end-of-life vehicles, etc.), appropriate monitoring of waste generation and treatment, fulfillment of certain conditions for landfills operation, etc.

2009 Law on Packaging and Packaging Waste Management regulates environmental requirements that shall be met by packaging during its production, release on market and putting in use and treatment of packaging waste, including obligations and responsibilities of economic operators and other entities involved in the process of packaging production, release on market and putting in use, rules for collection, reuse, recovery and disposal, as well as other conditions concerning handling packaging waste, reporting and economic instruments for achievement of national targets and packaging waste recovery.

2010 Law on the Management of Batteries and Accumulators and Waste Batteries and Accumulators regulates environmental requirements that shall be met by batteries and accumulators at their production and release on the market of the Republic of Macedonia and handling of waste batteries and accumulators including obligations and responsibilities of economic operators and other entities involved in the process of batteries and accumulators production and release on the market, restriction of the use of batteries and accumulators containing hazardous substances, for collection, reuse, recovery and disposal, as well as other conditions concerning handling the waste batteries and accumulators e, reporting and economic instruments for achievement of national targets and waste batteries and accumulators recovery.

2. Defined goals in waste management

The goals that need to be achieved in waste management are defined in 2004 Law on Waste Management and these are:

- Avoidance and reduction to the maximum possible extent of the quantity of waste generated,
- Recovery of usable waste components,
- Sustainable development through conservation and saving of natural resources,
- Prevention of negative impacts of waste on the environment and human life and health,
- Waste disposal in a manner acceptable to the environment and with high level of environment and human life and health protection.

Monitoring of the above set goals requires data and information on the quantity and the type of generated waste, as well as the manner of its treatment and impact on the environment and human health caused by waste treatment. Precise, accurate and comprehensive data, as well as clearly defined measures and activities for waste management are necessary to achieve the above set goals. The existing monitoring system and waste management data and information should be extended to include use of electronic data and information management system.

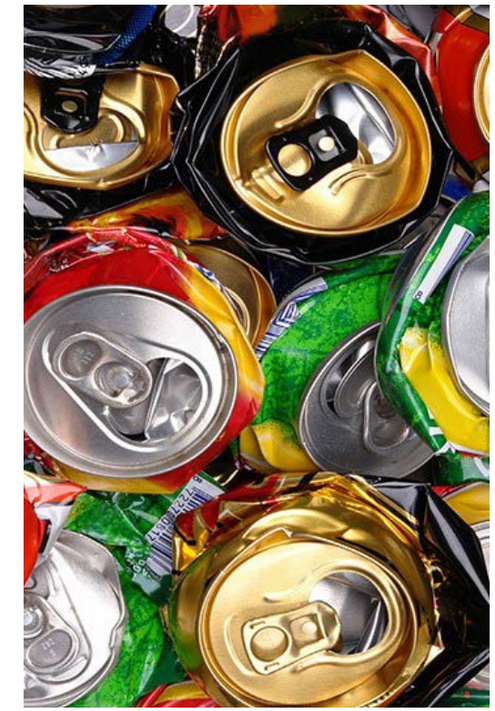
Under the Law on Packaging and Packaging Waste Management, the national targets for packaging waste handling are that the following quantities of packaging and packaging waste should be collected on the territory of the Republic of Macedonia within the following deadlines:

- by the end of 2020, minimum 60% of the packaging waste weight generated on the territory of the Republic of Macedonia should be processed by recovery operations or by processing for energy operations;
- by the end of 2020, minimum 55%, and maximum 80% of the packaging waste weight generated on the territory of the Republic of Macedonia should be recycled;
- by the end of 2020, the following quantities of materials used in packaging production should be recycled:
  - 60% glass,
  - 60% paper and cardboard,
  - 50% metals,
  - 15% wood, and
- by the end of 2018, 22.5% plastics, considering only recyclable materials in plastics.

Monitoring of the achievement of above set targets requires data and information on the quantity and the type of generated waste, as well as the manner of its treatment and impact on the environment and human health caused by waste treatment. Precise, accurate and comprehensive data, as well as clearly defined measures and activities for waste management are necessary to achieve the above set targets. The existing monitoring system and waste management data and information should be extended to include use of electronic data and information management system.

Under the Law on the Management of Batteries and Accumulators and Waste Batteries and Accumulators, the national targets are that the following quantities of portable waste batteries and accumulators should be collected by the end of:

- 2016 – minimum 25% of the weight of portable batteries and accumulators released on the market of the Republic of Macedonia, and
- 2020 – minimum 45% of the weight of portable batteries and accumulators released on the market of the Republic of Macedonia.



3. Status and trends

3.1. Management of municipal and other non-hazardous waste types

Under the applicable legislation in the area of waste management, Mayors of municipalities are obliged to submit annual report on non-hazardous waste treatment in the respective municipality to the Ministry of Environment and Physical Planning. Data obtained from the Mayors of the municipalities is shown on Diagram no 1[1] . The total quantity of collected, transported and disposed municipal and other types of non-hazardous waste reported by the Mayors of 26 municipalities, including the City of Skopje, amounts 439.061,04 tons for a population of 1.066.680 inhabitants. Calculated as an average per inhabitant, based on reported values for 2013, every inhabitant of Macedonia generated 411.6 kg municipal and other types of non-hazardous waste. Landfills reported disposal of 437.841.15 tons or 99.72% of the municipal waste. Recovery, including recycling 778.413 tons or 0.18%, composting 441.48 tons or 0.1%. Predominant manner of municipal and other types of non-hazardous waste management is disposal, i.e. waste landfilling on legal landfills reaches 99.72%. Only 0.28% recovered municipal and other types of non-hazardous waste have been reported compared to overall generated and transported municipal and other types of non-hazardous waste in 2013.

Fifty nine municipalities in the Republic of Macedonia have not observed their legal obligations and failed to submit reports by Mayors on the management of the Republic of Macedonia, or more than 50% of the inhabitants are not covered by reports and therefore it is not possible to adopt precise conclusions with regard to municipal and other types of non-hazardous waste management in the Republic of Macedonia.

[1] Data on the quantity of waste was obtained both in tons and m3. For the purpose of simplified analysis of data, adequate coefficient for conversion of m3 into tons was applied to certain waste types. Thus, we indicate possible error that might result from this manner of waste quantities conversion.

3.2. Recovery of municipal and other types of non-hazardous waste

Mayors of four municipalities – Bitola, Ohrid, Vinica and the City of Skopje reported 1.219.893 tons of recovered municipal and other types of non-hazardous waste. Presented in percentages, this accounts for 0.28% compared to overall reported, generated and disposed municipal and other types of non-hazardous waste in 2013. Out of the reported quantities of recovered waste, 778.413 tons were recycling of paper, cardboard, plastics and metals, and 441 tons of waste were composted.

Table no. 1 Overview of disposed and recovered municipal and other types of non-hazardous waste

		Quantity (tons)	Percentage (%)
Disposed municipal and other types of non-hazardous waste		437.841,15	99,72%
Recovery of municipal and other types of non-hazardous waste	Composted waste	441,48	0,28%
	Recycled paper, cardboard, plastics and metal	778,413	

Reported generated and disposed municipal and other non-hazardous waste types in certain municipalities in 2013

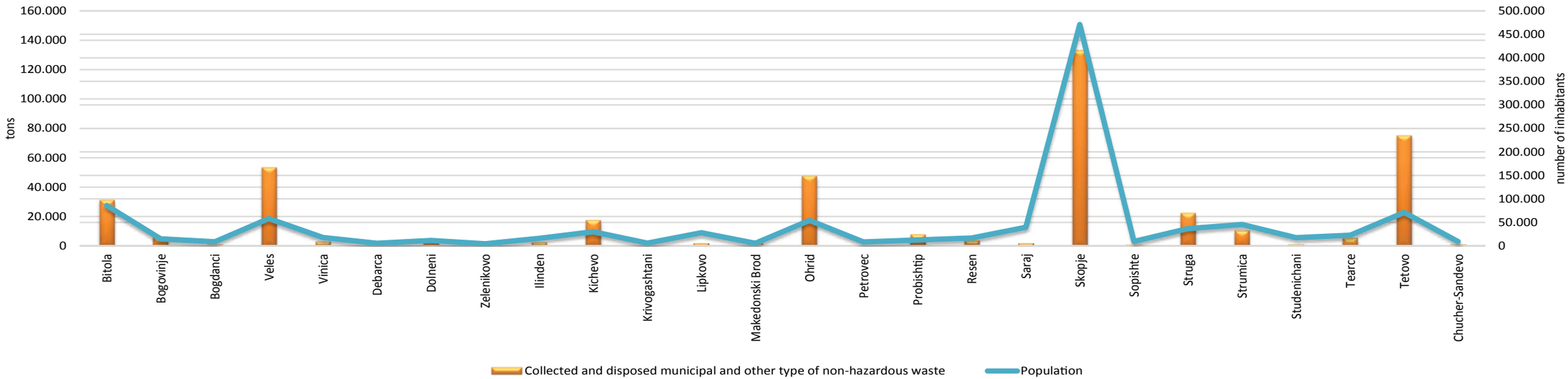


Diagram 1

Trend of reported generated and disposed municipal and other non-hazardous waste types expressed in tons per capita

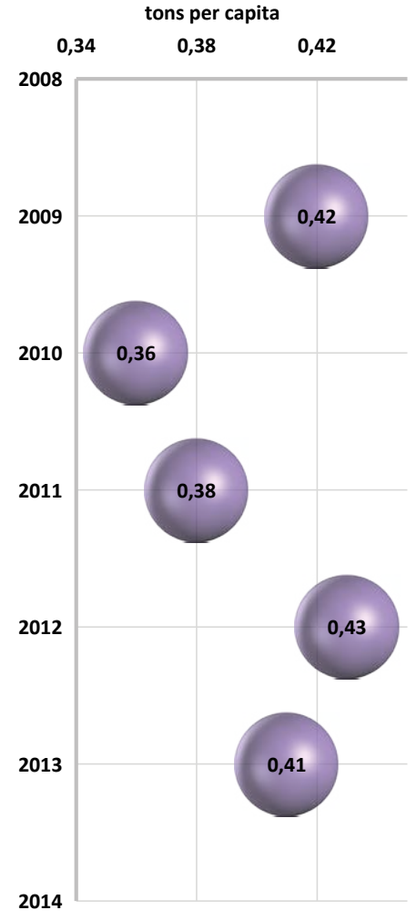


Diagram 2

Trend of reported generated and disposed municipal and other non-hazardous waste types expressed in percentage

Diagram 3

The five-year trend (2009-2013) of generated and disposed municipal and other types of non-hazardous waste in the Republic of Macedonia shows certain variations and ranges from 360 to 430 kg per inhabitant. However, incomplete coverage with annual reports of all inhabitants of the Republic of Macedonia does not allow adoption of precise conclusions with regard to trend in the generation of municipal and other types of non-hazardous waste (Diagram 2).

The five-year trend (2009-2013) of disposal or landfilling of municipal and other types of non-hazardous waste in the Republic of Macedonia shows insignificant variations and ranges mainly above 99%. Municipal waste recovery in the Republic of Macedonia is at a very low level and ranges between 0.09% and 0.37%, resulting mostly from recycling of paper, cardboard and plastics and low percentage of biodegradable waste composting (Diagram 3).

The above is not sufficient to make precise conclusion on the trend of municipal waste generation in the Republic of Macedonia, due to uneven coverage of the population by reports during years. Yet, except in 2009 and 2012, the quantity of generated municipal waste from 2010 to 2013 recorded growth of 4% on annual level at an average. Recovery of usable components of municipal waste as secondary raw materials is at minimum level and there is no visible saving and preservation of natural resources used as primary raw materials. Given the fact that landfilling or waste disposal is the dominant manner of municipal waste treatment, and this is done in landfills that do not operate in compliance with the legislation, great negative impact of waste on environment and human life and health remains.

3.3. Management of packaging waste by material type

Data and information on packaging waste management by specific type of material are submitted in accordance with the Rulebook on the format and content of the form of the annual report on the type and quantity of packaging released or imported on the market of the Republic of Macedonia in the previous calendar year and management of the waste of such packaging, the format and content of the form of production certification. The format and content of the form of the records of the overall packaging released or imported on the market of the Republic of Macedonia, as well as the manner of records keeping. Based on annual reports submitted to the Ministry of Environment and Physical Planning for 2012, the overall quantity of packaging released on the market was 42.515.62 tons.

Overall quantity of packaging released on the market in 2012

Glass

8.712,39 t

Plastics

13.379,35 t

Paper and cardboard

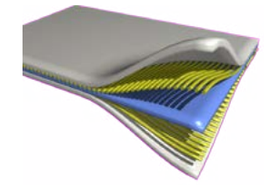
13.448,45 t

Metal

1.528,69 t

Wood

2.759,27 t



Composite materials

2.687,48 t

Total 42.515,62 t

The overall collected quantity of packaging waste amounts 8.018.25 tons, where collected quantity of municipal waste is 6.421.756 tons and collected quantity of packaging waste which is not municipal waste is 1.596.49 tons.

Total recycled and recovered packaging is 8.003.24 tons, where recycled quantity is 3.606.913 tons and quantity exported from the Republic of Macedonia for recycling and other ways of recovery is 4.396.33 tons.

Treatment of packaging and packaging waste in 2012

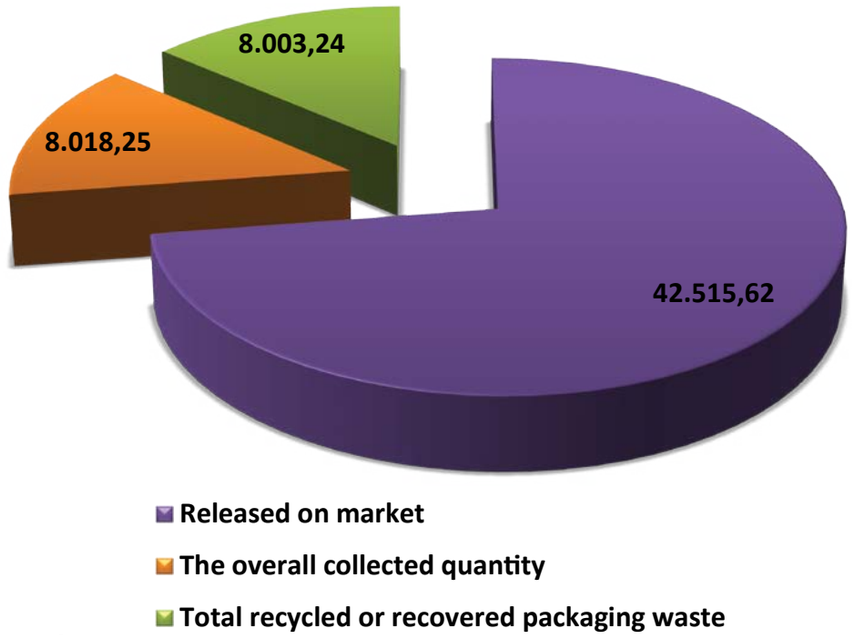


Diagram 4

Table 2: Overview of specific materials recycling

Material type	Released on market 2012	Recycling of material	% of material recycling
Glass	8.712,39	0,00	0,00
Plastics	13.379,35	4.147,31	31,00
Paper and cardboard	13.448,45	3.853,31	28,65
Metal	1.528,69	2,63	0,17
Wood	2.759,27	0,00	0,00
Composite materials	2.687,48	0,00	0,00
Other	0,00	0,00	0,00
Total	42.515,62	8.003,24	18,82

Percentage of the total waste recycled is 18.8%. Based on analysis made (Table 2), it may be concluded that the percentage of material recycling differs for different materials. For example: recycled plastics relative to plastics released on market is 31%, recycled paper and cardboard relative to those released on market is 28.65% and recycled metal compared to metal released on market is 0.17%.

As shown, the quantity of total recycled and recovered packaging waste from 2011 to 2012 increased and this also increased the percentage of recycled which in 2011 was 11.75% to reach 18.82% in 2012.

We may also conclude that the number of producers complying with legal obligation for reporting increased, while many producers transfer their obligation to legal person for packaging waste handling.

3.3.1. Recommendations for packaging waste management

The Programme for packaging waste management in the Republic of Macedonia (2011-2016) contains measures for education and organization of public awareness campaigns concerning packaging waste, measures for prevention of packaging waste generation and measures to encourage collection, selection, reuse, recycling and other forms of packaging waste recovery, processing and disposal.

3.4. Landfills

Reports obtained from several landfills in the Republic of Macedonia, including the landfill of Drisla where total of 2.629.017 tons of waste are landfilled, with exploited area being 70.000 m^2, while the total area available for exploitation is 550.000 m^2; then, Bukovo-Ohrid area, where total of 27.808 tons or 278.084 m^3 of waste is disposed, Maucker - Ohrid area, where total of 9519 m^3 of waste is disposed. In the area of Struga, the quantity of disposed waste reported is 11.880 tons and reported area for exploitation of 40.000 tons, while landfills Buchuk and Lojane reported total of 1920 tons of waste landfilled.

4. Management of hazardous waste

According to the legislation applicable in the area of waste management, business facilities that generate hazardous waste are obliged to submit annual reports on the treatment of hazardous waste to the Ministry of Environment and Physical Planning. Data obtained for 2013 from 64 business facilities which in the process of their operation generate hazardous waste, indicates total reported generated hazardous waste in an amount of 2.008.895.7 tons or 3.531,78m3. Business facilities reported disposal, i.e. landfilling of hazardous waste in an amount of 290.023.3 tons or 14.4% of the total waste generated. Recovery of hazardous waste is represented by 5.6 %, or total of 112.407.9 tons of hazardous waste are recovered. Business facilities reported their own disposal or landfilling of an amount of 1.601.327.8 tons or 933m3 or around 79.7% hazardous waste (Diagram no. 4). Amount of temporarily stored hazardous waste is 5.136.77 tons or 2.546.08 m3 or around 0.25% of the total amount of generated hazardous waste. Business facilities reported export of 930 tons and import of 2605 tons of hazardous waste.

Reported treatment of generated industrial hazardous waste expressed in tons in 2013

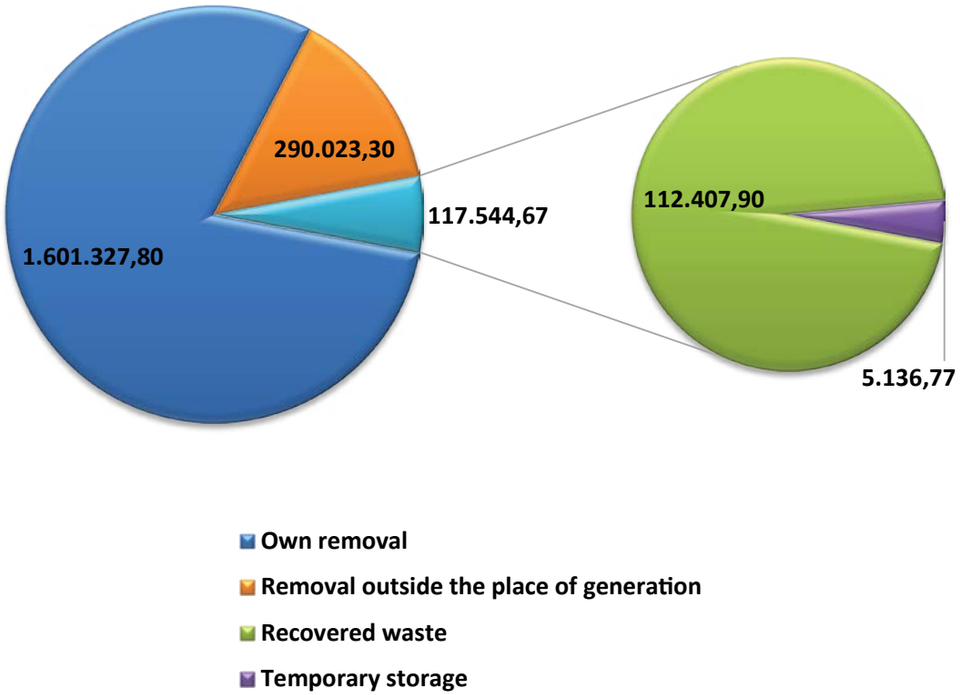


Diagram 5

Reported generated hazardous waste in the period 2011- 2013

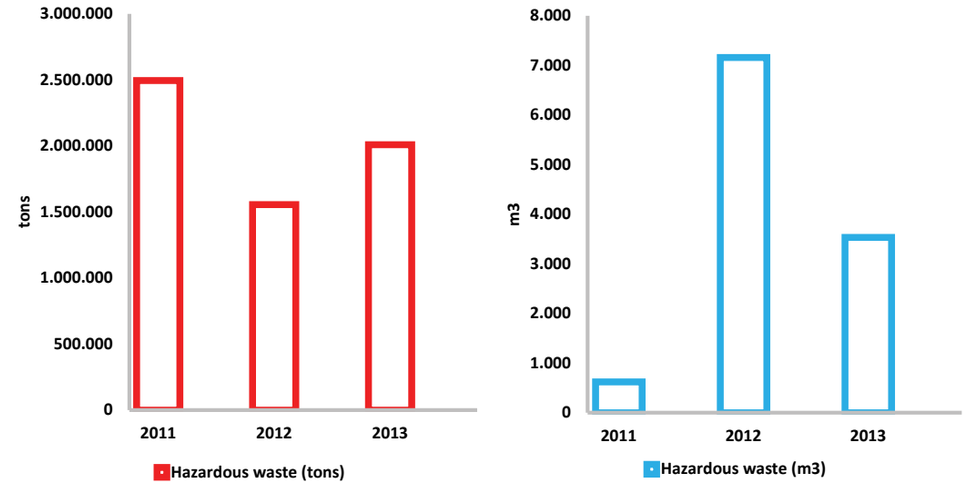


Diagram 6

With regard to the trend of generated hazardous waste from 2011 to 2013 (Diagram no. 6), we may conclude that the greatest amount of generated hazardous waste was reported in 2011 and in 2012 the amount reduced and increased again in 2013. However, the reported amount for 2013 is lower compared to 2011, despite the fact that the number of business entities that submitted reports is higher being 64 business entities in 2013 relative to 56 business entities that submitted report in 2011.

4.1. Medical waste

According to the legislation applicable in the area of medical waste management, health care institutions that generate medical waste are obliged to submit annual reports on the treatment of hazardous waste to the Ministry of Environment and Physical Planning.

According to data submitted by health care institutions in the Republic of Macedonia, the quantity of reported generated medical waste for 2013 was 611.32 tons or 54 m³, in line with the list of waste types presented in Table 3.

Table 3: Quantity of reported generated medical waste, 2013

Code of waste	Description	Quantity in t
18 01	Waste from neonates health care, diagnostics, treatment or diseases prevention with people	611,32
18 01 01	Sharp objects (except 18 01 03)	113,36
18 01 02	Parts and organs of human body, including bags and bottles with blood (except 18 01 03)	1,54
18 01 03*	Waste the collection and treatment of which is subject of special requirements for the purpose of protection from infections	456,46
18 01 04	Waste the collection and disposal of which is not subject of special requirements for the purpose of protection from infection (e.g. clothes, gypsum bends, clothes for single use, fabrics, diapers, etc.)	39,92
18 01 06*	Chemicals made of dangerous substances or containing dangerous substances	
18 01 07	Chemicals not mentioned in 18 01 06	0,04
18 01 08*	Cytostatic drugs and cytostatics	
18 01 09	Drugs not mentioned in 18 01 08	
18 01 10*	Waste from amalgam in dental health care	

* Hazardous waste

Quantity of generated medical waste reported by health care institutions, 2013, tons

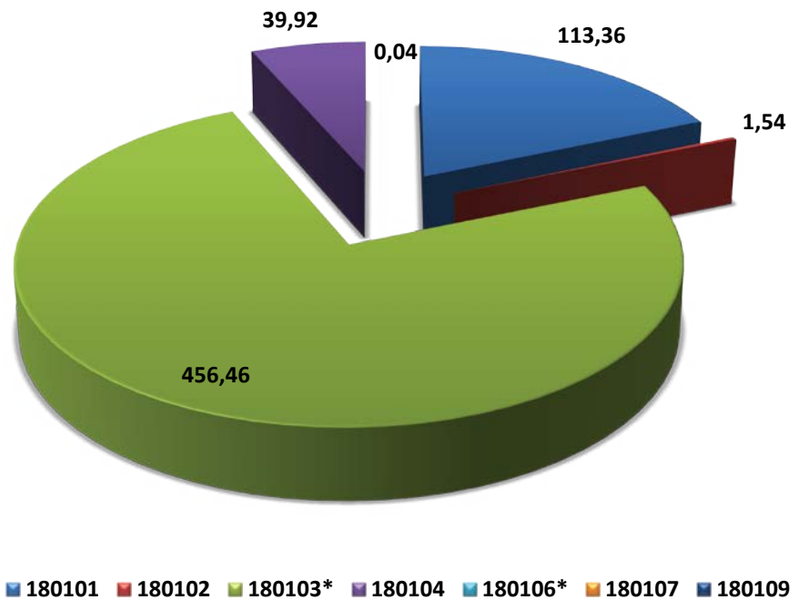


Diagram 7

Based on submitted reports on further treatment of medical waste, i.e. quantity of medical waste transferred to third persons, was 561.81 tons and 54 m³, we may conclude that medical waste in the Republic of Macedonia is transferred to third persons and according to delivered reports it is adequately treated and neutralized and does not pose direct threat to environment and people. It should be also pointed out that the presented quantities of waste are not the overall quantities of generated medical waste at the level of the Republic of Macedonia.

Table 4: Quantity of generated waste

year	quantity in tons
2010	195,6
2011	355,87
2012	444,78
2013	611,32

As indicated in the table, the quantity of generated medical waste for the last 4 years has been increasing gradually and also

Total quantity of generated medical waste in the period 2010-2013

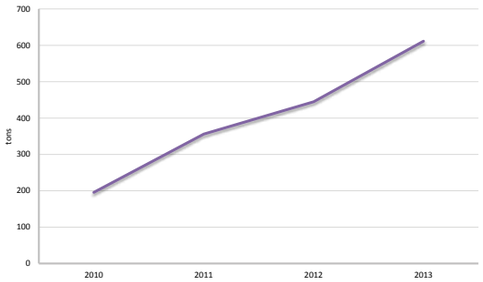


Diagram 8

the number of hazardous medical waste generators obliged to submit annual report on waste management in accordance with the Law on Medical Waste Management.

4.1.1. Recommendations

To improve hazardous medical waste management, improve separation of different medical waste fractions, establish adequate system of medical waste collection, transport, treatment and final disposal from all health care institutions in the Republic of Macedonia.

4.2. Management of waste batteries and accumulators

Data and information on the management of batteries and accumulators and waste batteries and accumulators are submitted in accordance with the Rulebook on the format and content of the form of the annual report on the management of batteries and accumulators and waste batteries and accumulators and the manner of their delivery, as well as the format and content of the form of the records of the quantities and types of batteries and accumulators released on the market of the Republic of Macedonia.

Based on annual reports submitted to the Ministry of Environment and Physical Planning for 2012, we may see that the overall quantity of BAs (batteries and accumulators) released on the market was 2.430.122.34 kg, where 28.352.47 kg were portable and 2.316.414.27 kg automobile, and 85.355.6 kg industrial. Consequently, the highest share of 95.32% in the overall quantity belongs to automobile batteries and accumulators.

Quantity of batteries and accumulators released on market, kg

Portable: 28.357,47

Automobile: 2.316.414,27

Industrial: 85.355,60

TOTAL

2.430.122,34

Diagram 9

According to reports delivered for 2012, as presented in Table 6, the quantity of collected automobile WBA (waste batteries and accumulators) was 540.255 kg, while industrial WBA amounted 900 kg. This leads to the conclusion that the highest share in collected WBA belongs to automobile batteries and accumulators with 99.8%. Quantity of treated and recycled automobile and recycled automobile and industrial WBA equals the quantity of collected WBA.

Table 5: Total quantity of batteries

	Quantity of collected WBA	Quantity of treated and recycled WBA	Quantity of exported WBA for treatment and recycling
Portable	0,00	0,00	0,00
Automobile	540.255,00	540.255,00	0,00
Industrial	900,00	900,00	0,00
Total	541.155,00	541.155,00	0,00

The overall quantity of BA released on the market in the Republic of Macedonia in 2012 increased from 2.430.122.34 kg compared to 2011 when the quantity was 1.548.690.13 kg

The number of producers complying with legal obligation for reporting increased, while many producers transfer their obligation to legal person for batteries and accumulators management.

Quantity of batteries and accumulators released on market in kg

2011	2012
1.548.690,13	2.430.122,34

4.2.1. Recommendations

To encourage higher extent of waste batteries and accumulators collection and minimize disposal of waste batteries and accumulators as part of municipal waste in order to achieve higher rate of their recovery, recycling and other manners of waste batteries and accumulators processing.

5. Waste storage, treatment, recovery and disposal

Under the applicable legislation in the area of waste management, business facilities that manage the waste, i.e. perform waste treatment, recovery, storage, and disposal are obliged to submit annual reports on waste treatment to the Ministry of Environment and Physical Planning. Data received for 2013 from 114 business facilities that manage waste indicate the following:

- Waste in a quantity of 1.828.209.783 tons and 16.847.68 m^3 was received, and imported in a quantity of 4.651.503 tons. Out of these quantities, received hazardous waste reported was 3.806.96 tons and 942.92 m^3, and for 3.623.36 tons and 942.92 m^3 of such waste the manner of further processing was not stated, while 11.56 tons are disposed and 172.03 tons are processed, including recycling. Also, import of 315.12 tons of hazardous waste was reported;
- Total of 269.802.95 tons and 16.983.1 m^3 of waste was reported as transferred. Out of these quantities, hazardous waste transferred to third persons was reported to be 3.253.7 tons and1.138 m^3, of which 6.21 tons were disposed and 137.84 tons recycled, and for the rest the manner of further treatment is not stated. Exported hazardous waste was reported in a quantity of 169.885.14 tons.

The quantity of transferred waste compared to the quantity of total waste received amounted 14.76%, indicating waste processing, including recycling, although most of the business facilities did not state the manner of the received waste treatment or handling or transferring. Imported waste amounted only 2.7% of the waste exported, which indicates domination of waste export over waste import in the Republic of Macedonia. Export of hazardous waste was 15.74% of the reported import of hazardous waste. The quantity of transferred hazardous waste compared to the quantity of the overall received hazardous waste as reported by business facilities was 85.5%.

Reported, received and transferred waste

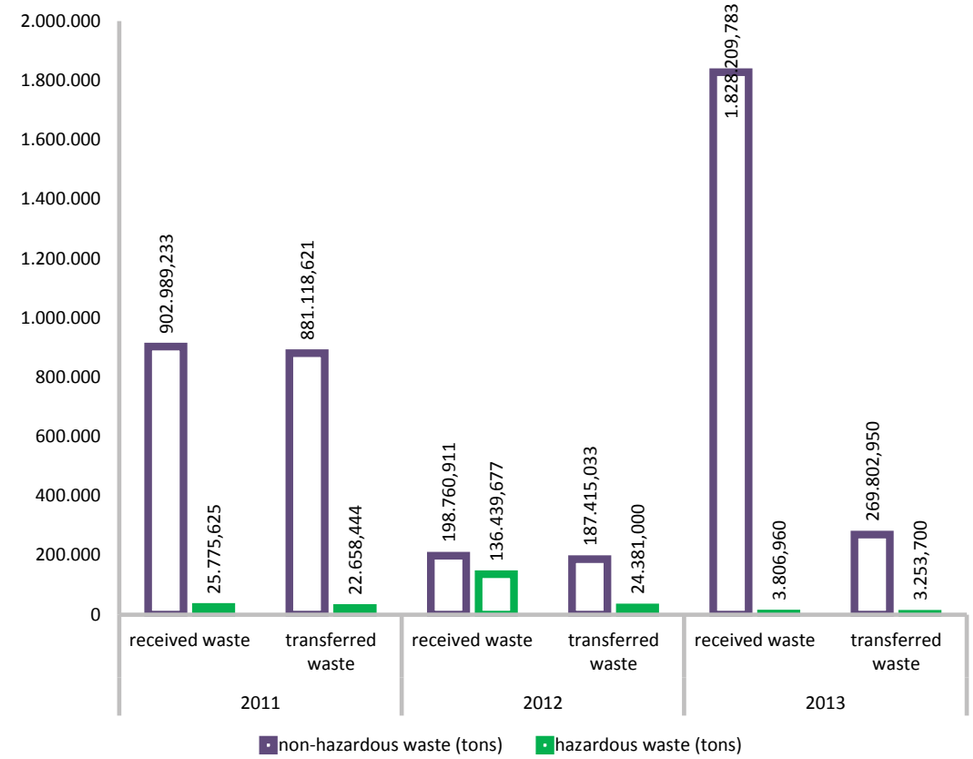


Diagram 10

Diagram 10 shows the trend of reported, received and transferred waste by business facilities that manage waste. Among reported non-hazardous waste, the most represented wastes are metals, paper, cardboard and plastics, while the reported hazardous waste contains mostly waste batteries and accumulators, end-of-life vehicles, slag from primary production, waste motor and transmission oils and lubricating oils, settled ashes, slag and dust from hazardous substances containing boilers, etc. In 2013, compared to other years, there is notable difference between presented received and transferred waste, which is not the case for other years. In 2012, there was notable drop in the total quantities of reported and transferred waste, which may be a result of the lower number of entities that submitted reports (only 63) compared to those that submitted reports for 2013 (114) or decreased scale of waste treatment.

6. Cooperation with the European Environment Agency in the area of waste

Macedonian Environmental Information Centre of the Ministry of Environment and Physical Planning in cooperation with the European Topic Centre for sustainable consumption and production, with the support of the European Environmental Agency as part of the support provided to Balkan countries, prepared the Study on Municipal Waste Management in the Republic of Macedonia in 2013. Information brochure on waste management policies in the Republic of Macedonia was prepared in 2011.

7. Summary of waste management

Quantities of generated municipal waste increase, although below the European average which amounts 512 kg in 2009. With regard to facilities for hazardous waste disposal, we may conclude that most of them operate in accordance with the legislation, while facilities for municipal waste combustion, mechanical and biological waste treatment and controlled composting of waste do not exist. There are no facilities for hazardous waste disposal either. Waste treatment (considering that waste disposal is the most represented form of municipal and hazardous waste management) brings huge undesired effects on environment due to emissions of CO2 and other greenhouse gases, emission of certain toxic and carcinogen substances in soil and ground waters, as well as from permanent loss of primary resources and lack of waste recognition as source of energy and secondary raw materials.

8. Recommendations concerning waste statistics

Establishment of electronic register and adoption of necessary regulations for its implementation in order to obtain updated and accurate data on the quantities and types of generated waste, as well as on their treatment and impact on environment and measures and activities in the area of waste management.

CONTAMINATED SITES

CONTAMINATED SITES

1. Introduction

The term “contaminated site” refers to certain area where the presence of soil contamination and severity of potential impacts on ecosystems and human health have been confirmed and this requires remediation of such sites. Remediation or cleaning out of contaminated site may result in full elimination or reduction of such impacts.

2. State

Preliminary investigations and identification of 16 sites in the Republic of Macedonia were completed and established soil contamination and these sites were marked as hot-spots. The main investigations were carried out in eight sites. Implementation of remediation measures was applied in three sites, while completion of the measures was not achieved in none of the sites.

Although there is a definition of contaminated site, due to the lack of limit values for the concentration of certain toxic chemicals in soil, it is difficult to determine the exact number sites where soil contamination has been established. The assessment of the contaminated site depends to a great extent on individual expert assessment. All sites where certain industrial/economic activity is performed are not taken into account as sites with certain contamination.

There are no legally specified limit values for the concentration of certain contaminants in the soil and standards for their detection in soil in our country. Generally, the existing legislation is intended to prevent new contaminations.

With regard to economic activities that contribute to soil contamination expressed in percentages, the highest share belongs to mining and metallurgy contributing 31.25% each, followed by organic chemical industry and energy production with 12.5%, as well as oil refining and leather manufacturing industry with 6.25%.

Economic activities that contribute to soil contamination

mining and metallurgy	organic chemical industry	oil refining and leather manufacturing industry
31,25%	12,5%	6,25%

3. Recommendations

Soil protection is regulated in several laws, including those that concern environment, nature protection, agricultural land, but there is no specific law on soil with clear definition of responsibilities and competences for contaminated sites and adoption of standards for contamination detection, specification of values of maximum permissible concentrations of certain substances in soil, care for and remediation of contaminated sites, as well as measures for soil contamination prevention.

CHEMICALS MANAGEMENT

CHEMICALS MANAGEMENT

1. Introduction

The introduction of the Law on Chemicals in 2010 established the grounds for adequate transposition of the European REACH Regulation, as well as obligations for harmonized classification and labeling of chemicals. The Law on Chemicals has been supported by a number of bylaws providing for the implementation of the legal framework and control of chemicals production and trade in the country.

Besides the above setup for chemicals management, there are specific activities for management of certain chemicals groups. In this context, apart from activities determined in chemical groups management, accent has been placed on the synergy in the implementation of certain chemical conventions.

2. Policy for chemicals

National Action Plan for Safe Chemicals Management

In the frames of the efforts undertaken by the Republic of Macedonia, definition of action plans for safe chemicals management was fully inspired by the country's obligation to take over and fully implement the European REACH Regulation on chemicals and Global Harmonized System for Chemicals Released in Circulation. In this context, the National Action Plan relies upon the five main pillars of actions for safe chemicals management, these being:

1. Strengthening of the control of chemicals access on market;
   - Establishment of legal, administrative and technical measures necessary to achieve chemical safety in chemicals use throughout their life cycle and thus by 2020 chemicals should be used and produced in a way leading to minimization of significant negative impacts on human health and environment;
   - Strengthening of Macedonia's role in the global implementation of SAICM (strategic approach in chemicals management), where the main goal of the NAP is to achieve adequate management of chemicals in the country, so to achieve that by 2020 chemicals are used and produced in a way leading to minimization of significant negative impacts on human health and environment;
2. Improvement of information on chemicals present on the market through the Global Harmonized System;
   - Enabling the key stakeholders – representatives of industry, health, economy, labour and transport to have information available on the use of chemicals, skills and adequate prevention measures to cope with negative effects of those chemicals in order to facilitate their implementation of effective programmes for human health and environment protection from chemical hazards;
   - Provision of standards for transport, storage, application and removal of chemicals and their implementation in order to ensure that chemicals are used safely;
3. Improvement of the safety of chemicals and protection of the health of professional and general public exposed at chemicals;
   - Providing institutions, employers, employees, non-governmental organizations and wider public with capacity for chemicals management at their work places to enable effective participation in chemical safety programmes.
4. Strengthening and application of Good Agricultural Practices;
   - Provision of education of farmers in agro-ecological issues through different programmes related with organic production schemes in the maintenance of traditional methods of growing;
   - Minimization of unusable waste and its responsible disposal, safe keeping of fertilizers and agro-chemicals and establishment of procedures for extraordinary action in accordance with the law;
   - Minimization of the risk of pollution in case of accidents;
   - Records keeping of storage, landfilling and recycling of organic fraction of the waste;
   - Provision of conditions for all chemicals applied in agricultural practices to be limited to rational quantities;
   - Settlement of the problem of high risk historical pollutions: contaminated sites and stored chemicals;
5. Establishment of legal framework with reference to areas of high risk: contaminated sites and old reserves;
   - To enable that all chemicals in use, chemicals in waste, as well as their byproducts are listed in a duly implemented inventory and assessed in order to establish their extent of danger and ensure that their locations and conditions are known.

The National Action Plan for Safe Chemical Management actually relies on the list of national priorities in the area of chemicals management:

   - Establishment of legal, political and institutional basis for proper chemicals use.
   - Management of waste and old chemicals (and minimization) and remediation of contaminated sites.
   - Protection of human health.
   - Sound agricultural practice.
   - Research, monitoring and database.
   - Education and training.
   - Participation of civil society and non-governmental organizations.
   - Participation of stakeholders.

3. Management of persistent organic pollutants

The structure of persistent organic pollutants (POPs) management was for the first time defined in the National Implementation Plan for POPs Reduction and Elimination (2005). In the course of 2013, review of the current plan and updated obligations corresponding with the obligations deriving from the Stockholm Convention on Persistent Organic Pollutants was made. In this regard, overview of the inventories of old and new industrial POPs was made and national priorities were defined. The text below presents the key elements in the management of this group of chemicals obtained through surveys conducted in the course of 2013.

3.1. Inventory of old/new industrial POP_s chemicals

National Implementing Plan of the Stockholm Convention in the Republic of Macedonia for the POPs chemicals needs to be updated with amended list of POPs and new 9 additional persistent organic pollutants (including new industrial POPs,

pesticides and accidental POPs).

The Stockholm Convention identified the following five chemicals as new industrial chemicals: tetrabromodiphenyl and pentabromodiphenyl ether (commercial pentabromo-diphenyl ether), pentachlorobenzene (PeCB), hexabromodiphenyl ether (commercial octabromodiphenyl ether), hexabromobiphenyl, perfluorooctane sulfonic acid (PFOS), its salts and sulfonyl fluoride (PFOS-F)

Preliminary inventory of c-octaBDE and related POP-PBDE (heptaBDE, hexa-BDE and octaBDE homologues) was made on the basis of comparison with other countries, developing countries by use of guidelines for inventory of new industrial chemicals and homologues and on the basis of assumptions from experts' surveys. The main input data for the initial calculation of POP-BDEs from EEE and from EEE (electric and electronic equipment) waste based on the quantities per capita for monitors with cathode tubes are as follows: a) number of citizens in the Republic of Macedonia, b) average mass of monitor cathode tubes, c) average content of polymer in monitor with cathode tube, d) average content of C-OctaBDE added to polymer and e) number of monitors with cathode tubes used in households, public administration, business sector, hotels and other public institutions.

Table 1. Preliminary inventory of homologues of c-OctaBDE (heptaBDE, hexaBDE and octaBDE) in EEE used in the Republic of Macedonia based on calculations of equipment with cathode tubes per capita

Homologues (kg)	Distribution of homologues c-octaBDE	POP-PBDEs of reserves of equipment with cathode tubes per capita in the inventory year - 2012 (kg)
		∑c-octaBDE
		9.086 kg
		999 kg
hexaBDE	43%	3.906 kg
hexaBDE	35%	3.180 kg

Table 2. Quantity of c-OctaBDE in computer monitors with cathode tubes and for TV monitors cathode tubes for private consumers (households)

Private consumers (households)					
Monitors	Num-ber	mass (kg)	mass(t)	Quantity of plastic moni-tors (30%)(tons)	Average quantity of c-OctaBDE (kg)
Computer monitors with cathode tubes	29.292	413.017	413	124	315
TV monitors with cathode tubes	424.076	13.400.808	13.401	4.020	3.498
Total	453.368	13.813.825	13.814	4.144	3.812

Table 3. Quantity of c-OctaBDE in computer monitors with cathode tubes and for TV monitors cathode tubes in public administration and business sector

Monitors	Number	mass (kg)	mass(t)	Quantity of plastic monitors (30%)(tons)	Average quantity of c-OctaBDE (kg)
Computer monitors with cathode tubes	100.543	1.417.656	1.418	425	1.080
TV monitors with cathode tubes	204.090	6.449.231	6.449	1.935	1.683
Total	304.633	7.866.888	7.867	2.360	2.764

Table 4. Quantity of c-OctaBDE in EEE waste disposed on landfills

Monitors	Number	mass (kg)	mass(t)	Quantity of plastic monitors (30%)(tons)	Average quantity of c-OctaBDE (kg)
Computer monitors with cathode tubes	189.229	2.668.129	2.668	800	2.033
TV monitors with cathode tubes	97.965	3.095.680	3.096	929	808
Total	287.194	5.763.809	5.764	1.729	2.841

Table 5. Quantity of c-OctaBDE in EEE waste exported in other countries for recycling

Monitors	Number	mass (kg)	mass(t)	Quantity of plastic monitors (30%)(tons)	Average quantity of c-OctaBDE (kg)
Computer monitors with cathode tubes	1.99.566	2.813.886	2.814	844	2.144
TV monitors with cathode tubes	5.102	161.231	161	48	42
Total	204669	2.975.117	2.975	893	2.186

Table 6. Quantity of c-PentaBDE in vehicles still in use in the Republic of Macedonia

Preliminary distribution of quantities of c-PentaBDE in transport sector in Macedonia for 2012	
Cars	2155kg
Buses	233kg
Trunks	78kg
Total	2467kg

Table 7. Quantity of POP-PBDEs in transport sector for the listed homologues of POP-PBDEs

Distribution of homologues of c-PentaBDE		POP-PBDEs in vehicles in use in the year of inventory 2012	POP-PBDEs imported in vehicles in the year of inventory 2012	POP-PBDEs in used vehicles in the year of inventory 2012	POP-PBDEs disposed on landfills in the past from transport sector *
		(kg)	(kg)	(kg)	(kg)
Inventory of c-PentaBDE		c-PentaBDE	c-PentaBDE	c-PentaBDE	c-PentaBDE
		3.355	165	868	499
tetraBDE	33%	1.107	54	286	165
pentaBDE	58%	1.946	96	503	289
hexaBDE	8%	268	13	69	40
hexaBDE	0.50%	17	1	4	2

In the context of the old twelve persistent organic pollutants, detailed inventory of polychlorinated biphenyls (PCBs) was made in the updated document.

Table 8. Detailed inventory of PCBs

Description		Number of units	Weight of oil (kg)	Total weight (kg)
Estimated quantity of transformers		9.500	12.000.000	43.000.000
Inventoried transformers		8.000	10.105.000	36.200.000
Tested transformers		8.000	10.105.000	36.200.000
Equipment containing more than 10% PCBs and quantity above 5 liters	transformers	12	8.000	28.100
	condensers	409	2.460	24.600
Equipment containing more than 0.05% PCBs and quantity above 5 liters – transformers		312	140.000	600.200

Description		Number of units	Weight of oil (kg)	Total weight (kg)
Equipment containing more than 0.005% PCBs and quantity above 0.05 liters	transformers	58	33.300	135.800
	condensers	1.691	6.890	68.900
Out of use equipment	transformers	113	34.600	148.600
	condensers	1499	6.470	64.700
Used equipment	transformers	269	146700	615.500
	condensers	601	2.870	28.700
Tested barrels		179	45.200	45.200
Barrels with PCB contaminated oil		59	16.000	16.000
Total quantity of identified PCBs	transformers	382	181.300	764.100
	condensers	2.100	9.350	93.500
	Used oil in barrels	59	16.000	16.000
	Total:		**206.650**	873.600
Treated transformers		119	36.000	155.000
Discarded condensers		801	3.120	31.200
Remained transformers with PCBs to discard		**263**	**145.300**	609.100
Remained condensers with PCBs to discard		**1.299**	**6.140**	61.400
Remained waste with PCBs to discard		59	16.000	16.000

In the context of accidental production of persistent organic pollutants, calculations were made of emissions of substances classified in Annex C of the Stockholm Convention.

Table 9. Preliminary Inventory of PCBs for the period 2005-2011

	PCB	Annual release (g TEQ/a)				
Group	Groups of sources	Air	Water	Land	Product	Residue
1	Waste combustion					
2	Ferrous and non-ferrous metallurgy	0.3	0,0	0,0	0,0	0,000
3	Production of electricity and heat	498.4	0,0	0,0	0,0	0,019
4	Production of mineral products	0.0	0,0	0,0	0,0	0,000
5	Transport sector	0.0	0,0	0,0	0,0	0,000
6	Process of open combustion	2.3	0,0	0,0	0,0	0,000
7	Production of chemicals and products for general use	0.0	0,0	0,0	0,0	0,000
8	Miscellaneous					
9	Disposal on landfills					
10	Identification of potential hot-spots					
1-10	Total	500.96	0,00	0,00	0,00	0,02
	Grand total					500.98

Table 10. Summary Table of dioxins and furans emission for the period 2005-2011

Year	Annual emissions by media (g TEQ/a)					Total per year
	Air	Water	Land	Product	Residue	
2005	32.7	0.5	0.8	0	24.8	58.8
2006	33.6	0.4	0.8	0	26.6	61.4
2007	36.1	0.4	0.8	0	27.3	64.6
2008	34	0.4	0.8	0	23.1	58.3
2009	31.8	0.4	0.8	0	26.2	59.2
2010	32.9	0.4	0.8	0	25.1	59.2
2011	35.6	0.4	0.8	0	28.3	65.1

Summary of annual emissions of PCDD/PCDF for the period 2005-2011

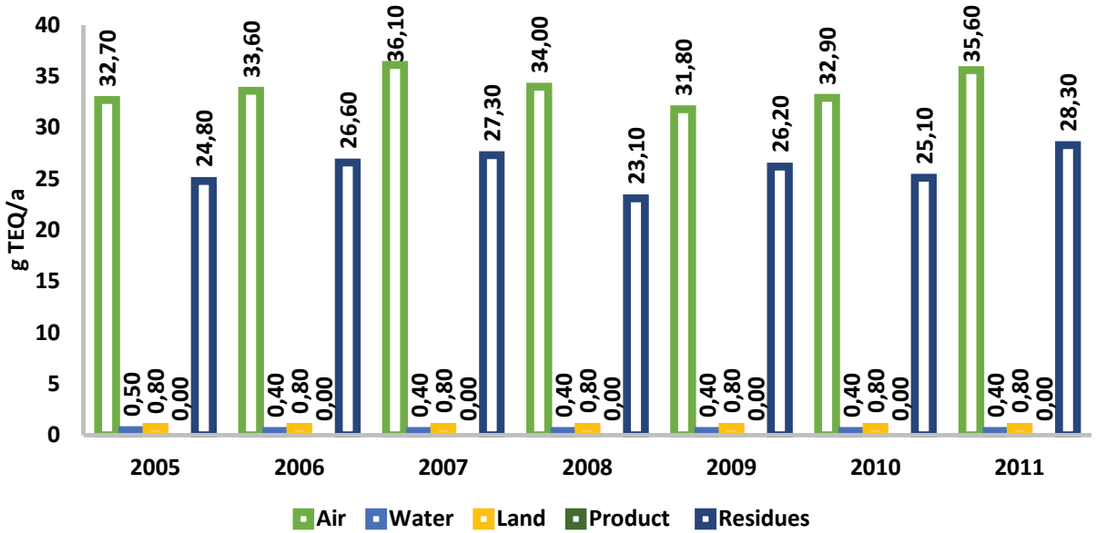


Diagram 1

3.2. Synergy and coordinated implementation of Basel, Rotterdam and Stockholm Conventions

Basel, Rotterdam and Stockholm Conventions are multilateral environmental agreements sharing the same goal that is protection of human health and environment against negative impacts of chemicals and waste. In order to strengthen coordination and cooperation between Basel, Rotterdam and Stockholm Conventions, the Conferences of Parties of these Conventions took series of decisions. The purpose of this so called "synergy process" is to strengthen the implementation of these three Conventions on national, regional and global levels, through provision of fundamental policy guidelines, improvement of the efficiency in the provision of support to the Parties of the Conventions, reduction of their administrative load and maximizing effective and efficient use of resources at all levels. However, synergy allows for maintenance of legal autonomy of these three multilateral agreements.

Synergy is achieved when the combined effect of several components of the system exceeds the sum of their individual effects. Synergy is achieved when activities of intergovernmental and governmental institutions, non-governmental organizations and other bodies participate together in the settlement of certain problem.

Basel, Rotterdam and Stockholm Conventions were ratified by the Republic of Macedonia in the period 1997 – 2010. Their implementation contains elements of common responsibilities between several institutions. The leading institution in the coordination of the three agreements is the Ministry of Environment and Physical Planning. Other institutions that play important roles in the implementation of the activities necessary to meet their provisions are the Ministry of Health/Drugs Bureau and Ministry of Agriculture, Forestry and Water Economy/Phytosanitary Administration. Furthermore, Ministry of Transport and Communications, Customs Administration, Ministry of Interior, Ministry of Foreign Affairs, and Ministry of Labour and Social Policy are important parts in the overall chemicals and waste management cycle.

The legal framework includes primarily the Laws on the ratification of Basel, Rotterdam and Stockholm Conventions by which all obligations deriving from them enter into force. National legislation covers only certain parts of the three agreements. The assessment has indicated that provisions related to the management of hazardous waste are to the greatest extent harmonized with the existing national legislation. Furthermore, major portion of the provisions of Rotterdam Convention are transposed in the existing Law on Chemicals. Special legal act should be adopted to make the provisions of the Stockholm Convention more transparent.

The assessment of the legal and administrative framework indicates the need to define priority steps that should be followed in the formulation of the action plan:

- Priority step: Establishment of coordination mechanism.
- Priority step: Identification of cross-cutting thematic areas and provisions for synergy in each thematic area.
- Priority step: Identification of similarities and gaps between national environmental policy and action plan for each thematic area and formulation of statement for each thematic area in the national context.
- Priority step: Definition of synergy.
- Priority step: Formulation of national strategies for synergy implementation with regard to each thematic area and definition and proposal of action for each strategic statement.
- Priority step: Definition of synergy scheme.
- Priority step: Facilitation of the replication of the national synergy scheme in the region of Central and Eastern Europe and beyond.

Priority steps will be carried out through implementation of the activities set in the Action Plan for Synergy and

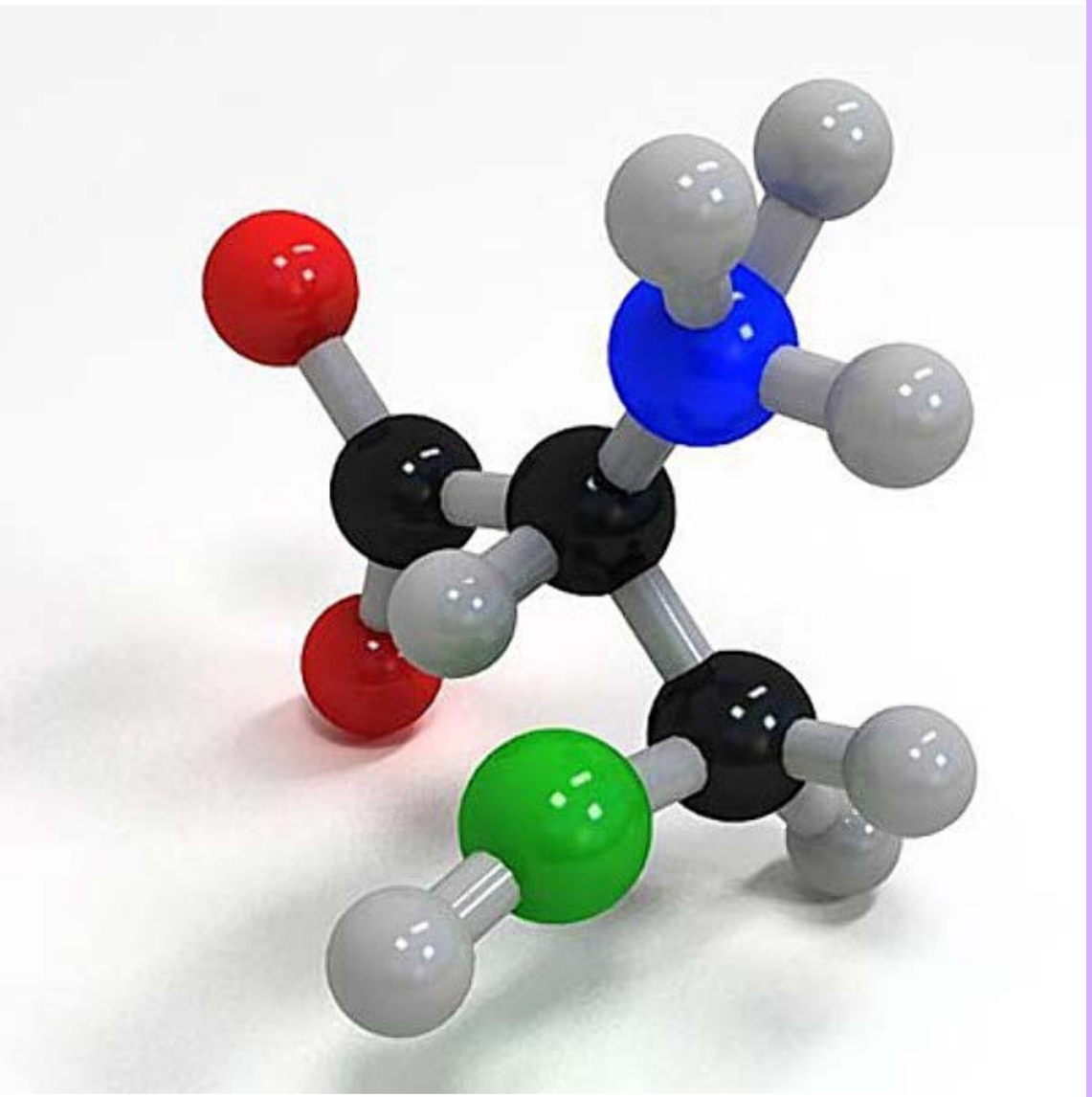
Coordinated Implementation of Basel, Rotterdam and Stockholm Conventions in the period 2014 – 2017.

Table 11. Brief overview of the Action Plan for Synergy and Coordinated Implementation of Basel, Rotterdam and Stockholm Conventions

Priority step	Activities
Establishment of coordination mechanism	– Assessment of the implementation of the three Conventions and definition of action plan – Review of possibilities for establishment of the key mechanisms for efficient coordination of national activities – Analysis of relevant governmental and non-governmental organizations with regard to field activities – Formulation of institutional mechanism for implementation, monitoring and evaluation – Establishment of coordination body – Organization of different forms of communication to promote awareness of the obligations related to the Conventions, especially inter-institutional and inter-sectoral visions and cooperation – Establishment of inter-sectoral committee
Identification of cross-cutting thematic areas and provisions for synergy in each thematic area	– Analysis of the contents of the three Conventions and identification of thematic areas for synergy. – Analysis of the gaps in the national legislation related to the three Conventions. – Harmonization of the national legislation with the provisions of the Conventions. – Review and establishment of common provisions of the Conventions and identification of these provisions in each Convention. – Definition of common statement/list composing the provisions of the three Conventions.
Identification of similarities and gaps between national environmental policy and action plan for each thematic area and formulation of statement for each thematic area in the national context	– Identification of the relevant national policy for each of the defined provisions – Comparison and identification of differences with the relevant national environmental policy and reconstruction of common content on national level. – Determination of the need to define policy for common provisions of the three Conventions. – Organization of mini workshops for policy makers.

Priority step	Activities
Definition of synergy	– Evaluation of the national development documents – Provision of permanent communication with the competent institutions – Definition of synergy programmes – selection of related and proposed programmes and intensive implementation of the synergy scheme in the country – Mobilization of the relevant stakeholders – ntensification of the participation of all relevant sectors and institutions/organizations on local level – Proposing legislation to mainstream national policies towards the implementation of the three Conventions. – Training of participants for planning, development and reporting under projects with accent on interactions between the three Conventions. – Definition of the links between the three Conventions as short, medium and long-term activities and programmes to be identified by all relevant stakeholders. – Preparation and training of qualified human capacity and trainers that would include synergy in projects and activities on local level. – Coordination and networking with regional and international partners in synergy definition. – Evaluation of development and impacts achieved through adaptation of the processes for synergy definition.
Formulation of national strategies for synergy implementation with regard to each thematic area and definition and proposal of action for each strategic statement	– Contextualization of the goals of the country with the proposed strategies to implement the common provisions for each thematic area. – Elaboration of the content of each strategy to generate the crucial actions taking into account current policy, strategy, institutional and operational circumstances in the Republic of Macedonia. – Development of national strategy and action plan
Definition of synergy scheme	– Definition of the precise role of each institution, organization, involved person – Organization of kick-off meeting with all institutions and organizations – Definition of each step to be undertaken by certain institutions/ organizations to secure synergy in the implementation of the three Conventions – Definition of procedure for harmonized implementation of defined steps – Preparation of synergy scheme for the implementation of the Basel, Rotterdam and Stockholm Conventions – Training for efficient implementation of the synergy scheme between Basel, Rotterdam and Stockholm Conventions

Priority step	Activities
Facilitation of the replication of the national synergy scheme in the region of Central and Eastern Europe and beyond	– Creation of web site on synergy – Establishment of network between the relevant competent institutions of the Parties of the three Conventions on regional level and beyond – Organization of regional trainings in synergy scheme creation – Creation of regional web site (in the frames of the Regional Center for the Basel Convention, Bratislava) for synergy between the three Conventions.



HOISE

NOISE

1. Introduction

Environmental noise is a severe problem. Sounds are part of our everyday life they are often unwanted or harmful in outdoors environment created by human activities.

Environmental noise affects primarily the quality of life, disruption of normal rhythm of work and rest. It causes both physical and psychological problems among population, by disturbing the basic activities of man such as sleeping, rest, study, communication, and it reflects especially on hearing impediment.

Noise is constantly growing and it is especially difficult to control in densely populated agglomerations and residential areas near airports, railways and highways.

The level of noise released from a certain source of noise depends a lot on the distance from the source and whether we stand in front of some barrier, if there is such. Many other factors influence the level of the noise and the measured results might vary by tens of decibels for a rather similar source of noise. Explanation of this difference is the way in which noise is released from the source, how it travels through air and how it arrives to the receptor.

The most important factors influencing the spread of the noise are as follows:

- Type of source (point or linear);
- Distance from source;
- Atmospheric absorption;
- Wind;
- Temperature and temperature gradient;
- Obstacles, such as barriers and buildings;
- Underground absorption;
- Reflection;
- Humidity; and
- Precipitations.

Measurement and monitoring of the noise are necessary to achieve and maintain environmental noise levels within the limit values defined in four areas according to the extent of protection against noise, with health and well-being of the population being the ultimate objective.

According to the current legislation, data from noise measurement and monitoring is submitted to the Ministry of Environment and Physical Planning, Macedonian Environmental Information Centre.

2. State and trends

2.1. Effects of noise on human health

Ministry of Health is responsible for the assessment of harmful effects of environmental noise on the health of exposed population. On the basis of studies carried out by the Public Health Institute the most frequent consequences of increased noise level occurs as disturbed sleeping, annoyance of the population, hearing impediments, cardio-vascular problems and it affects psychophysical condition.

2.2. Status of noise

2.2.1. Environmental noise

Public Health Centers in Bitola, Kichevo and Kumanovo make assessment of the harmful effect of environmental noise on exposed population at several measuring points. The obtained results are processed adequately and delivered to the Macedonian Environmental Information Centre.

Intensity of noise is presented through the basic noise indicators through day-Ld, evening-Le and night-Ln, expressed in dB(A), defined in the Rulebook on the application of noise indicators, additional noise indicators, manner of noise measuring and methods for environmental noise indicators assessment.

At each measuring point, four times per 50 measurements are made during 24 hours. Two measurements are conducted during day based on which the value of Ld indicator is calculated, one measurement during evening for Le and one during night for Ln. The period day/evening/night has been determined on the basis of the Law on Environmental Noise, so that the day lasts 12 hours from 7.00 to 19.00 hours, evening lasts 4 hours from 19.00 to 23.00 hours and night lasts 8 hours from 23.00 to 7.00 hours.

1. Bitola

Division for hygiene and environmental health of the PHI Public Health Centre – Bitola measures environmental noise levels in April and October. In the period 2010 to 2013, according to the Rulebook on the locations of measuring stations and measuring points, noise levels are measured on nine measuring points presented on the following map (Figure 1).

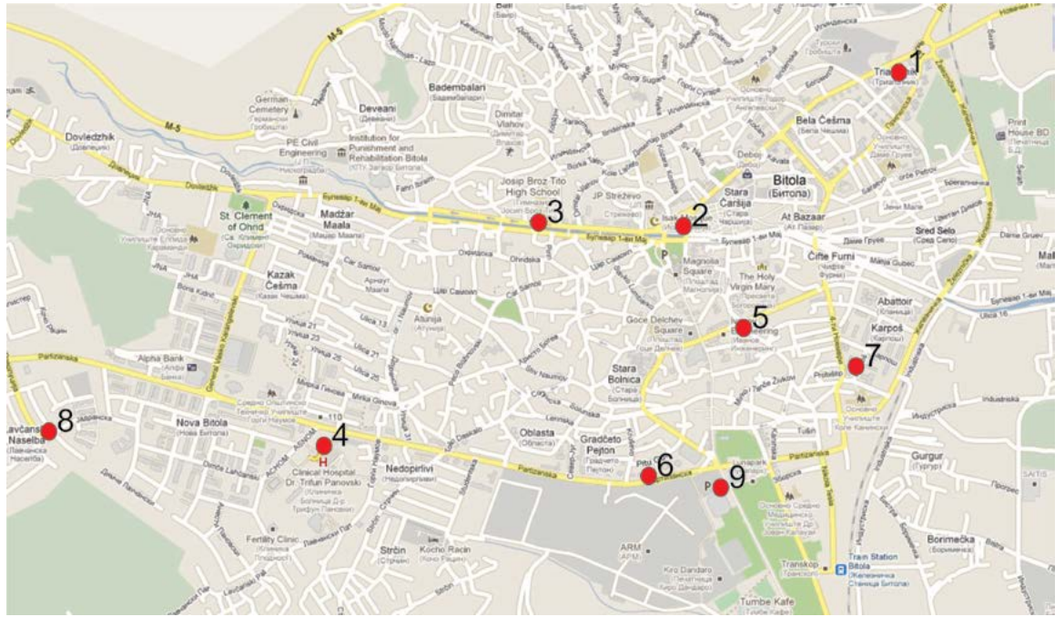


Figure 1. Disposition of measuring points

Diagram 1 shows that the intensity of environmental noise for indicator Ld, at six measuring points has a trend of slight decrease for the observed period, while at other three points it has a trend of constant intensity. Data leads to the conclusion that, except on the measuring point 8 where noise level does not exceed the LV, the level of noise at all other points is above the LV for that measuring point and exceeding ranges between 0.39 and 15.62 dB(A) for indicator Ld.

The level of noise in 2013 was reduced compared to 2012 at all measuring points.

Diagram 2 shows that the intensity of

Intensity noise environment in Bitola basic indicator Ld

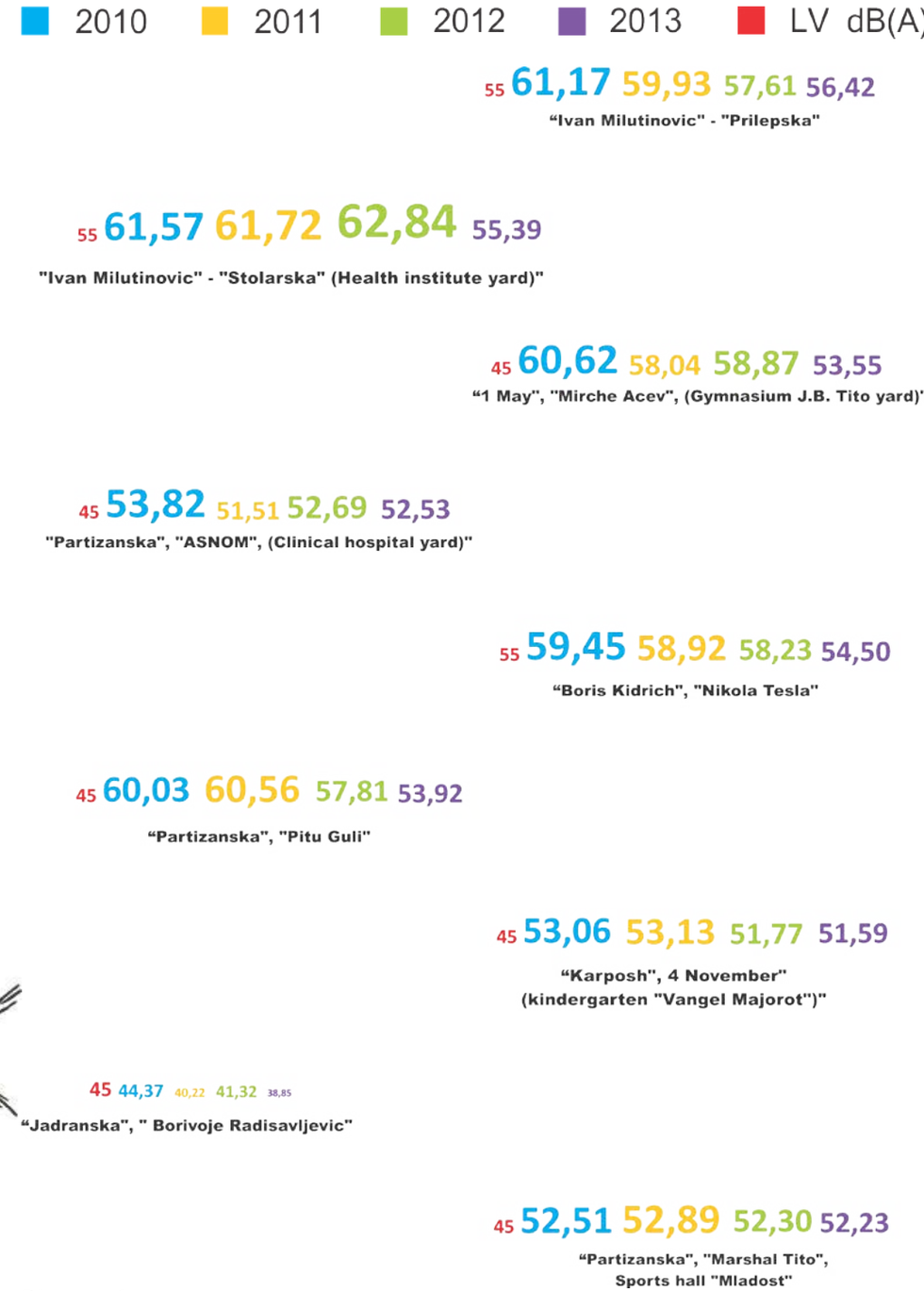


Diagram 1

environmental noise for indicator Le, at five measuring points has a trend of slight decrease for the observed period, while at other four points it has a trend of constant intensity. Data leads to the conclusion that, except on the measuring points 2, 3 and 6 where noise level exceeds the LV and exceeding ranges between 0.29 and 5.42 dB(A) for indicator Le, the level of noise at all other points is below the LV for that measuring point.

The level of noise in 2013 was reduced compared to 2012 at seven measuring points, while at the rest of two measuring points 1 and 7 there was increase by around 1 dB(A).

Diagram 3 shows that the intensity of environmental noise for indicator Ln, at six measuring points has a trend of decrease

Intensity noise environment in Bitola basic indicator Le

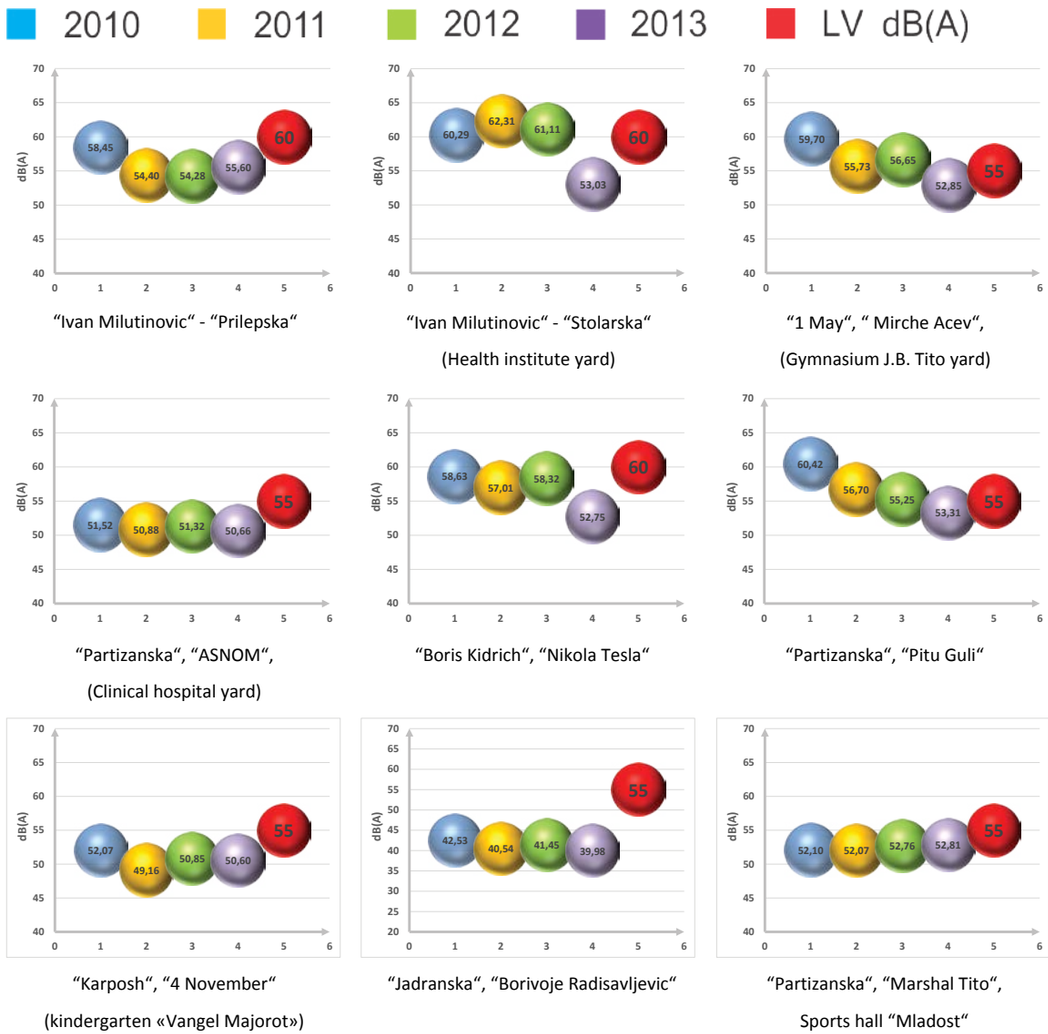


Diagram 2

for the observed period, while at other three points it has a trend of constant intensity. Data leads to the conclusion that, except on the measuring points 1, 5, 7 and 8 noise level does not exceed the LV, while the level of noise at all other points is above the LV for that measuring point, and exceeding ranges between 0.75 and 8.93 dB(A) for indicator Ln.

The level of noise in 2013 was reduced compared to 2012 at eight measuring points, while at the measuring point 7 there was slight increase by 1.33 dB(A).

Intensity noise environment in Bitola basic indicator Ln

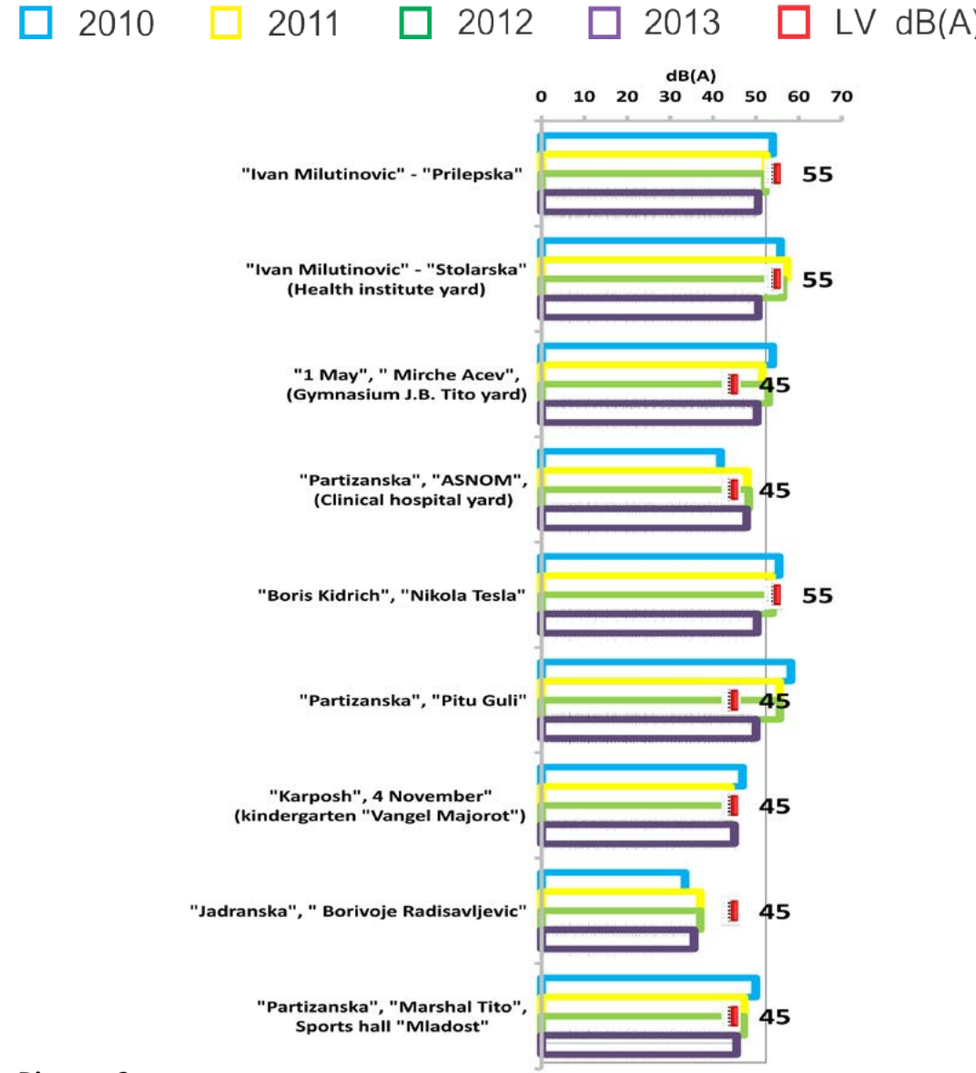


Diagram 3

2. *Kichevo*

Division for hygiene and environmental health of the PHI Public Health Centre – Kichevo measures environmental noise levels in April and October. In the period 2010 to 2013, according to the Rulebook on the locations of measuring stations and measuring points, noise levels are measured on nine measuring points presented on the following map (Figure 2).

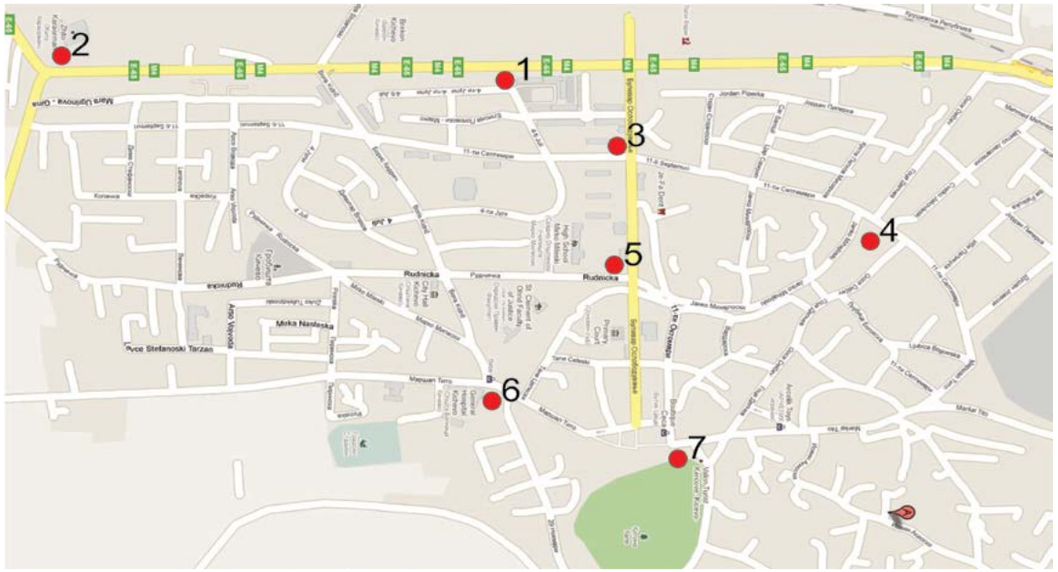


Figure 2. Disposition of measuring points

Diagram 4 shows that the intensity of environmental noise for indicator Ld, at all measuring points has a variable trend of decrease and increase for the observed period, while at other three points it has a trend of constant intensity. Data leads to the conclusion that, on the measuring point 2 for the observed period, measuring point 4 from 2011 to 2013 and measuring points 6 and 7 for 2012 and 2013, the noise level did not exceed the LV, while the level of noise at all other points was above the LV for that measuring point and exceeding ranged between 1.15 and 15.19 dB(A) for indicator Ld.

The level of noise in 2013 compared to 2012 was increased at six measuring points, and at the measuring point 5 it was reduced by 2.20 dB(A).

Intensity noise environment in Kicevo basic indicator Ld

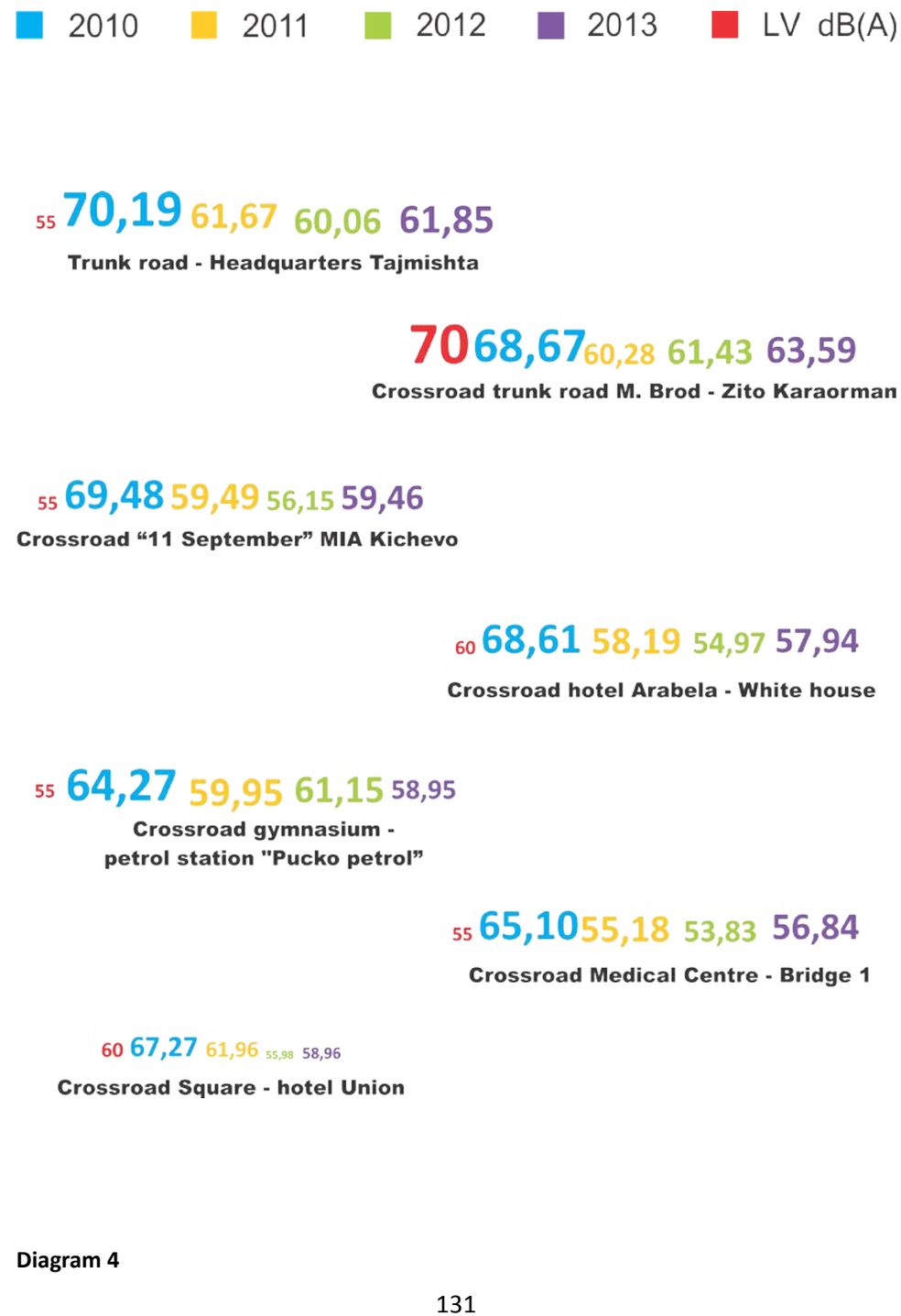


Diagram 4

Diagram 5 shows that the intensity of environmental noise for indicator Le, at all measuring points has a variable trend of decrease and increase for the observed period, while at other three points it has a trend of constant intensity. Data leads to the conclusion that on the measuring points: 1 in 2013, 2 for the observed period, measuring point 4 from 2011 to 2013 and measuring point 7 for 2012, the noise level did not exceed the LV, while the level of noise at all other measuring points was above the LV for that measuring point and exceeding ranged between 0.45 and 13.19 dB(A) for indicator Le.

The level of noise in 2013 compared to 2012 was increased at six measuring points, and at the measuring point 1 it was reduced by 4.07 dB(A).

Intensity noise environment in Kicevo basic indicator Le

Diagram 5

Diagram6 shows that the intensity of environmental noise for indicator Ln, at all measuring points has a variable trend of decrease and increase for the observed period, while at other three points it has a trend of constant intensity. Data leads to the conclusion that on the measuring points: 2 from 2011 to 2013, 4 in 2011 and 2013 and 6 in 2011, the noise level did not exceed the LV, while the level of noise at all other measuring points was above the LV for that measuring point and exceeding ranged between 0.35 and 19.29 dB(A) for indicator Ln.

The level of noise in 2013 compared to 2012 was increased at three measuring points, and reduction at the measuring points 1 (1.10 dB(A)), 2 (2.84 dB(A)), 3 (3.72 dB(A)) and 4 (9.06 dB(A)).

Intensity noise environment in Kicevo basic indicator Ln

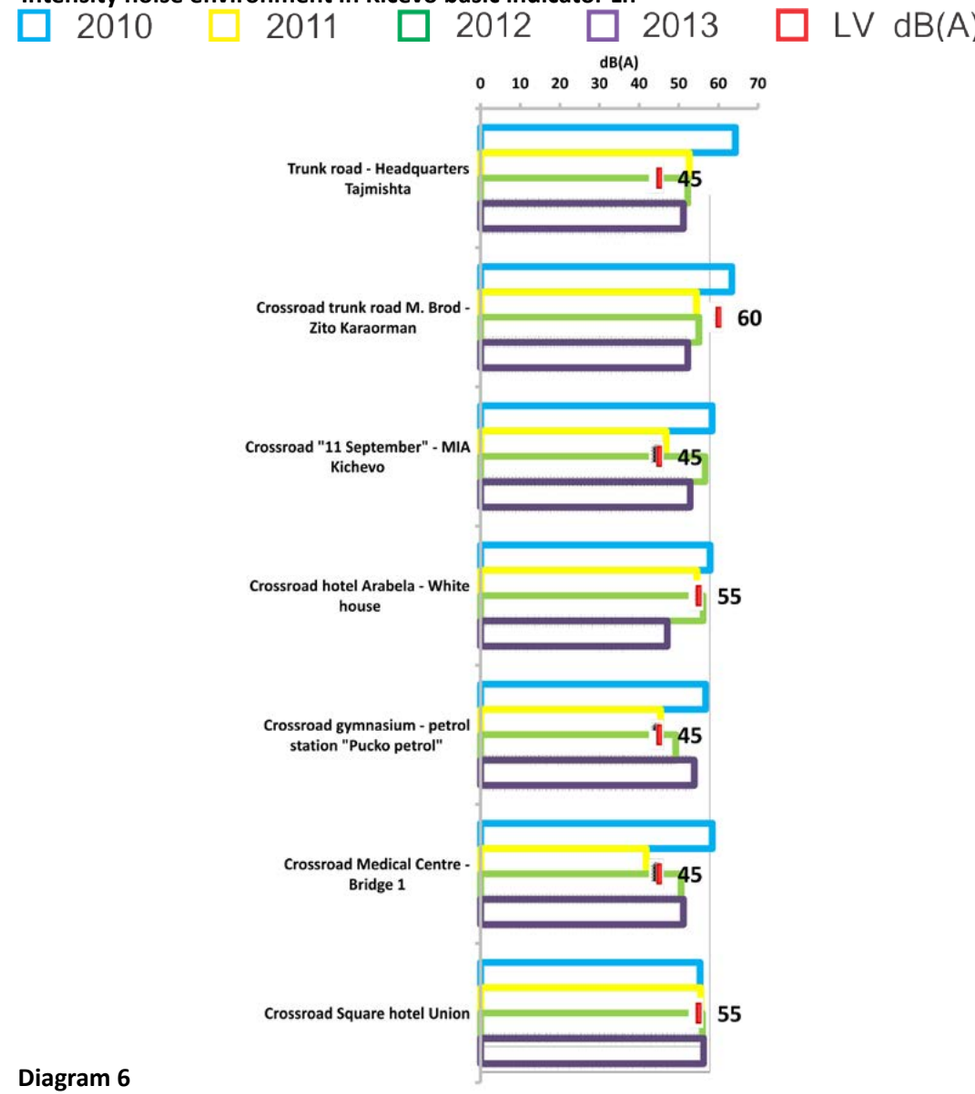


Diagram 6

3. Kumanovo

Division for hygiene and environmental health of the PHI Public Health Centre – Kumanovo measures environmental noise levels in April and October. In the period 2012 and 2013, according to the Rulebook on the locations of measuring stations and measuring points, noise levels are measured on nine measuring points presented on the following map (Figure 3). In 2011, the level of noise was measured at five measuring points.

Figure 3. Disposition of measuring points

Diagram 7 shows that the intensity of environmental noise at all measuring points had significant increase above the LV for that measuring point for indicator Ld, or the LV was exceeded by a value ranging from 6.13 to 18.43 dB(A).

The level of noise in 2013 compared to 2012 increased at the measuring point 7 by 0.98 dB(A), and at all other measuring points the noise level decreased.

Diagram 8 shows that the intensity of environmental noise at all measuring points had significant increase above the LV for that measuring point for indicator Le, or the LV was exceeded by a value ranging from 2.26 to 17.91 dB(A).

Diagram 9 shows that the intensity of environmental noise for the basic indicator Ln at all measuring points was above the LV. Significant increase of the indicator

Intensity noise environment in Kumanovo basic indicator Ld

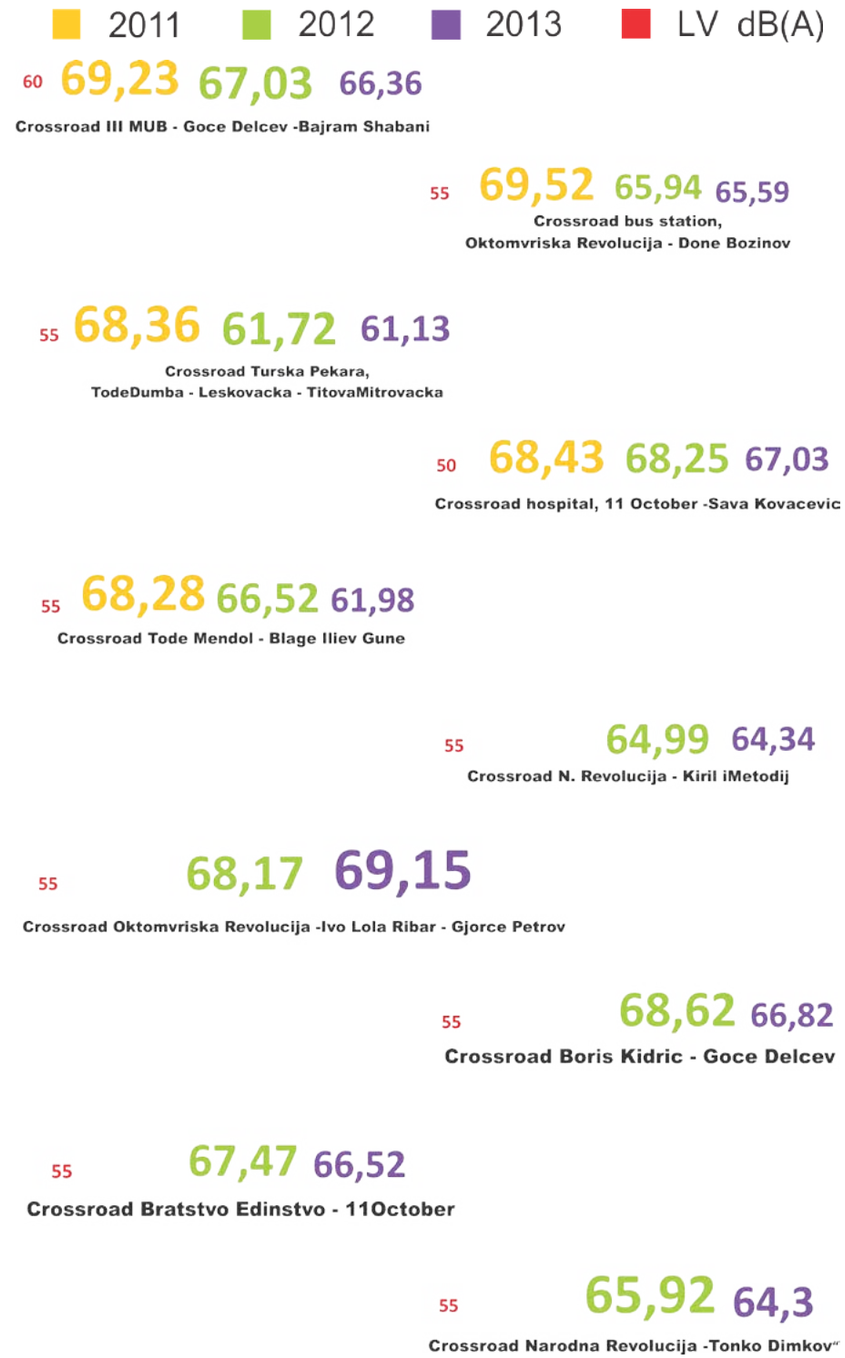


Diagram 7

over night was measured at all measuring points by a value ranging from 8.2 to 23.65 dB(A) for the indicator.

The level of noise in 2013 compared to 2012 increased at the measuring points 1, 6 and 8, and at all other measuring points the noise level decreased.

2.2.2. Noise from industry

Macedonian Environmental Information Centre keeps and updates cadastre of noise polluters. In 2013, data was requested to update the noise cadastre by 64 installations that obtained or applied for

Intensity noise environment in Kumanovo basic indicator Le

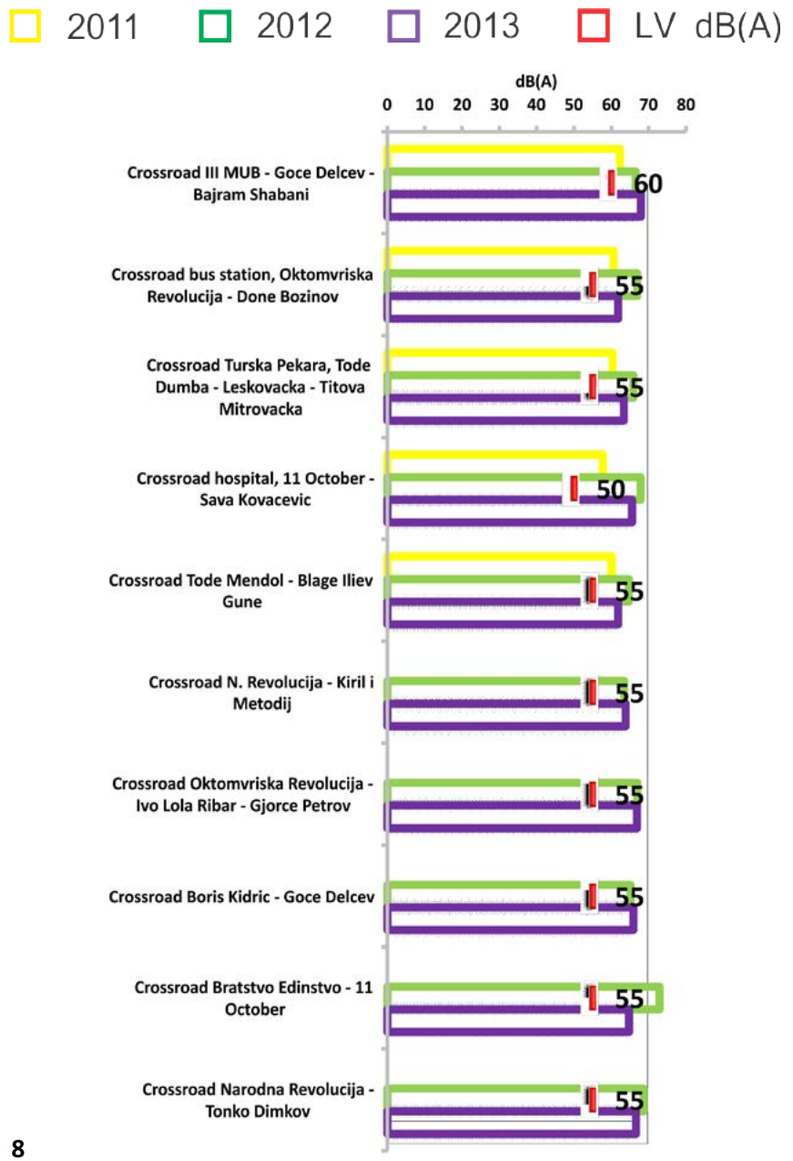


Diagram 8

A integrated environmental permit.

Analysis conducted and data processing indicated that only 28 installations delivered data on measured environmental noise level.

Among those, in 26 installations, environmental noise level at all measuring points was below the limit value. In two installations, the environmental noise level exceeded the limit value, at four measuring points by 5 dB(A), at two measuring points by 10 dB(A) and at one measuring point by more than 10 dB(A).

Intensity noise environment in Kumanovo basic indicator Ln

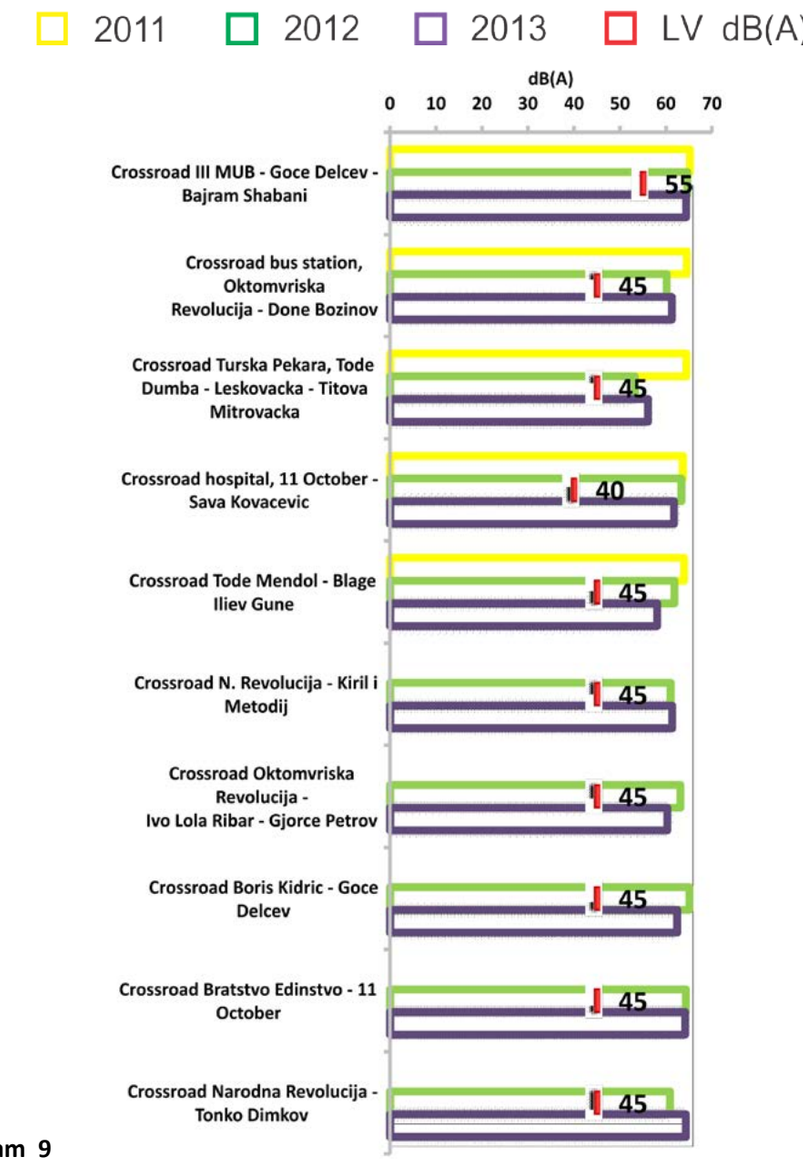


Diagram 9

2.2.3. Conclusion

Based on the data processed on environmental noise, we may conclude that among the three observed cities, Kumanovo is the city with the highest noise pollution. The environmental noise level in Kumanovo at all measuring points and for all three basic indicators: noise during day-Ld, evening-Le and noise during night-Ln, was above the permissible limit value.

With regard to environmental noise from industry, we may conclude that among 28 installations, the noise levels were above the permissible limit value in only 2 installations.

2.3. Causes of noise

The main generators of environmental noise are the means of transportation in road, railway and air transport and industrial installations.

Especially significant and specific to Macedonia is the noise from construction activities, neighbourhood and noise caused by other independent sound equipment, such as noise from religious facilities.

3. Brief assessment and possible development

3.1. Regulations on noise control

For the purpose of defining the future policy for environmental noise as one of the main environmental problems in the Republic of Macedonia, noise management is regulated in the provisions of the Law on Protection against Environmental Noise. This Law has transposed the basic Directive on environmental noise - 2002/49/EC, by which the main recommendations of the European Union have been fulfilled and full management of environmental noise has been enabled. The Law provisions specify:

- Methods of assessment by noise indicators;
- Methods of assessment for harmful effects;
- Adoption and implementation of planning documents, as well as
- Undertaking of measures for protection against environmental noise.

Based on the Law on Protection against Environmental Noise, the Ministry of Environment and Physical Planning, in cooperation with the competent ministries has so far adopted several bylaws in order to enable full implementation of the Law on Protection against Environmental Noise. These bylaws regulate in detail the inspection supervision, environmental indicators and their application, noise monitoring, adoption and implementation of planning documents and conditions and technical measures for protection against environmental noise caused by specific sources.

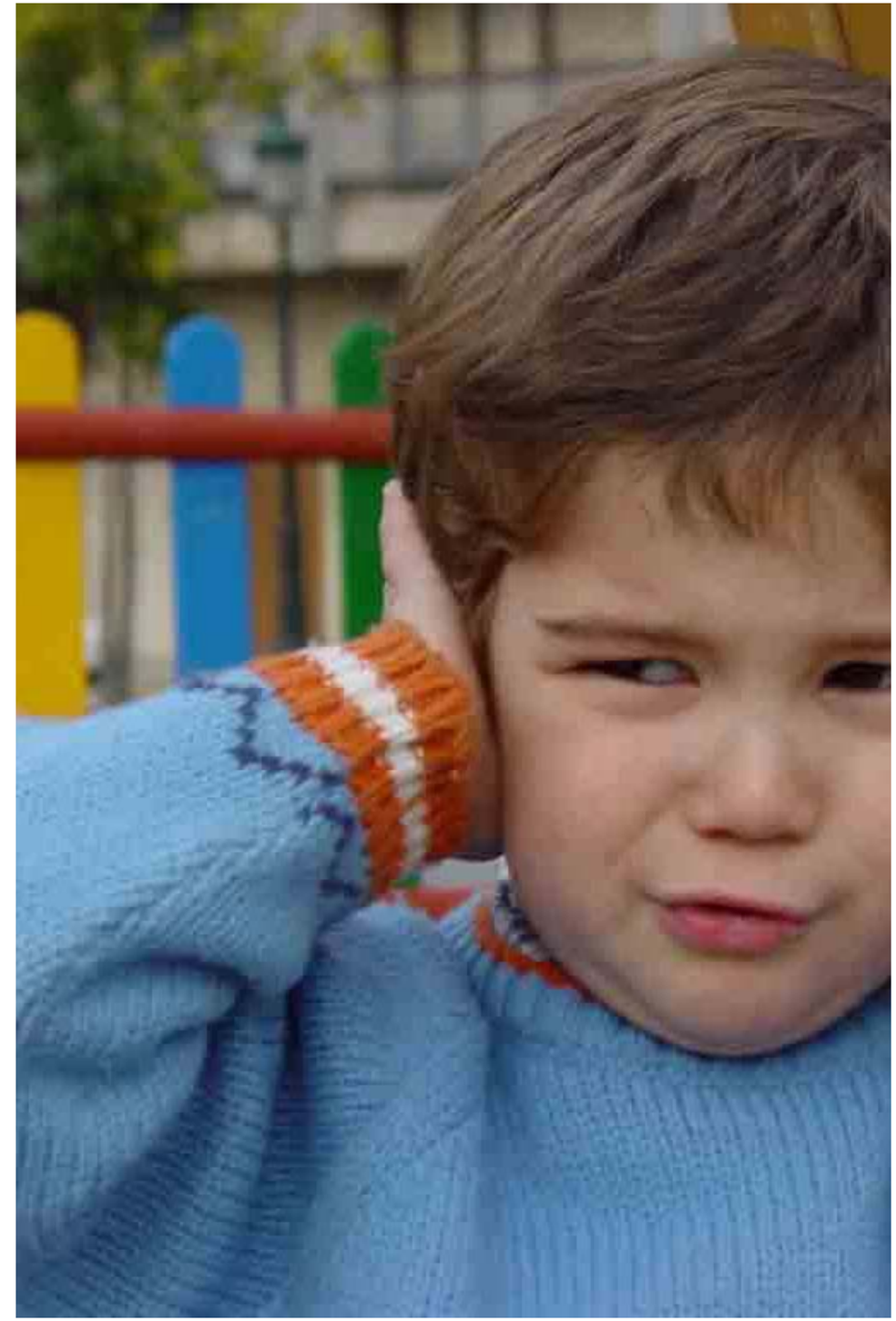
3.2. Responsibilities

The Law stipulates the main carriers of the obligation for environmental noise management, these being:

- Bodies of the state administration;
- Municipalities, City of Skopje and municipalities in the City of Skopje; and
- Legal and natural persons.

Body holding the responsibility in the area of noise, especially with regard to the implementation of the Law on Protection against Environmental Noise, enforcement of the law and regulations adopted under this Law is the Ministry of Environment and Physical Planning.

Responsibilities in terms of noise control from health point of view also belong to the State Sanitary and Health Inspectorate



within the Ministry of Health.

With reference to noise control, the Ministry of Economy performs inspection supervision over the release on the market of machines, means of transportation, devices and equipment for operation and production, as well as devices, products and appliances, while the units of the local self-government perform supervision over noise generated by catering, artisan and tourist activities.

The Ministry of Interior, based on the Decision establishing cases in which and conditions under which the peace of citizens is regarded disturbed by harmful noise, in accordance with the provisions of the Law on Misdemeanours against Public Order and Peace, undertakes activities for detection of misdemeanours involving disturbance of public order and peace.

3.3. Control and reduction of noise

Control and reduction of environmental noise has two main goals, first to protect us from noise that annoys us or disturbs everyday activities and second, to protect us in future from increased noise levels that will further deteriorate the quality of the environment.

3.3.1. Establishment of state and local noise monitoring networks

Measurement and monitoring of noise in the Republic of Macedonia is not a continuous process. One of the basic measures for achievement of high level of noise control and reduction is to establish noise monitoring, which is systematized measurement, monitoring and control of the state of environmental noise.

For the above reasons exactly, it is necessary to establish state and environmental local noise monitoring networks, especially for agglomerations, main roads, main railways and airports as specified in the Decree for agglomerations, main roads, main railways and airports for which strategic noise maps should be prepared.

Collected, verified and processed data and information on the state of environmental noise make the official database of the state of noise in the environment, serving as basis for noise management and protection against noise.

3.3.2. Limit values for noise

For the purpose of avoiding, preventing or reducing harmful effects on human health and environment, limit values for noise levels are specified to limit the levels of all sources of noise, including time period, position of the source and types of areas where noise is generated.

According to the extent of protection, limit values for the basic noise indicators Ld and Le range from 50 dB(A) for areas of first extent, to 70 dB(A) for areas of fourth extent, while for the basic indicator Ln they range from 40 dB(A) for areas of first extent, to 60 dB(A) for areas of fourth extent.

According to the type of premises when measured inside the premises, limit values for the basic noise indicators Ld, Le and Ln range from 30 dB(A) to 55 dB(A).

Limit values for noise levels in areas outside urbanized locations, depending on the area, for the basic noise indicators Ld, Le and Ln range from 35 dB(A) to 70 dB(A).

3.3.3. Misdemeanour sanctions

According to the provisions of the Law on Protection against Environmental Noise, fines are specified as misdemeanor sanctions for legal and natural persons that exceed the permissible noise level.

Total of 11 requests for initiation of misdemeanor procedure have been submitted to the Ministry of Environment and Physical Planning. Of these, five requests were filed by authorized inspector of the City of Skopje, three requests each were filed by authorized inspector of the Municipality of Centar and Municipality of Karposh and one request was filed by authorized inspector of the Municipality of Bitola.

On the basis of the above listed filed requests, the MEPP's Misdemeanour Commission passed sanctions in a form of fine in a total amount of 6.900 EUR in denar counter value. Nine of the pronounced fines are for legal persons in an amount of 500 EUR in denar counter value and eight of the pronounced files in an amount of 3200 EUR in denar counter value are for natural persons. Two of the filed requests are subject of ongoing procedure.

3.4. Development of awareness of noise

Increase of public awareness of environmental noise problems to a higher level among noise generators and general public is very important factor in the process of noise management.

Noise generators should endeavour towards application of modern technologies with reduced noise and use of quieter means of transportation.

According to the provisions of the Law on Protection against Environmental Noise, data and information from the information system of the state of noise are accessible to the public. Furthermore, the Mayors of the Municipalities and the City of Skopje are obliged to disseminate strategic noise maps and action plans for noise and report on other measures for protection against noise and measures and activities aimed at improving the overall state of their area implemented in the preceding year and activities planned for the next year.

3.5. Measures to avoid noise

One of the main priorities of the Ministry of Environment and Physical Planning is establishment of healthy living conditions for people and protection of the environment against noise, through undertaking measures and activities for environmental noise avoidance, prevention or reduction.

Under the Law on Protection against Environmental Noise, one of the key measures is the development of strategic noise maps.

Strategic noise maps are prepared for:

a. agglomerations;
b. main roads;
c. main railroads;
d. main airports;
e. populated places; and
f. areas of specific interest that do not belong to defined agglomeration.

3.5.1. Obligations for development of strategic noise maps

So far, no strategic noise maps have been developed and consequently the Republic of Macedonia does not have data on the number of population exposed at certain noise levels. According to legal provisions, strategic noise maps should be developed by the end of 2015 at latest.

In January 2011, in order to define the obligations, the Government of the Republic of Macedonia adopted the Decree for agglomerations, main roads, main railways and main airports for which strategic noise maps should be prepared.

The Ministry of Environment and Physical Planning is responsible for elaboration, adoption, use and keeping of strategic noise maps for the main roads, main railways and main airports. Under the Decree, the Ministry of Environment and Physical Planning should so far prepare only strategic noise maps for the main roads.

The Council of the Municipality and of the City of Skopje, at the proposal of the Mayor of the Municipality and of the City of Skopje, are responsible for elaboration, adoption, use and keeping of strategic noise maps for agglomerations and populated places. The Decree specifies agglomerations for which strategic noise maps shall be developed, namely the City of Skopje, Municipalities of Bitola, Kumanovo and Tetovo. The Legal person managing the area of specific interest is responsible to develop strategic noise map for the area of specific interest. According to data available so far, there is no need to prepare strategic noise maps for these populated places and areas of specific interest.

3.5.2. Obligations for development of Action Plans for noise

Action plans for noise are elaborated on the basis of the prior prepared strategic noise maps by entities responsible to prepare strategic noise maps. According to the Law on Protection against Environmental Noise, one year upon the adoption of strategic noise maps, the first action plans should be adopted with measures that need to be undertaken for protection against noise at places indicated on the maps as places where the permissible limit value has been exceeded. Given the fact that no strategic noise maps have been developed so far, there have been no action plans for noise elaborated as well.

3.5.3. Other measures for protection against noise

Spatial and urban planning and acts for their implementation are crucial in the process of unwanted environmental noise prevention. For that purpose, the Law specifies that the Plan, in the section on protection, should also contain measures for protection against noise. Planning should take into account the aspects of zoning, to protect residential zones from noise by positioning them away from industrial zone and zone with frequent traffic.

Also, in the frames of procedure for building permit issuance, the planning documents for a structure should meet specific conditions and measures concerning the standards for protection against noise for buildings.

Legal and natural persons are obliged to select, procure and use equipment, installations, devices and means for transportation that generate low level of noise, and products and appliances generating noise within the limit values for noise levels.

4. Recommendations

The Seventh Environmental Action Programme (7EAP) “living well in the boundaries of our Planet”, has as its objective to provide, by 2020, that air pollution in EU reduces significantly and approach the levels recommended by WHO. It also recommends that this will require implementation of updated policies for noise harmonized with the latest knowledge and measures for reduction of noise at source, including improvements in urban planning. In short-term, the European Commission will undertake review of the Directive on environmental

noise in the course of 2014, which might result in proposal to amend Directive and strengthen its implementation.

In order to achieve the objective of the 7EAP and enable prevention and reduction of noise which causes harmful effects on human health and reduce the number of people exposed to harmful noise levels, the following recommendations should be followed:

1. Adoption of all bylaws deriving from the provisions of the Law on Protection against Environmental Noise;
2. Provision of maximum implementation of the provisions of the existing legislation in the area of environmental noise;
3. The process of preparation of spatial and urban plans and acts for their implementation, in the frames of the content on protection, should include protection measures against noise as well;
4. Planning documents for structures that are subject of building approval should fulfill specific conditions and measures concerning standards for protection against noise in buildings;
5. Preservation of quiet zones in agglomerations as such;
6. Provision of modernization of installations by remediation of existing and introduction of new solutions for noise reduction;
7. It is recommended that the Ministry of Environment and Physical Planning and agglomerations obliged to prepare strategic maps to commence the process of preparation in the course of 2014;
8. It is recommended that the Ministry of Environment and Physical Planning forms a working group composed of professional representatives of the relevant institutions to work on determination of national method for noise mapping;
9. It is necessary to establish noise monitoring as systematized noise measurement, monitoring and control of the state of noise in environmental media and areas;
10. It is recommended that the Ministry of Environment and Physical Planning in cooperation with the Ministry of Health, prepares the Annual programme for work of the state noise monitoring network and the Programme for public health in the segment of protection against noise;
11. It is necessary to establish Information system of the state of environmental noise as part of the overall environmental information system in the Republic of Macedonia to cover data obtained from noise monitoring, strategic maps and action plans for noise and other relevant data obtained by individual noise measurements; and
12. Based on processed data on environmental noise in the three cities in the Republic of Macedonia, undertake measures for reduction of environmental noise in them.

AIR

AIR

1. Introduction

Quality of air remains to be an important issue which is vitally linked with public health, economy and environment. Poor quality of the air can cause deterioration of health, premature death, as well as disorder in ecosystems and problems with crops. This causes huge economic damage for the country expressed through reduced productivity of workforce and deteriorated condition of the environment.

Effects of air pollution are mostly felt on two levels:

A) in urban environments, where majority of the population in Macedonia lives and air pollution causes problems with human health.

B) in ecosystems, where air pollution impedes growth of vegetation and causes damages to biodiversity.

Data from the monitoring stations of the state automatic air quality monitoring system indicate that concentrations of measured pollutants originate from almost all economic and social activities. Utilization of energy resources through combustion processes, industrial activities, transport, inadequate management of waste (storage, transport, burning), as well as accelerated activities of natural origin (electrical discharges, weather disasters, earthquakes, saharian rainfalls…) are factors contributing the most to the occurrence of air pollution.

The issue of air pollution has already exceeded local relevance and is considered in wider regional context. Major part of pollution originates from sources located at distances of several thousand kilometers. Transport of air pollutants, i.e. transboundary air pollution caused by atmospheric movements is an enormous challenge for the countries in the region. Pollution of the air leads to adverse effects on regional level, such as acidification of forest ecosystems, lakes and watercourses and eutrophication of water bodies. Pollution with ammonia emissions into the air which in greatest part originates from agricultural activity is growing problem not only for aquatic systems but also to biodiversity.

Policies and strategies for air pollution reduction are primarily targeted at reducing emissions from traffic (combustion of fossil fuels in vehicles), as well as use of alternative energy sources, bio-fuel and natural gas are primary processes for air quality improvement. Also, phasing-out ozone depleting substances is part of the process of atmospheric pollution reduction.

Initiation of the process of transposition of European legislation into the national one involved preparation of law and bylaws on the quality of ambient air. Their implementation from 2004 onwards has been contributing continuously to the improvement of the quality of ambient air. Besides such improvement of the quality of the air, the Republic of Macedonia faces new challenges in maintaining high standards of the quality of the air. Most of these challenges result from slow modernization of production industrial processes using old technologies which are not compliant with the use of the best Available Techniques, inadequate burning of waste, use of wood for homes heating during winter, incomplete combustion of fuels in vehicles, considering their age (30% of the vehicles are older than 20 years, etc.).

2. Legal regulations on air quality control, protection and improvement

The Law on Ambient Air Quality adopted in August 2004 and amended several times (Official Gazette of the Republic of Macedonia no. 67/2004, 92/2007, 83/2009, 35/10, 47/11, 100/12, 163/2013) is a framework law in the area of air. The goals of this Law are avoidance, prevention and reduction of harmful effects on human health and environment as a whole, prevention and reduction of pollutions causing climate change, as well as provision of relevant information on the quality of ambient air.

On the basis of the Law on Ambient Air Quality, 16 bylaws were prepared and adopted to introduce limit values for quality and air emissions, methodology of monitoring the quality and emissions in the air, manner of preparation of planning documents for air protection against pollution, manner of information of citizens and international organizations, etc.

One of the basic instruments for reduction of air emissions that contribute to transboudary air emissions is the Convention on long-range Transboundary Air Pollution (CLRTAP), ratified and signed by the Republic of Macedonia on 17 November 1991. From the moment of the Convention entry into force, it has been expanded with eight Protocols. Republic of Macedonia ratified all Protocols in the last quarter of 2010 (see the list of laws and bylaws in the area of environment, part on international cooperation). The goal of the Protocols is reduction of the emission of the following pollutants: SO2, NH3, NMVOC, CO, NOx, POPs and heavy metals through definition of emission limit values for stationary sources, restriction of production and use of persistent organic pollutants, introduction of standards for air emissions measuring and monitoring, as well as establishment of the best available techniques in old and new installations (regulated continuously through the process of A and B IPPC permitting and A adjustment permits with adjustment plans).

The values of the national ceilings for 2010 are at the same time integral part of Annex II to the Gothenburg Protocol to the Convention on long-range Transboundary Air Pollution (CLRTAP), ratified by the Republic of Macedonia in October 2010. The Executive body of CLRTAP, upon the delivery of the values for national ceilings for the purpose of including the Republic of Macedonia in Annex II to the Gothenburg Protocol requested correction of the values having in mind the reported data on pollutants emissions – sulfur dioxide and ammonia – on national level. The newly proposed corrected values were accepted by the Executive Body of the CLRTAP/ UNECE at the Meeting held in December 2013 and by this the Republic of Macedonia became full member of Annex II to the Gothenburg Protocol.

Proposed amendments of the Rulebook on the ceilings list the following ceilings for pollutants emission:

SO_2	NOx	NH_3	NMVOCs
110 kt/year	39 kt/year	12 kt/year	30 kt/year

Based on analyses made on data on air emissions and quality, MEPP has so far prepared several national strategic documents defining measures for air emissions reduction. National Programme for gradual reduction of the quantities of emissions of certain pollutants at the level of the Republic of Macedonia for the period from 2012 to 2020 was adopted by the Government and published in Official Gazette of the Republic of Macedonia no. 108/2012. The Programme has identified measures for reduction of the emissions of the following pollutants: sulfur dioxide, nitrogen oxides expressed as nitrogen dioxide, ammonia, volatile organic compounds, total suspended particulates and carbon monoxide in the air. National Plan for Ambient Air Quality Protection presents the status of air quality, defines measures for protection and improvement of the quality of ambient air in the Republic of Macedonia, as well as all relevant institutions responsible for their implementation in the next 5 years (2013-2018). National Plan for Air was adopted by the Government and published in Official Gazette of the Republic of Macedonia no. 170/2012.

Considering that these strategic documents are adopted by the Government of the Republic of Macedonia, it should be mentioned that part of the measures is already under implementation, and part is planned to start with implementation in the forthcoming years.

In order to observe the quality of the air and the manner of implementation of the measures defined in strategic documents, while taking into account integrated approach to air protection, Inter-sectoral Working Group for Air Quality was established in 2012, composed of representatives of all relevant institutions. Ministry of Environment and Physical Planning and Inter-sectoral Working Group for Air Quality prepared recommendations and short-term measures for ambient air quality improvement or protection in case of alarming pollution. Some of these recommendations and measures were implemented in the period December 2013 – January 2014, as a result of occurrence of high concentrations of PM_{10}.

3. Status and trends

Air emissions

With regard to air emissions, users of certain installations that are sources of pollutants in the ambient air are obliged to perform monitoring of emissions at the source and report to the Ministry of Environment and Physical Planning. Data from the measurement of emissions from installations is used to prepare the Inventory of emissions of all pollutants in accordance with the methodology for preparation of the basic inventory of air emissions (CORINAIR - CoR Inventory for Air Emission) defined in the Rulebook on the methodology for inventory taking and establishment of the level of pollutant emissions into atmosphere in tons per year for all types of activities, as well as other data for submission of the Programme for European Air Monitoring (EMEP) and delivered to the European Environmental Agency and United Nations.

In the frames of this annual report assessing the quality of the air, we took the emissions of pollutants on national level determined in accordance with the CORINAIR methodology delivered at the same time to EEA and United Nations. Categorization of emissions was made by Selected Nomenclature of Air Pollution (SNAP), i.e. emissions on national level were categorized in 11 sectors by pollutant.

Emissions from natural sources, such as forest fires, were not taken into account due to their low share in the overall emission of the main pollutants. Due to the fact that emission inventory is made by the principle n-2 where n is the current year, detailed analysis of data on air emissions by SNAP sectors was made in the frames of this Report for 2012. At the same time, in order to present and analyze the trend of pollutants emissions during the last several years, data on air emissions for the period 2004 and 2012 was taken into account. It should be mentioned that in 2012 recalculations of emissions were made for the reporting period and therefore data differs from the data presented in previous annual reports.

Air quality monitoring

Assessment of the quality of air is based on the analysis of data from the automatic air quality monitoring stations composing the State Automatic Air Quality Monitoring System (SAAQMS). Five stations are based in Skopje (Karposh, Centar, Lisiche, Gazi Baba and Rektorat). Two monitoring stations are based in each Ilinden (villages Mrshevci and Miladinovci), Veles and Bitola, and one in each Kumanovo, Kochani, Kichevo, Kavadarci, Tetovo and Lazaropole.

Monitoring stations measure ecological and meteorological parameters. Automatic air quality monitoring stations measure the following pollutants: sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, suspended particles sized up to 10 micrometers (PM_{10}), suspended particles sized up to 2.5 micrometers (PM2.5), benzene, toluene, ethyl-benzene, ortho and para xylene (BTX). The measuring points in the village Mrshevci and Gazi Baba do not measure concentration of ozone, measuring point Rektorat does not measure concentration of sulfur dioxide, Lazaropole does not measure concentration of carbon monoxide. BTX is measured in Miladinovci, Rektorat, Centar and Karposh, and $PM_{2.5}$ is measured by the stations in Centar and Karposh. From among meteorological parameters, the following are measured at all measuring points: wind velocity and direction, temperature, pressure, humidity and global radiation.

Locations of monitoring stations are shown on the figure 1.

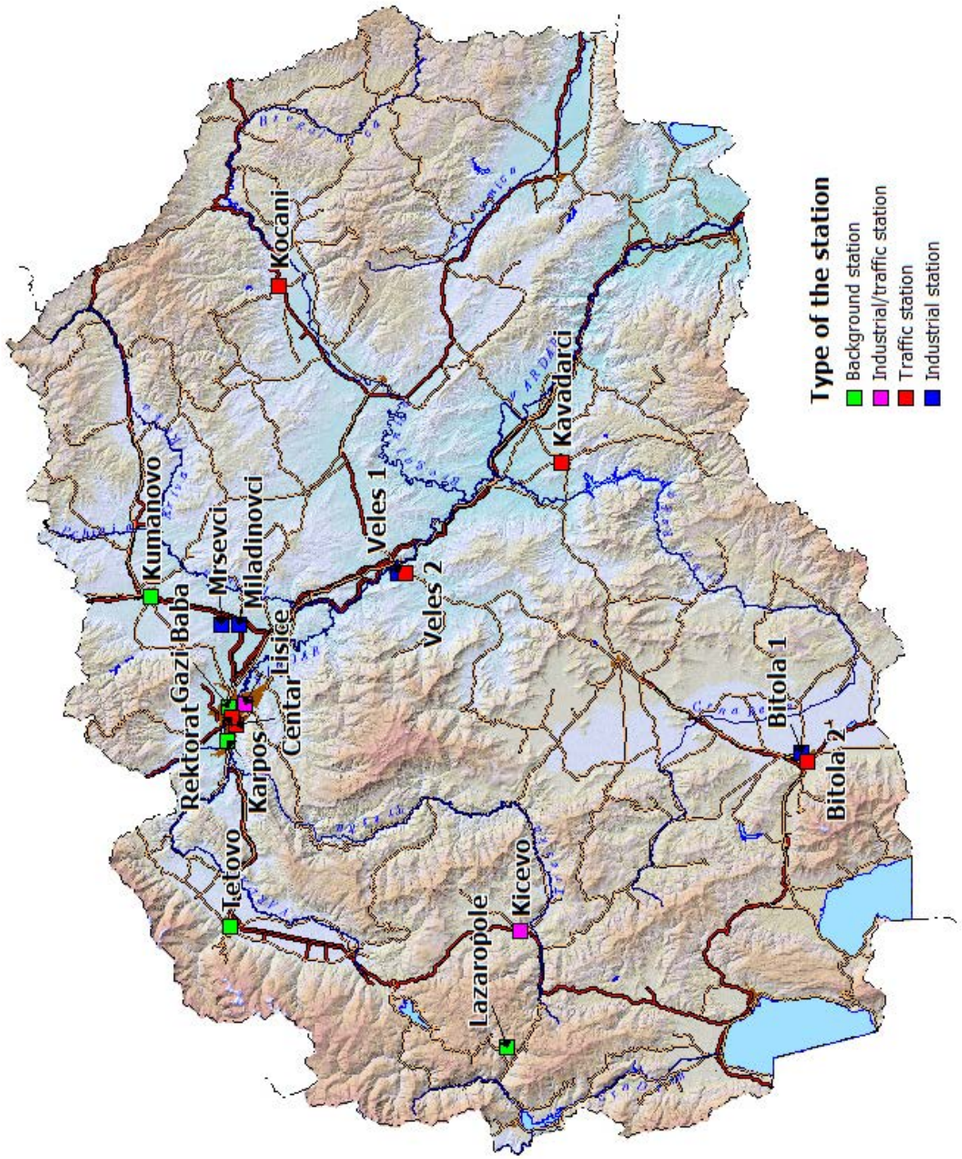


Figure 1. State Automatic Air Quality Monitoring System

3.1. Sulfur dioxide (SO_2)

SO_2 is suffocating gas of sharp smell formed by combustion of sulfur containing materials. It is a gas able to react in ambient air with moisture in the air and form unstable sulfuric acid, as well as with other pollutants to form aerosols. This property leads to its occurring in clouds, fog, rain and aerosols.

Processes releasing largest amounts of sulfur dioxide coal combustion in electricity and heat production, industrial processes operated in smelting plants, oil refineries, industries for wood pulp processing and production of paper, metal industry and transport.

Sulfur dioxide, forming ions in wet air, is the reason for the formation of acid rains which cause damage in ecosystems. All this results in degradation of chlorophyll, reduced photosynthesis and changed metabolism of proteins. Also, acid rains while settling down cause acidification of soils and waters and consequently loss of biodiversity, often far from the source of emission. With humans, it easily enters respiratory system and high concentrations of SO_2 can cause lungs and heart diseases. It is a strong irritant and known to aggravate symptoms of people suffering of asthma, bronchitis, emphysema and other lung disorders.

3.1.1. Emissions of sulfur dioxide

Proportional distribution of sulfur dioxide emission by sectors for 2012 at the level of the Republic of Macedonia is presented on Diagram 1.

Emission of SO_2 by SNAP sectors for 2012

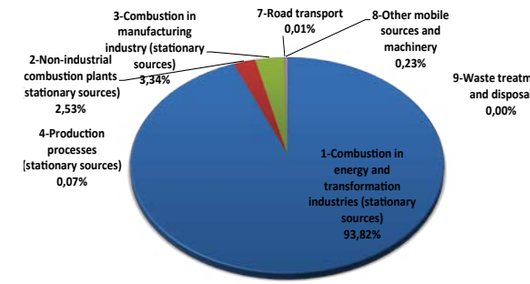


Diagram 1

Diagram confirms that 93,8% of the total amount of SO2 is released from fuels combustion in the process of electricity and heat production, 3% is released from combustion plants in production industry.

Total emissions of SO2 distributed by SNAP sectors for the period 2004 to 2012.

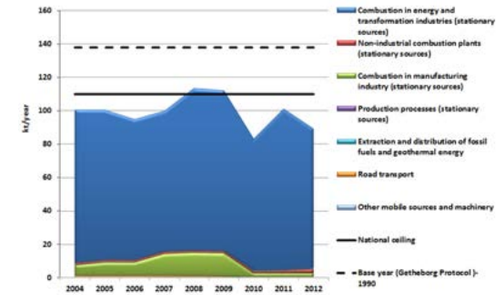


Diagram 2

Diagram 2 indicates that, in 2012, total emissions of SO_2 were below the national upper limit – ceiling which is 110 kilotons. The upper limit – ceiling for SO2 was exceeded only in the period 2008-2009. Also, it is evident that emissions of sulfur dioxide for 2012 compared to baseline year were reduced by 35%. This means that the requirements of the 1994 Protocol on sulfur were fulfilled, according to which emissions of sulfur dioxide should be reduced by 30% compared to 1990; also, the upper limit –

ceiling for 2010 was not exceeded according to the requirements of the Gotheborg Protocol. With regard to trends, we may note that there were no major changes in the emissions of sulfur dioxide originating from electricity production, which is due to the fact that there were no major changes in the consumption of coal in this sector. On the other side, SO_2 emissions from fuels combustion in industry and administrative facilities were reduced, due to the use of crude oil with sulfur content up to 1%.

3.1.2. Sulfur dioxide in ambient air

Monitoring of the concentrations of SO2 in ambient air is carried out by automatic measuring instruments and manual measurements. Due to problems of regular maintenance of monitoring stations, i.e. irregular provision of spare parts, there was lower data coverage for SO2 in 2013. Therefore, the analysis took into account data from those monitoring stations reaching data coverage of 30 %.

Data on average annual concentrations and average annual concentrations in winter period for sulfur dioxide for 2013 from the monitoring network of MEPP are presented on the next Diagram.

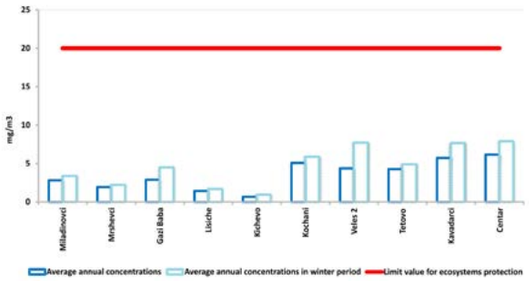


Diagram 3

Diagram 3 indicates that the average concentration of sulfur dioxide measured during winter period is higher than average annual concentration at all measuring points. No exceeding was recorded of the limit value for ecosystems protection with reference to average annual concentration and average concentration in winter period, at any measuring point. The lowest average annual concentration of sulfur dioxide was recorded at the measuring point Kichevo amounting 0,67μg/m^3, and the highest one in Skopje at the measuring point Centar with 6.16 μg/m^3.

Data on average annual concentrations and average annual concentrations in winter period for sulfur dioxide from the monitoring networks of PHC Skopje and Veles is shown on Diagram 4.

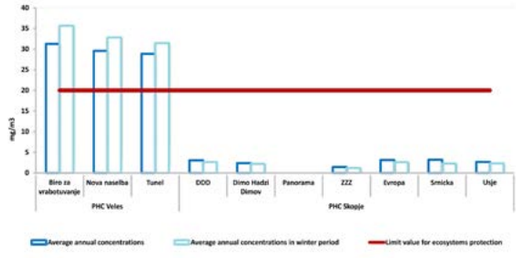


Diagram 4

The average concentration of sulfur dioxide измерена in winter period is higher than the average annual concentration at all measuring points. Exceeding of the limit value for ecosystems protection with reference to average annual concentration and average concentration in winter period were recorded at the measuring points Biro za vrabotuvanje, Nova Naselba and Tunel. No exceedings were recorded at the measuring points DDD, Dimo Hadzi-Dimov, ZZZ, Evropa, Srnichka and Ushe. The lowest average annual concentration of sulfur dioxide was recorded at RHI amounting 1.42 μg/m^3, and the highest at Biro za vrabotuvanje amounting 31.27 μg/m^3.

In 2013, the number of allowed exceeding of the hourly limit value was not exceeded, from health protection point of view, at any measuring station.

The allowed number of exceeding of the daily limit value from health protection point of view was not exceeded at any measuring station of the MEPP's monitoring network. The allowed number of exceeding of the daily limit value from health protection point of view was not exceeded at any measuring station of the PHC Skopje and PHC Veles, either.

Diagram below presents average annual concentrations of SO_2 for the period 2005 to 2013, from the monitoring stations of the SAAQMS located in urban environments, i.e. all monitoring stations having available data with sufficient data coverage, except station in Lazaropole which represents rural environment.

Average annual concentration of SO_2

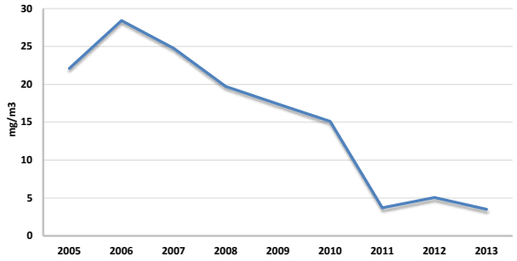


Diagram 5

Data presented on the Diagram indicate trend of reduction in SO2 concentrations, but as there is no trend of significant emissions reduction, we may assume that there is some uncertainty in this trend. Part of the falling trend is caused by adaptation of the zero level of instruments in the stations from 2008 further on.

3.2. Nitrogen oxides

NO_2 is red to brown gas often visible in polluted air in the main urban centres. This highly reactive gas is formed by oxidation of nitrogen monoxide (NO). High concentrations of this pollutant cause sharp odour, while low concentrations cause odour similar to hydrogen. NO_2 is formed during the processes of combustion, and in the presence of light NO by photochemical reaction turns into NO_2.

NO is formed by reaction between N_2 and O_2 at high temperature, mostly in installations for electricity production in which fossil fuels burn, in incinerators, etc. However, the main source of NO are the outlet steams from automobile engines.

At high concentrations, NO may react with hemoglobin in blood and prevent transfer of oxygen, as is done by CO. Nevertheless, such high concentrations of NO can rarely be reached in polluted air. The main role of NO as pollutant is that it is precursor for obtaining other pollutants.

Nitrogen oxides (NOx) are mixture of nitrogen monoxide and nitrogen dioxide and they occur as a result of natural impacts or human activities. Natural sources of NOx include thunders, as well as biological and abiological processes in soil. The biggest anthropogenic sources of NO_2 are combustion processes at high temperatures (like those going on in automobiles), combustion of coal, oil and diesel, domestic fireplaces and waste incineration.

3.2.1. Nitrogen oxides emissions

Proportional distribution of nitrogen oxide emissions by SNAP sectors for 2012 at the level of the Republic of Macedonia is shown on Diagram 6.

NOx emissions by SNAP sectors for 2012

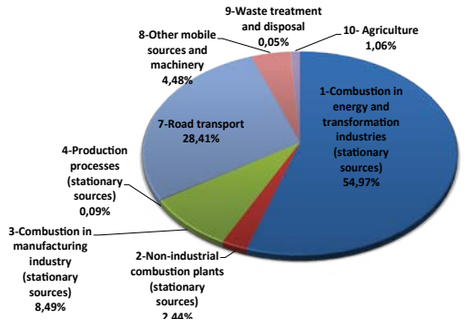


Diagram 6

The Diagram shows that the greatest emissions of nitrogen oxides are released in electricity production (54.97%), road transport (28.41%) and combustion in manufacturing industry with 8.49 %.

Overall emissions of NOx distributed by SNAP sectors for the period 2004 to 2012.

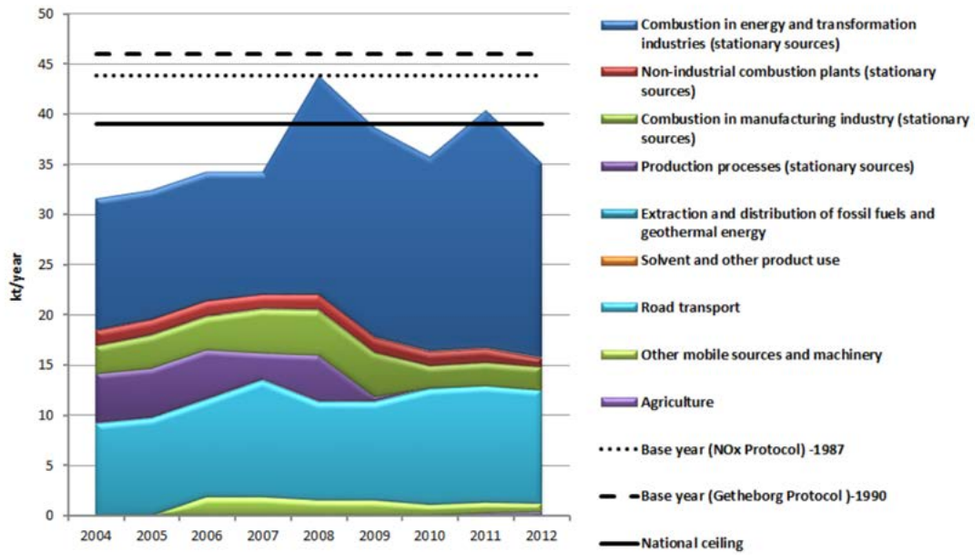


Diagram 7

Diagram 7 indicates that in 2012, the overall emissions of NOx were below the National ceiling being 39 kilotons. The ceiling for NOx was exceeded only in 2008 and 2011. Furthermore, it is evident that emissions of nitrogen oxides for 2012 compared to baseline year (1987) have decreased by 20%. This means that the requirements of the

old NOx Protocol have been met (not to exceed the emission of the baseline year) and the ceiling for 2010 was not exceeded in accordance with the requirements of the Gothenburg Protocol. With reference to the trend, it should be underlined that data used was for the period 2008-2012 for the sector of electricity and heat production from the measured concentrations by installations, while for preceding years – calculations were used based on emission factor and therefore emissions are lower.

3.2.2. Nitrogen oxides in ambient air

NO2 in ambient air is monitored by the automatic monitoring stations of the Ministry of Environment and Physical Planning. Due to problems in regular maintenance of the monitoring stations, i.e. irregular procurement of spare parts, there was lower coverage with data on NO2 in 2013. Therefore, the analysis took into account data from the stations with more than 30 % data coverage.

Average annual concentration of nitrogen dioxide for 2013

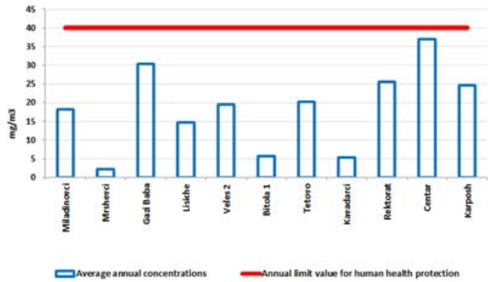


Diagram 8

The average annual concentration of nitrogen dioxide related to limit value for human health protection was not exceeded at any measuring point in the country. The lowest average annual concentration of nitrogen dioxide was recorded in Mrshevci of 2.12 μg/m³, and the highest value in Skopje at the measuring point Centar - 36.94 μg/m³.

In 2013, the number of permissible exceeding of hourly limit value

(18 hours) from health protection point of view was not exceeded at any measuring point in the country. Exceeding of hourly limit value recorded in Gazi Baba (7 times), Lisiche (once) and Tetovo (15 times) was during winter period during fog occurrence and temperature inversion.

The next Diagram shows average, maximum and minimum annual concentration of nitrogen dioxide for the period 2005 to 2013, taking into account the data available from the conducted measurements at 16 measuring points positioned in urban and suburban environments.

Average, minimum and maximum annual concentration of nitrogen dioxide

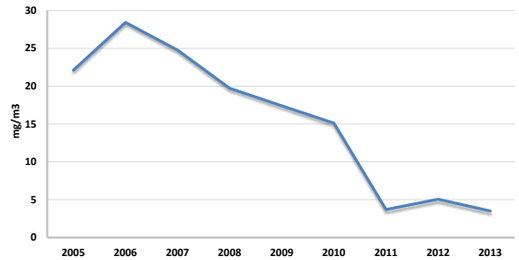


Diagram 9

Based on the analysis of data from nitrogen oxides monitoring, we may conclude that concentrations of NO_2 were the highest at the measuring points in Skopje, especially those set to measure pollution mainly from traffic (Rektorat and Centar) with exceeding of annual limit value. This is due to high frequency of traffic in the capitol of the Republic of Macedonia which is one of the main sources of this pollutant. Additionally,

higher concentrations of nitrogen dioxide are measured in Skopje, during winter period when episodes of high pollution occur, because the surrounding mountains prevent dispersion of pollution in distanced areas. The minimum annual average concentration of NO2 was recorded at the measuring points positioned in suburban environments (Veles 1 and Mrshevci). However, we should point out that the trend of reduction of nitrogen dioxide concentrations is not that rapid as indicated by data presented from measurements. This situation results from insufficient portion of nitrogen dioxide data coverage.

In order to determine the effect of traffic on the concentrations of nitrogen dioxide in ambient air, the next Diagram shows average annual concentrations from the two monitoring stations in Skopje, one positioned in the centre of the city at frequent cross-road, i.e. station Centar, and the other positioned in urban background environment in the yard of the Primary School “Petar Pop Arsov”, Karposh station, for 2012 and 2013.

Average annual concentrations of NO_2

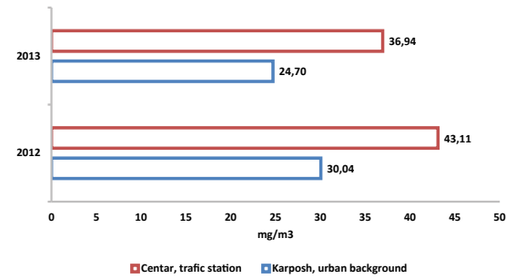


Diagram 10

Data presented on Diagram 10 indicate that the station monitoring pollution from the traffic measured average annual concentrations of NO_2 by 12.24 μg/m³ and 13.07 μg/m³ higher compared to station positioned in area where there is no nearby source of pollution which affects measured concentrations directly. In conclusion, the impact of traffic on the average annual concentration of nitrogen dioxide is around 30%.

The next Diagram shows 24 hourly distribution of NO_2 concentrations measured in 2013 by automatic monitoring stations. Namely, we may note that the measured concentrations presented on the Diagram produce curves with two peaks, with one peak occurring in morning hours around the start of the working hours, and the second peak occurs in afternoon hours by the end of working hours when the frequency of the traffic is the highest. This also indicates that emissions of this pollutant from traffic contribute significantly to its concentrations in ambient air.

24 hour distribution of concentrations of NO_2

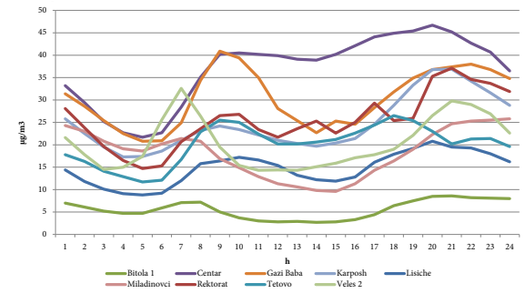


Diagram 11

3.3. Suspended particulate matters (PM_{10}, $PM_{2.5}$, TSP)

Suspended particulate matters are complex heterogeneous mixture of solid and liquid particles differing in size, form, colour, chemical composition, physical characteristics and origin. These particles in the air are categorized in accordance with their size and are one of the main sources for visibility reduction.

Big particles with diameter above 10 micrometers are classified as total suspended particulate matters (TSP). PM_{10} are coarse particles with a size up to 10 micrometers, while $PM_{2.5}$ are the so called fine particles with a size lower than or equal to 2.5 micrometers.

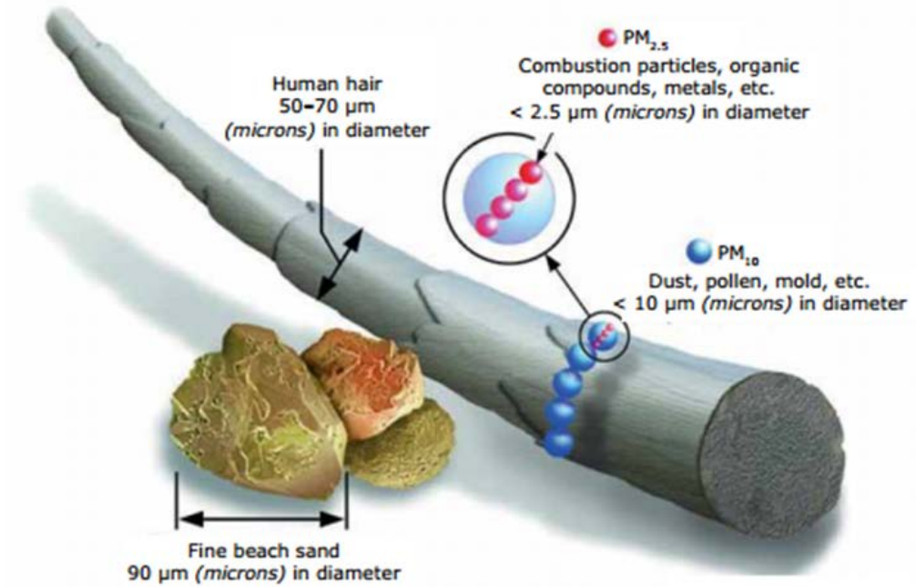


Figure 1. Illustration of the size of PM_{10} and $PM_{2.5}$

Suspended particulate matters, generally known as aerosols, can be also categorized as primary and secondary particulate matters. Primary particulate matters come directly into the atmosphere (e.g. from chimneys), while secondary particulate matters form in the atmosphere with oxidation and transformation of emissions of primary gaseous substances. Emissions of gaseous substances that take part in the formation of particulate matters are also known as precursor gases. The best known precursor gases for secondary particulate matters are SO_2, NO_X, NH_3 and VOCs (volatile organic compounds, class of chemical compounds the molecules of which contain carbon).

Exposure of humans to suspended particulate matters can affect their health, so that they can be inhaled and penetrate thoracic region of respiratory tract and cause irritation

of nose and throat, damage to lungs, bronchitis, cardiovascular diseases and mortality.

Suspended particulate matters originate from natural and anthropogenic sources. Anthropogenic sources include combustion of fuels in thermal power plants, waste incineration, households heating, as well as combustion of fuels in vehicles. In cities, emissions from vehicles, re-suspension of dust from roads and burning of wood, fuel or coal for homes heating represent the most significant local sources.

3.3.1. Emission of suspended particulate matters

Proportional distribution of total solid particulate matters and particulate matters up to 10 micrometers and up to 2.5 micrometers (PM_{10} and $PM_{2.5}$) by SNAP sectors for 2012, at the level of the Republic of Macedonia is shown on the next three Diagrams.

Total particulate emissions for 2012

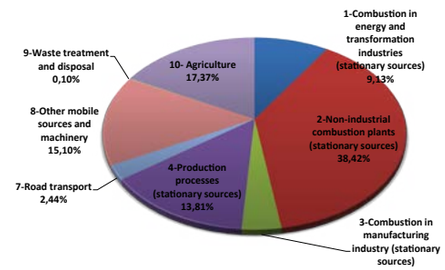


Diagram 12

PM_{10} emissions by SNAP sectors for 2012

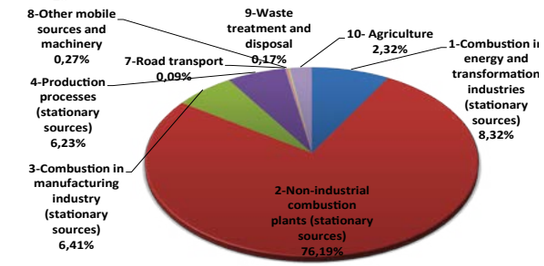


Diagram 13

Diagram 12 indicates that predominant sources of total dust are the processes of heat and electricity production, as well as manufacturing processes. Diagrams 13 and 14 indicate that the highest percentage of emission originates from non-industrial facilities. This SNAP sector includes emissions from homes and administrative buildings heating. Production facilities especially in the area of metallurgy and electricity production facilities have significant contribution. Traffic at national level contributes to the emission of these pollutants. However, it should be noted that distribution of sources of emission on local level is diverse. This is important for the capitol where frequency of traffic is very high and contribution of this source is much higher than the estimated one at national level.

$PM_{2.5}$ emissions by SNAP sectors for 2012

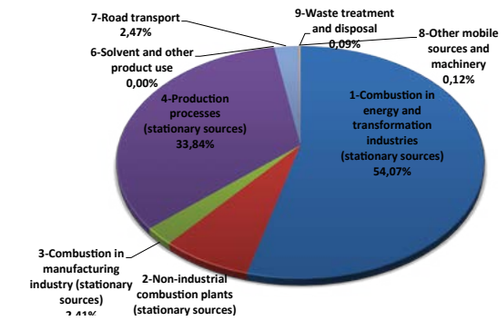


Diagram 14

3.3.2. PM_{10} and $PM_{2.5}$ in ambient air

Monitoring of PM_{10} in ambient air has been carried out in the frames of the State Automatic Air Quality Monitoring System since December 2002, followed by gradual establishment of 17 measuring points, while the monitoring of $PM_{2.5}$ started by the end of 2011 at two measuring points in Skopje.

Owing to problems with regular maintenance of monitoring stations, such as untimely procurement of spare parts, data on PM_{10} for 2013 has lower coverage. Therefore, the analysis took into account data from stations where data coverage was above 30 %.

PM_{10}

Average annual concentrations of PM_{10} for 2013.

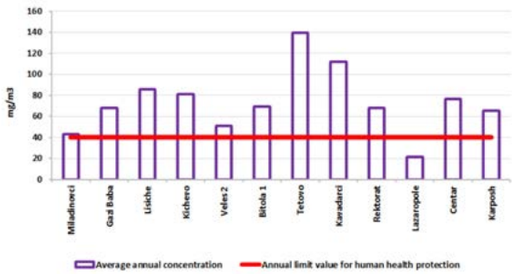


Diagram 15

The average annual concentration relative to the annual limit value for human health protection has not been exceeded only in the village Lazaropole. The lowest average annual concentration for PM10 was measured in Lazaropole being 21.36 μg/m^3 and the highest one in Tetovo with 139.59 μg/m^3.

The number of exceeding of the daily limit value for 2013

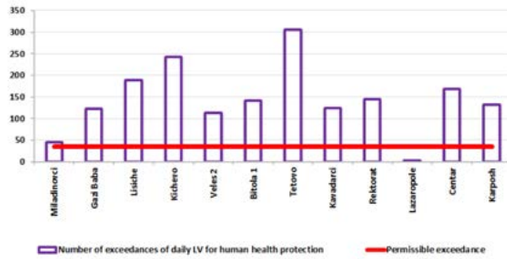


Diagram 16

Diagram 16 indicates that in 2013 the number of permissible exceeding of the daily limit value from human health protection point of view was exceeded at all measuring stations except the measuring station positioned in the village Lazaropole.

High concentrations of this pollutant originate from combustion of fuel in vehicles, industrial production processes and central heating plants. This situation is especially stressed during winter period when increase in the concentration of these particulate matters is also under the influence of homes heating, as well as climate and meteorological conditions. Influence of weather conditions is especially notable in valleys where fog occurs, there is insufficient air circulation to blow away the pollution and there is temperature inversion, too.

The next Diagram shows annual distribution of the concentrations of PM_{10}, and it is evident that there are higher concentrations of this polluting substance during winter period (November-February) compared to other seasons.

Annual distribution of concentrations of PM_{10}

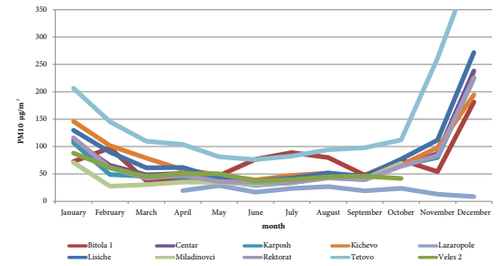


Diagram 17

The trend of the annual average concentration of PM_{10} and average number of exceeded average daily limit value in urban and suburban areas in Macedonia, for the period 2005 to 2013

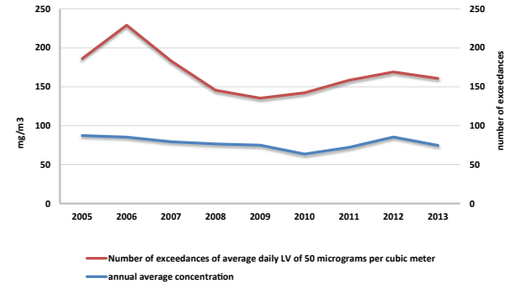


Diagram 18

The number of exceeded average daily limit value for PM_{10} at several selected stations positioned at places with higher pollution in urban environments, for the period 2005 to 2013

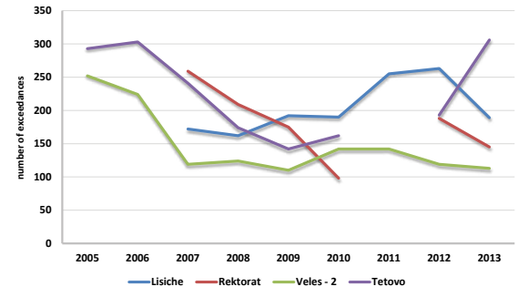


Diagram 19

Based on data presented on Diagrams 18 and 19, we may conclude that the number of exceeded average daily limit value is significantly higher compared of permissible number of exceeding of 35 days in the course of a year. We should mention that most of the cases of exceeded average daily limit value occur during winter period. It can be also noted that throughout the analyzed period from 2005 to 2013, the average annual concentration exceeded the annual limit value at all stations positioned in urban areas. From the Diagram, it is evident that there was a trend of decrease in the concentration of PM_{10} in the period from 2005 to 2010. Higher average annual concentrations have been measured during the last three years, resulting from higher number of days with exceeded average daily limit value.

$PM_{2.5}$

Annual distributions of concentrations of $PM_{2.5}$ and PM_{10} for 2013 for the measuring points Karposh and Centar

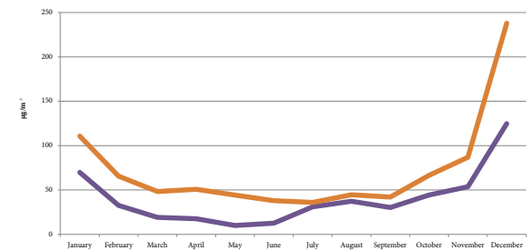


Diagram 20

Annual distribution of concentrations of $PM_{2.5}$ and PM_{10} for 2013 metering point Karposh

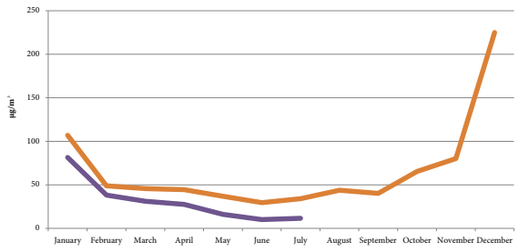


Diagram 21

Measurements in Skopje showed that concentrations of $PM_{2.5}$ reached around 70-80 % of the concentrations of PM_{10} both in the city centre and background station Karposh. The average annual concentration of $PM_{2.5}$ is 44.6 μg/m³ in Centar and 24.03 μg/m³ in Karposh, while the average annual concentration of PM_{10} is 76.26 μg/m³ in Centar and 65.10 μg/m³ in Karposh. It can be noted that the trend of measured concentrations of $PM_{2.5}$ follows the trend of PM_{10}, or the highest concentrations are measured during winter period.

Average annual concentration of $PM_{2.5}$ from the measuring points Karposh and Centar for 2012 and 2013

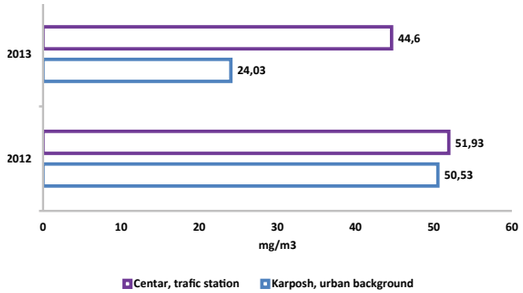


Diagram 22

Diagram indicates that concentration of $PM_{2.5}$ in 2012 was higher compared to concentrations for 2013. Furthermore, higher concentrations of $PM_{2.5}$ were measured at the measuring point Centar than at the background station Karposh in 2012. On the other side, owing to lower data coverage by the monitoring station Karposh in 2013, i.e. non-operation of the instrument from August by the end of 2013, it was significantly lower compared to 2012 when data coverage was above 90%.

3.3.3. Carbon monoxide (CO)

CO is colourless toxic gas with no smell and taste. 80% of the carbon monoxide present in the atmosphere comes from natural sources. The rest of 20% originates from human activities, such as incomplete combustion of liquid and solid fuels, such as oil, coal and wood. Primary sources of this pollutant are exhausted gases from automobiles, industrial processes (such as processing of metals and chemical production), incomplete burning of solid waste, domestic fire places and forest fires. CO has the property of photochemical effect by which it participates in the formation of ground ozone O_3.

Namely, pollution with carbon monoxide is the greatest threat to urban areas with dense flow of traffic. Millions of tons of this invisible but fatal gas are released in the atmosphere every year and 75% originate from exhaust gases of automobiles. On the streets and in parking garages, the levels of threat are exceeded in most of the time. These concentrations do not cause instant death, but long-term exposure may cause physical and mental disorders. Carbon monoxide reduces significantly the capacity of the blood to transport oxygen to the tissues of the body and blocks different important biochemical reactions in cell. Carbon monoxide is fatal gas as it replaces molecules of O2 which are normally bound to atoms of Fe in blood hemoglobin.

Symptoms of poisoning with carbon monoxide are the same as those occurring in oxygen deficiency. All, except the most severe cases, are reversible though the process might be slow. The best antidote is intake of oxygen.

Artificial respiration can also help in cases where clean oxygen is not available.

Chronic exposure to CO, even to low levels, such as in case of smoking, creates additional effort for the heart and increases the chances for heart attack. Carbon monoxide reduces the ability of blood to transport oxygen and consequently the heart has to work harder to supply tissues with oxygen.

Dangerous levels of carbon monoxide gas can be present in crowded parking garages or in tunnels.

Emissions of carbon monoxide

Quantities of emissions of carbon monoxide for 2012 by SNAP sectors

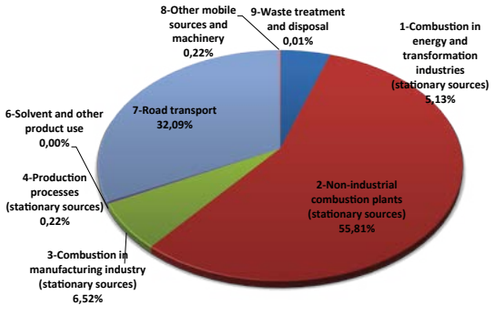


Diagram 23

The highest percentage of the emission of carbon monoxide originates from the sector of non-industrial combusting installations (households and administrative facilities – 55.81%) and sector relating to emissions from road traffic (32.09%). This is most probably due to incomplete combustion of solid and liquid fuels used in these two sectors.

Total CO emissions for the period 2004-2012

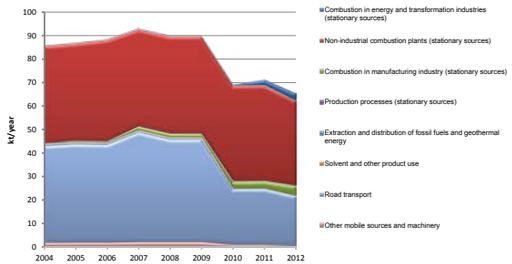


Diagram 24

Compared to 1990, carbon monoxide emissions have reduced by 26.17%. In the period 2004-2012, there was fall in carbon monoxide emissions, especially from the traffic, resulting from the introduction of catalytic converters. As far as CO emissions from non-industrial combusting installations are concerned, slight decrease has been recorded during the last several years. However, major reduction in this sector has not been noted due to incomplete combustion of fuels used by households and administrative institutions, especially when using fire wood.

Carbon monoxide in ambient air

CO in ambient air is monitored by automatic monitoring stations of the Ministry of Environment and Physical Planning. Due to problems in regular maintenance of the monitoring stations, i.e. irregular procurement of spare parts, there was lower coverage with data on CO in 2013. Therefore, the analysis took into account data from the stations with more than 30 % data coverage.

Maximum daily eight hour average values of carbon monoxide in 2013

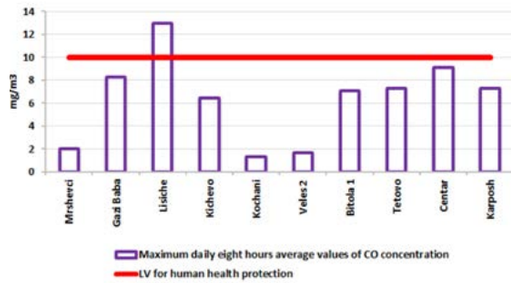


Diagram 25

Diagram 25 indicates that the maximum daily eight hour average values of carbon monoxide concentrations exceed the limit value for human health protection only at the measuring point Lisiche in Skopje, which is due to emissions from traffic, as well as emissions from non-industrial combusting facilities (households and administrative institutions).

Average, the maximum and the minimum annual concentration of carbon monoxide for the period 2005 to 2013, taking into account measurements of carbon monoxide from all measuring stations in the country

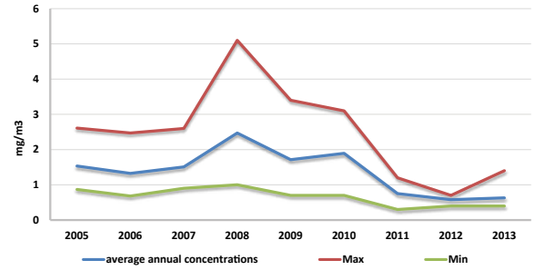


Diagram 26

Diagram 26 indicates that in the period 2005 to 2008, there was a trend of increase of carbon monoxide concentrations, while after 2008 up to 2013 there was reduction in measured concentrations of this pollutants, but as there has been no trend of significant reduction in emissions, we may assume that there has been some uncertainty in this trend. Part of the trend of reduction was caused upon the adjustment of the instruments at zero level in the stations in 2008 onwards. Maximum annual concentrations were measured in Skopje at the measuring points in Centar and Lisiche, and minimum concentration was measured in Kumanovo. Higher concentrations of carbon monoxide were recorded in Skopje because the contribution of the traffic in the capitol to emissions of this pollutant compared to other cities is much bigger.

3.3.4. Ozone

Ozone is a gas composed of three atoms of oxygen – O_3, with specific smell and higher reactive ability. It is present in troposphere and stratosphere. Minor part of the quantity of troposphere ozone is generated naturally, while major part from anthropogenic factors. Ozone is generated naturally in higher layers of atmosphere where it forms 20 km thick ozone layer positioned at a height of 25-30 km. In this part, ozone concentration is very high compared to lower layers of the atmosphere (troposphere). Ozone absorbs harmful UV radiation from the sun and in this way the ozone layer protects life on Earth. Ultra violet radiation invisible to man affects living beings. Additionally, radiation with waves length of 230 to 290 nm, called UV–radiation, causes burns and can also cause sight damage and skin cancer and this radiation is partially absorbed by ozone. Consequently, the overall amount of UV radiation reaching the Earth surface is conditioned by the concentration of O3 in ozone layer. Therefore, it is necessary to maintain appropriate concentration of ozone in ozone layer.

Nevertheless, higher concentrations of ground ozone O3, formed by photochemical reactions involving NO_X, VOCs and other compounds and ozone precursors in the presence of solar light can cause harmful effects in humans and environment. These photochemical reactions usually occur during warm summer months as ultra violet radiation of sun initiates consequent photochemical reactions. Ozone is also key ingredient of urban smog. The main sources of NO_X and VOCs are the exhaust gases of motors, emissions of industrial plants, steams from benzene, chemical solvents and biogenetic emissions from natural sources. Ground ozone O3 can also be transported at longer distance under adequate meteorological conditions.

Even rural areas are prone to increased levels of ozone, because wind takes ozone and polluting substances to hundreds of kilometers away from the sources that generate them. Furthermore, organic

compounds released from forest areas, influence ozone formation. However, its content is also affected by the part of the day (intensity of solar radiation) and yearly seasons. The influence of the part of the day on the concentration of ozone is shown on the next Diagram. Namely, it is obvious that the highest concentrations of ozone occur in afternoon hours (13-15h), when solar radiation is the highest, too.

24 hour distribution of concentrations of O_3

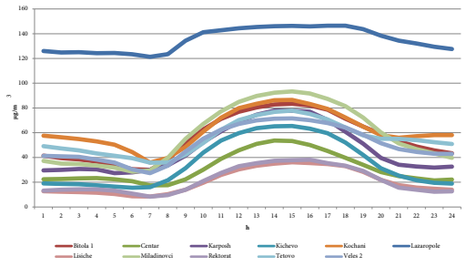


Diagram 27

Highest concentrations of this pollutant are also recorded in spring and summer, while the lowest concentrations occur during winter period as shown on the next Diagram.

Annual distribution of concentrations of O_3

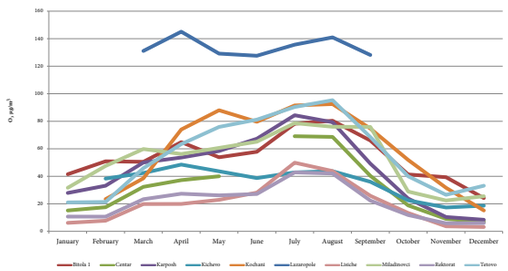


Diagram 28

Ozone in ambient air is monitored by automatic monitoring stations of the Ministry of Environment and Physical Planning. Due to problems in regular maintenance of the monitoring stations, i.e. irregular procurement of spare parts, there was lower coverage with data on O3 in 2013. Therefore, the analysis took into account data from the stations with more than 30 % data coverage.

The number of exceeded target values for human health protection in 2013.

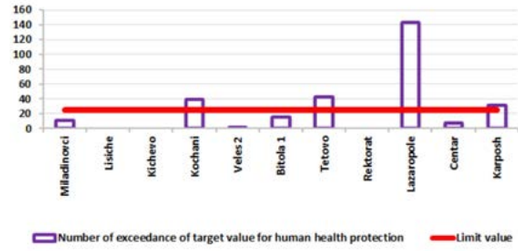


Diagram 29

The Diagram indicates that the number of exceeded target value for human health protection was exceeded at the measuring points in Kochani, Tetovo, Lazaropole and Skopje at the measuring point in Karposh.

Long-term target for human health protection for ozone in 2013

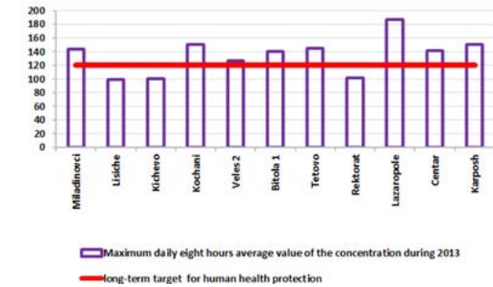


Diagram 30

Long-term target for human health protection was exceeded at the measuring points Miladinovci, Kochani, Veles – 2, Bitola 1, Tetovo, Lazaropole, Centar and Karposh.

Long-term target for vegetation protection for ozone in 2013

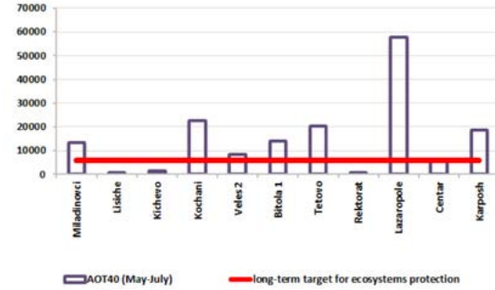


Diagram 31

Long-term target for vegetation protection was exceeded at the measuring points Miladinovci, Kochani, Veles 2, Bitola 1, Tetovo, Lazaropole, Centar and Karposh.

AOT40 expressed in μg/m^3 x hours, which means the sum of the difference between hourly concentrations higher than 80 μg/m^3 (= 40th parts of billion) and 80 μg/m^3 during analyzed period May-July. One hour values measured every day between 8:00 in the morning and 20:00 in the evening by Central European Time are taken into account, when there is highest solar radiation. Exceeding of long-term targets for ozone during 2013 in our country are due to geographical position in the southern part of Europe characterized with high number of sunny days during summer period.

Diagram 32 shows the average number of exceeding of the target value for ozone in the period 2005 to 2013, while Diagram 33 shows AOT40 that is comparable with the long-term target for vegetation protection in the same period in urban areas, taking into account measurements from the monitoring stations positioned in several cities in the country and in rural areas, taking into account measurements of ozone concentrations at the measuring point in the village Lazaropole positioned at an altitude of 1300 m.

Number of exceeding the target value for ozone

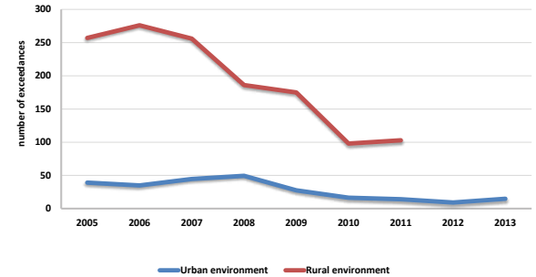


Diagram 32

AOT 40

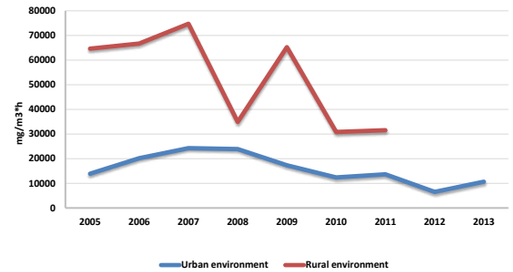


Diagram 33

Based on data presented on Diagram 32, we may conclude that the permissible number of exceeding of 25 days has been slightly exceeded in urban areas, while the number of days with exceeded target value for human health protection is very high. Furthermore, Diagram indicates that in the period 2005 to 2013 there was a falling trend in the number of days with exceeded target value for ozone in Lazaropole, and slight rising trend in urban areas in the period 2005 to 2008, and after 2008 up to 2013 falling trend was recorded. Diagram 33 leads to the conclusion that long term target for vegetation protection of 6000

µg/m³ * h was slightly exceeded in urban areas, while significant exceeding was recorded in Lazaropole representing rural areas in the country. It can be reaffirmed again that the impact of organic compounds released in forest areas on ozone formation is significant, especially during summer period at higher solar radiation.

3.3.5. Non-methane volatile organic compounds (NMVOC)

Non-methane volatile organic compounds make a wide spectrum of organic substances except methane which at a temperature of 273.15 K manifest steam pressure of at least 0.01 kPa, or appropriate volatility under given applicable conditions.

These substances influence the concentration of tropospheric ozone and contribute to the effect of greenhouse and formation of ozone holes. They are mostly released in processes involving application of dyes, lacquers, pesticides, polishing products and other solvents and products. Another important source of emission of these pollutants is transport, as well as processes of fuels combustion in heat production.

These pollutants have harmful impact on the functioning of ecosystems, and cause reduced commercial productivity of forests and fogginess. With regard to people, higher concentrations of NMVOC cause irritation of lungs and increased sensitivity to respiratory infections and asthma.

Emissions of Non-methane volatile organic compounds (NMVOC)

The share of SNAP sectors in emission of non-methane volatile organic compounds

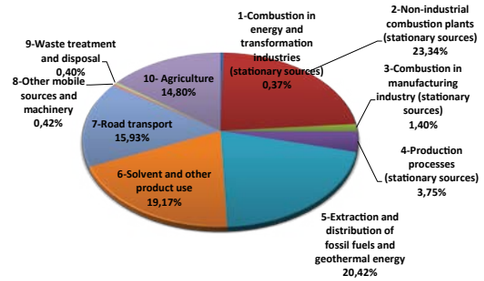


Diagram 34

The highest percentage of the emission of non-methane volatile organic compounds originates from the sector of fuel combustion in non-industrial facilities (23.34%), followed by the sector of extraction and distribution of fossil fuels and geothermal energy (20.42%), use of solvents (19.17%), road transport (15.93%) and agricultural sector (14.8%). This indicates that there are no dominant sectors of emission in the country in the case of these pollutants.

Total emissions of NMVOC for the period 2004-2012

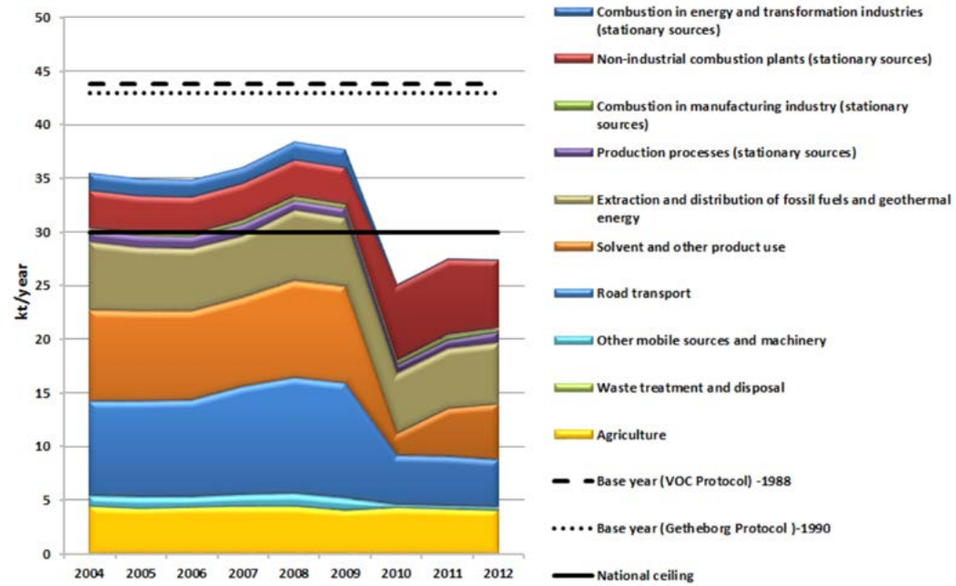


Diagram 35

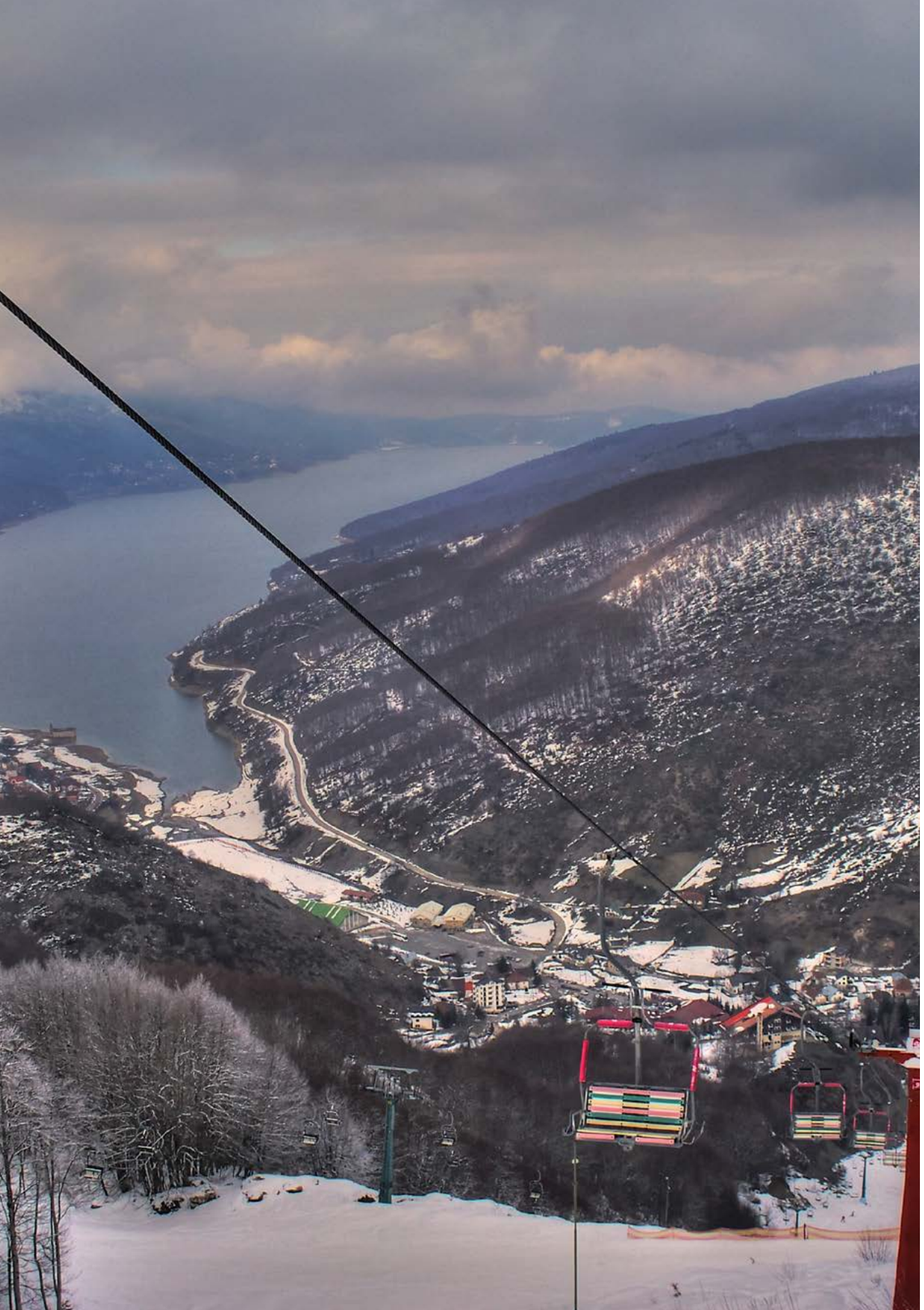
The Diagram shows that emissions of NMVOC reduced by 36% compared to 1988 and thus the requirements of the old VOC Protocol протокол (reduction of 1988 emissions by 30%) were fulfilled. In the period 2004-2012, there was real drop of the emissions of these substances only from the sector use of solvents, or more precisely from the process of printing due to reduced use of ink. Furthermore, during the last three years, no exceeding of emissions was recorded on national level above the ceiling which was 30 kilotons.

NMVOC - Benzene in ambient air

Benzene is volatile organic compound which may have carcinogenic effects on people. According to available knowledge, there is no threshold under which benzene does not have harmful effects. Therefore, concentrations of benzene in ambient air should be minimized in order to minimize the risk.

The most important sources of benzene are transport (benzene is component of motor fuels) and homes heating. Highest concentrations of benzene may be found in urban locations near high frequency roads.

In the frames of the State Automatic Ambient Air Quality System, air is measured at two locations in Skopje, in Centar and Karposh, since the end of 2011.



Average annual concentrations of benzene from the measuring points Centar and Karposh for 2012 and 2013

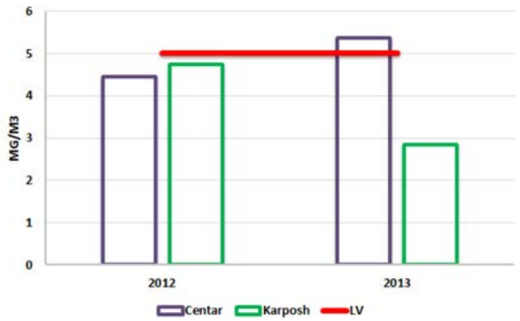


Diagram 36

The Diagram shows that the annual limit value for human health protection was slightly exceeded at the measuring point in Centar for 2013. Limit value for 2012 was not exceeded at both measuring points, though higher concentration measured at the measuring point Karposh was due to insufficient data coverage. Higher concentration of benzene for the measuring point Centar for 2013 was due to the fact that the station measuring air pollution from traffic is positioned at highly frequent cross-road in the city centre where concentrations of benzene are higher. Stations in Karposh on the other side measures air pollution in so called urban background and therefore benzene concentrations are lower.

3.3.6. Ammonia (NH_3)

Emissions of ammonia originate mainly from activities performed in agriculture, such as livestock breeding, etheric fermentation especially from larger farms, use of fertilizers and unregulated waste burning on open areas.

With reference to environment, high concentrations of this pollutant may cause eutrophication which disrupts natural ecosystems, reduces the growth rate and morphological development, while at very high concentrations it is toxic for fish and other aquatic organisms. High ammonia concentrations with people may cause eye and respiratory tract irritations and increased blood pressure.

NH_3 emissions by SNAP sectors for 2012

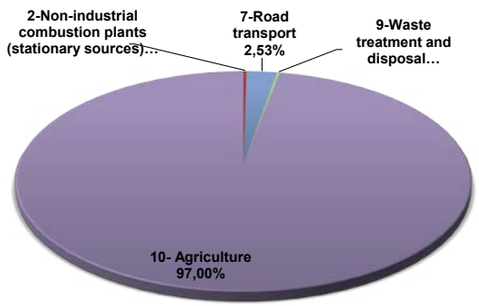


Diagram 37

As indicated in 37, almost entire identified emission of ammonia originates from agricultural sector (97%), most of which from cows breeding, and around 2.53% from traffic.

Total emissions of NH_3 from agriculture for the period 2001-2012 year

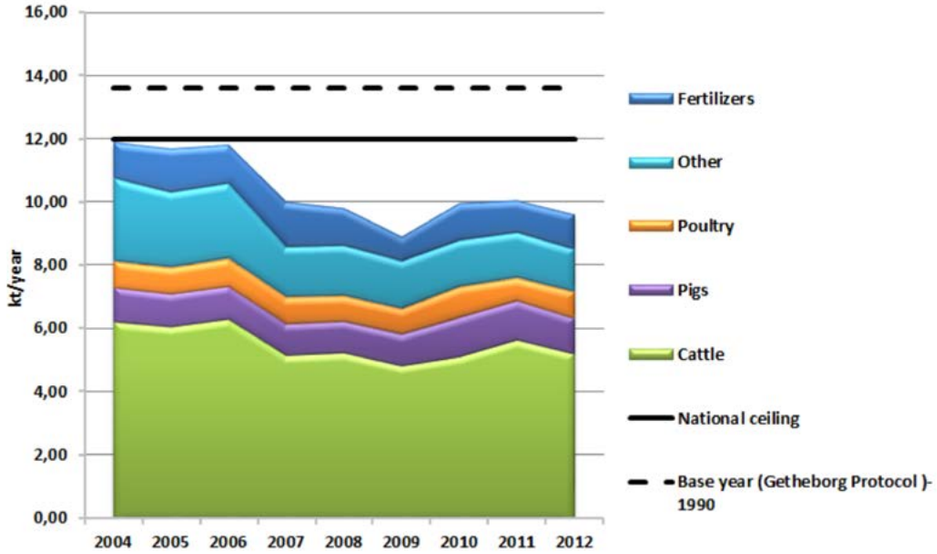


Diagram 38

With regard to emissions in the period 2004-2012, agricultural sector noted slight drop in NH3 emissions from livestock breeding due to reduction in the number of bred cows. Furthermore, we may note that throughout the reporting period, ammonia emissions are below the ceiling value for ammonia in 2010 amounting 12 kilotons. Compared to 1990 when estimated ammonia emissions were 13.5 kilotons, reduction of ammonia was 20.5% resulting from reduction in the number of bred livestock, especially sheep and cows.

3.3.7. Heavy metals

The term 'heavy metals' refers to chemical elements – metals having relatively high thickness that are toxic at low concentrations. The group of heavy metals includes: mercury (Hg), cadmium (Cd), arsenic (As), chromium (Cr), thallium (Tl), nickel (Ni) and lead (Pb).

At increased concentrations, heavy metals may cause damages on kidneys, liver, nervous system, as well as circulation system in humans and animals. Additionally, certain heavy metals like arsenic are carcinogenic. Heavy metals most often enter organisms through food, water or cigarets. Absorption through breathing is minor, but air has the main role in the transfer of these pollutants in all environmental media. Heavy metals can be released in the air from high number of sources.

Protocol on heavy metals to the Convention on Transboundary Air Pollution Transfer covers lead (Pb), cadmium (Cd) and mercury (Hg). The biggest sources of cadmium (Cd) are coal, oil, gas, mining activities including smelting, phosphate fertilizers, sewerage sludge, motor vehicles (tires and lubricating oils). Sources of lead (Pb) are coal, oil, mining activities including smelting, gas combustion, sewerage sludge, pesticides, and petrol combustion in motor vehicles. Mercury can be released in the air during metal smelting processes, production of iron and steel, production of electricity, cement industry, burning of waste and inadequate treatment of electrical equipment and fluorescent lamps.

With reference to air quality, Decree on limit values, besides cadmium, includes arsenic and nickel as well. Sources of arsenic (As) are combustion of gas, coal, oil, mining activities including smelting, production of steel, fossil fuels combustion, production of geothermal energy, phosphate fertilizers, and pesticides. Sources of nickel (Ni) are combustion of gas, coal, oil, mining activities including smelting, fossil fuels combustion, oil refining, sewerage sludge, and combustion of diesel in motor vehicles.

Emissions of heavy metals

The greatest contribution to emissions of heavy metals: lead (Pb), cadmium (Cd), arsenic (As), nickel (Ni) and mercury (Hg) (covered by national legislation) comes from processes of electricity production and production processes or metallurgy, as well as small combustion facilities, as indicated on the next Diagrams showing contributions of emission sources for 2012.

Emissions of As with SNAP sectors for 2012

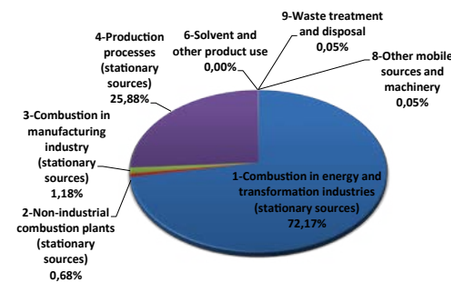


Diagram 39

Emissions of Pb with SNAP sectors for 2012

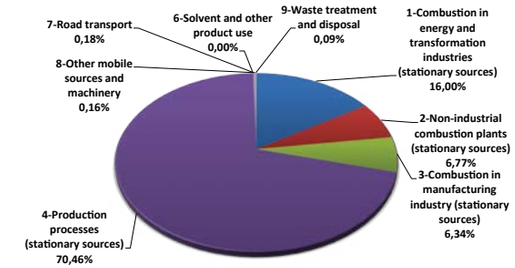


Diagram 40

Emissions of Ni with SNAP sectors for 2012

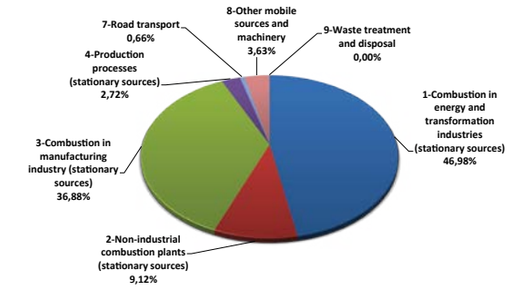


Diagram 41

Emissions of Cd with SNAP sectors for 2012

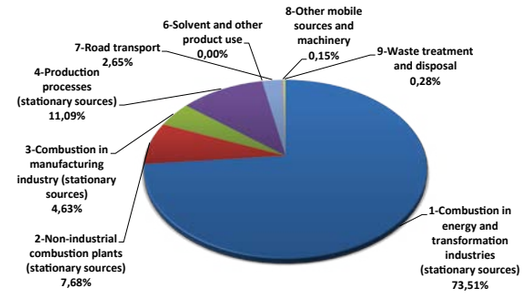


Diagram 42

Having ratified the Protocol on heavy metals (Official Gazette of the Republic of Macedonia no.135/2010), the Republic of Macedonia undertook to reduce emissions of heavy metals (lead, cadmium and mercury) below the levels of 1990 taken as baseline year. Compared to 1990, emissions of lead were reduced by 94% or by 98 Gg, emissions of cadmium were reduced by 61% or 0.24 Gg, and emissions of mercury by 68% or by 0.64 Gg.

The basic measure leading to such a high reduction in lead was introduction of lead free petrol, while reduction of all three metals compared to 1990 is at the same time due to the closure of Lead and Zinc Smeltery in Veles in 2006.

Heavy metals in ambient air

Veles

During 2013, Public Health Centre – Veles carried out survey of the concentrations of lead (Pb), cadmium (Cd) and zinc (Zn) in the air at the measuring point Nova Naselba in Veles.

Average monthly concentrations for these heavy metals in the air

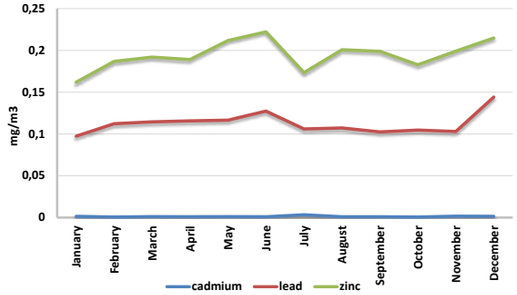


Diagram 43

The average value of lead (Pb) measured at the measuring point Nova Naselba for 2013 was 0.1126 μg/m³, exceeding the annual limit value for lead which was 0.5 μg/m³.

The average annual value for cadmium (Cd) measured at the measuring point Nova Naselba for 2013 was 0.0012 μg/m³ and the annual target value for cadmium which was 0.005 μg/m³ or 5 ng/m3 was not exceeded.

According to experimental, scientific and expert analyses, the optimal value for the concentrations of zinc (Zn) below which no negative environmental and human health impacts are expected, is 0.800 mg/m3. The average annual concentration measured at the measuring point Nova Naselba is 0.1944 μg/m³, which means that the value of 0.800 μg/m³ has not been exceeded.

The next Diagrams show average annual concentrations of cadmium, lead and zinc measured in Veles in the period 2006 to 2013 compared to specified limit or target values.

Average monthly concentration of cadmium

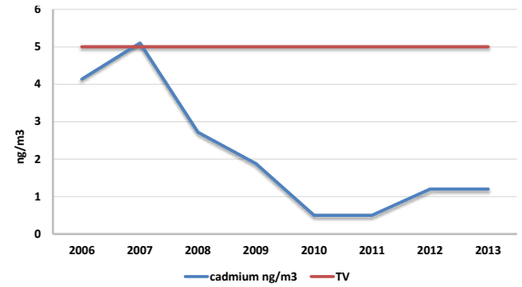


Diagram 44

Monthly average concentration of lead

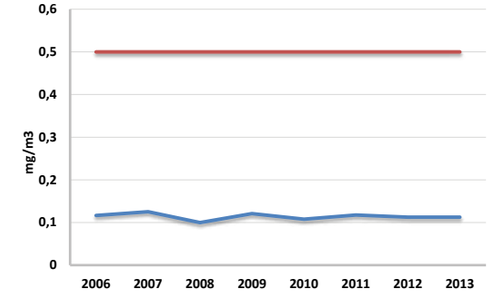


Diagram 45

Average monthly concentrations of zinc

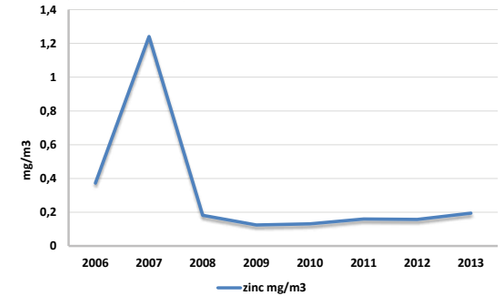


Diagram 46

Data presented on Diagrams 44, 45 and 46 lead to the conclusion that there has been no exceeding of specified limit value for lead in the analyzed period, exceeding was recorded for the target value for cadmium only in 2007 година, and the optimal value for zinc was exceeded only in 2007.

Skopje

In the City of Skopje, measuring of heavy metals were performed during 2013 ay five specific locations, i.e. industrial, urban, urban background, rural and environment dominated by traffic impact, in the frames of four measuring campaigns in the period between June 2013 to January 2014. Duration of each measuring campaign was five weeks.

Pollutant/ measuring point	Lead (Pb) ng/m³	Zinc (Zn) mg/m³	Nickel (Ni) ng/m³	Arsenic (As) ng/m³	Cadmium (Cd) ng/m³
Gjorche Petrov	0,013	0,82	81,37	2,91	0,73
Zelenikovo	0,006	0,93	13,38	2,21	1,03
Aerodrom	0,0041	1,255	70,10	3,77	1,52
Centar	0,026	0,79	26,16	3,32	0,85
Gazi Baba	0,020	1,63	20,30	4,23	2,65
Target value	0,5		20	6	5

Target value for nickel was exceeded at all measuring points except at the measuring point in Zelenikovo. Target value for arsenic has not been exceeded at any of the measuring points. Concentrations of cadmium were below the specified limit value. Limit value for lead has not been exceeded at any of the measuring points.

4. Brief assessment and possible development

4.1. Particulate matters

Measurements of air quality conducted in the period 2005 – 2013 show exceeding of limit values for particulate matters bigger than 10 micrometers in all major cities where pollution is measured. Also, values measured for the concentration of $PM_{2.5}$ follow the trend of the values for PM_{10}, and highest concentrations of both types of particulate matters, as expected, are recorded during winter period. Highest concentrations of PM_{10} were measured in Skopje as the biggest urban area in the country with the highest number of population, frequency of vehicles and high number of industrial facilities contributing to pollution. Geographical position of Skopje is such that the city spreads along the valley where in case of fog occurrence there is not sufficient air circulation to take pollution away and there is also a phenomenon of temperature inversion.

Emission inventory shows that there was no significant reduction in dust emissions in the period 2004 to 2012 indicating he fact that measures are needed to reduce this pollutant.

4.2. Nitrogen oxides

Data from the measured concentrations of nitrogen dioxide indicate exceeding of hourly limit value, especially in days with significantly increased concentrations of PM_{10}. Exceeding of the average annual concentration for nitrogen dioxide was recorded only in Skopje and this was due to the highest frequency of traffic, operation of heating plants and industrial facilities.

Emissions of nitrogen oxides compared to 1987 decreased by 23%, and compared to 1990 by 20%. In 2012, emissions of NOx (35 Gg) were below national ceiling value. However, no significant drop in emissions was recorded in the observed period, which suggests that measures should be undertaken to reduce this pollutant in order to fulfill the requirements of the Goteborg Protocol and meet projections set in the National phase-out plan.

4.3. Ozone

On the basis of processed data on ozone for the period 2005 to 2013, it may be concluded that the target value for human health protection in urban areas has been slightly exceeded, while in the rural area Lazaropole this target value was exceeded in most of the days, ranging from 98 days in 2010 to 276 days in 2006. Long-term target for vegetation protection follows the trend of the target value.

Exceeding of target values for ozone result from high concentrations of ozone occurring in summer period at stronger solar radiation is specific to our country due to its geographical position.

4.4. Non-methane volatile organic substances

Compared to 1988, emissions of NMVOC decreased by 36%. In the period 2010 to 2012, NMVOC emissions were below the national ceiling specified in accordance with Goteborg Protocol and Rulebook

on the quantities of the ceiling values of pollutants emission.

From among non-methane volatile organic compounds, measurements of benzene in ambient air were conducted in the period 2012 and 2013, Measured concentrations range around target value indicating the fact that more significant measures for these pollutants reduction should be undertaken.

4.5. Sulfur dioxide (SO_2)

Concentrations of sulfur dioxide are far below the limit value at all measuring points. However, it should be noted that the most significant contribution to sulfur dioxide emissions originates from the process of coal combustion (which contains high percentage of sulfur) for electricity production. This pollution also causes acidification in soil and waters and has transboundary effect on air pollution.

4.6. Carbon monoxide (CO)

Concentrations of carbon monoxide are below the limit value at all measuring points. Furthermore, slight drop in the emissions of this pollutant has been recorded for the last several years and their further reduction is expected.

4.7. Heavy metals

Data on measured concentrations of cadmium and lead in Veles does not show exceeding of target or limit value for these pollutants. However, the analysis made of the results of the campaign conducted at five measuring points in the City of Skopje shows that the highest measured concentrations of cadmium and arsenic were recorded at the measuring point Gazi Baba, though they do not exceed the target value. Higher concentrations of heavy metals at this measuring point arise from emissions from installations for metal production and processing situated close to the measuring point. Compared to lead which was below the limit value, the target value for nickel was exceeded at all measuring points.

We may conclude that emissions of heavy metals, especially lead, decreased compared to previous years. Nevertheless, given the fact that most of the heavy metals are carcinogenic, it is necessary to undertake measures for their reduction, especially by installations for production and processing of metals, alloys and ferro-alloys, considering that processes of these installations make the greatest contribution to emissions of lead, arsenic, cadmium and nickel.

4.8. Ammonia (NH_3)

Agriculture has the greatest contribution to ammonia emission with 98%. During the whole observed period, there was no exceeding in the ceiling value of this pollutant being 12 kilotons. However, the Republic of Macedonia as Party to Gothenburg Protocol is obliged to undertake strategies and measures specified in the National Plan for Air Protection and strategic documents and programmes prepared by the Ministry of Agriculture, Forestry and Water Economy.

5. Recommendations

5.1. Particulate matters ($PM_{2.5}$ and PM_{10})

In cases of exceeded alert threshold, the Inter-sectoral Working Group for air (IWG) made recommendations and short-term measures for human health protection. These recommendations and measures are posted on the MEPP's portal http://airquality.moepp.gov.mk and sent to the Centre for Crisis Management and then distributed to relevant institutions and media.

Considering that the greatest share in the emission of these substances belongs to non-combustion facilities, such as administrative institutions and households (34% for PM_{10}, and 76% for $PM_{2.5}$), reduction in particulate matters emissions, especially during winter period, can be achieved by promoting public awareness which requires organization of major campaigns, public awareness raising among the youngest generations, campaigns for proper use of fuels in households, as well as greater involvement of media.

However, it should be underlined that short-term measures can achieve short-lived mitigation of the state, i.e. minimum reduction in the concentrations of particulate matters. To achieve limit values for PM_{10} specified in the national legislation, it is necessary to implement medium and long term measures for reduction as proposed in the National Plan for Air Protection concerning mainly gasification of the City of Skopje and at the level of the Republic of Macedonia, implementation of measures defined in A-IPPC permits or A-adjustment permit with adjustment plan, introduction of higher EURO standards for vehicles and increased utilization of renewable energy sources.

5.2. Nitrogen oxides (NOx)

Only by way of implementation of the measures for nitrogen oxides reduction it will be possible to achieve gradual reduction of NOx. Due to the fact that the share of electricity and heat producing installations in the overall emission of this pollutant amounts 55%, it is necessary to proceed with the implementation of the measures for NOx reduction initiated in 2014 in central heating plants (substitution of crude oil with gas and introduction of burners with low Nox emissions). Reduction of NOx emissions by 9.5 kilotons will be possible in the period 2012-2020 by implementation of the measures in the energy sector as specified in the National Plan for Air Protection concerning development and putting into operation of hydro power plants, wind farms for electricity production, as well as modernization of installations for electricity production.

Reduction of NOx, as well as CO, can be achieved through application of measures to reduce emissions from transport (share of NOx emissions is 28%, and of CO - 32%). Measures are defined in the National Plan for Air Protection and concern renewal of vehicle fleet through use of vehicles with higher EURO standards, cancelation of old vehicles import, improvement of the quality of liquid fuels, as well as improvement of public transport. These measures will have particular effect on the emissions of NOx in the agglomeration of Skopje region where traffic caused pollution is the highest due to the greatest traffic frequency. In parallel with the reduction of nitrogen oxides, concentration of secondary particulate matters which participate in the formation of the former should reduce, as will the effect of eutrophication and the level of ozone (O_3).

5.3. Non-methane volatile organic substances

Given the fact that emission of these substances does not have dominant sector, significant reduction in the emissions of these substances will be achieved by application of the measures set in the National Plan for Air Protection in the frames of the sectors energy, transport and agriculture, as well as the measures to be

implemented with the enforcement of the Law on VOC Emissions Control in the use of petrol and other VOC Directives. Reduction of emissions from the sector of fossil fuels extraction and distribution will be enabled by substitution of the low quality coal from open pits with bio-fuels. With regard to emissions from solvents use sectors, it is necessary to implement Directives 1999/13/EC, 1994/63/EC, 2009/126/EC and 2004/42/EC. It is primarily necessary to finalize the transposition of these Directives into the national legislation and initiate the implementation of the mentioned requirements from the relevant EU measures. These requirements concern application of reduction scheme comprising emissions from installations using NMVOCs containing solvents, reduction of NMVOC content in dyes and coatings, control of their emissions in petrol storage, distribution to the terminals of petrol stations and petrol filling in vehicle motors.

5.4. Sulfur dioxide (SO_2)

With regard to sulfur dioxide emission, the analysis of data indicated that it is necessary to introduce the best available techniques in installations for electricity production, given the fact that their contribution to the emissions on national level amounts as much as 94%. These measures will not only contribute to the reduction of emissions on national level, but those will also contribute to the reduction of transboundary effect of this pollutant causing acidification. By this, the requirements of CLRTAP and Gothenburg Protocol, ratified by the Republic of Macedonia will be fulfilled.

5.5. Carbon monoxide (CO)

Concentrations of carbon monoxide are below limit values and should be maintained. Emissions of this pollutant should be reduced because carbon monoxide is precursor of ozone as it participates in its formation.

Measures in the area of transport described in the preceding chapter will contribute to the reduction of traffic caused emissions. As far as emissions from non-combustion facilities are concerned, such as administrative institutions and households, those can be reduced by substitution of fuel used for heating, such as wood, coal and oil with natural gas, expected to take place upon the introduction of gasification in the City of Skopje and at the level of the Republic of Macedonia.

5.6. Heavy metals

Installations in the area of metallurgy which possess A-IPPC permit or A-adjustment permit with adjustment plan should apply the best available techniques or measures defined in the permits concerning reduction of heavy metals emissions. However, apart from recommended application of for metals reduction in environment and humans, it should be borne in mind that the main way of heavy metals absorption in living organisms is food and not air.

5.7. Ammonia (NH_3)

To reduce the emissions of ammonia which contribute to acidification and eutrophication, it is necessary to apply the Code of Good Agricultural Practice through sustainable management and breeding of livestock and appropriate management of organic and mineral fertilizers. These measures are defined are defined in strategic documents and programmes prepared by the Ministry of Agriculture, Forestry and Water Economy and set in the National Plan for Air Protection for the period 2013-2018.

WATER

WATER

1. Introduction

Water is limited and vital resource necessary for life sustenance, providing social welfare, economic prosperity and ecosystem health. According to hydrographic conditions, there are four river basin areas in the Republic of Macedonia (Vardar, Crn Drim, Strumica and Juzhna Morava)and three natural tectonic lakes (Ohrid, Prespa and Dojran Lakes). Most of the water resources are domicile, formed by precipitations. Republic of Macedonia is not rich in surface waters and they are mainly dependent on occurrence, duration and intensity of precipitations. As a result of morphological, hydrogeological and hydrogeographical structure of the relief, surface water resources run rapidly in hydrographic network (rivers, streams and lakes) and water flows out of the country. The only exceptions are the karstic areas where water is retained for longer periods below ground and feeds running waters of the river network.

2. Status of surface waters

2.1. Hydrological status of rivers

Data on hydrological status of rivers and lakes are provided by Hydrometeorological Administration, which performs daily measurements at 7:30 hours. Quantity of water running through several rivers is monitored continuously. The number of measuring stations differs for different watercourses. In this report, the flow of the following rivers will be presented: Vardar, Treska, Pchinja, Bregalnica and Crna Reka. Vardar River belongs to Aegean Sea and enters it directly. Rivers Treska, Pchinja, Crna Reka and Bregalnica are major tributaries of Vardar and waters from their watershed areas enter into Vardar. The flow of Vardar river will be presented by four representative measuring stations along the watercourse, while for other rivers, the flow will be presented by data from one measuring station.

2.1.1. Vardar

The flow of Vardar river will be presented the following measuring stations: Jegunovce, Skopje, Veles and Demir Kapija. The measuring station Jegunovce is closest to the springs of Vardar, followed by the stations Skopje and Veles. From among presented monitoring stations, Demir Kapija station is the furthest one from the springs of Vardar and consequently the quantity of water in the mentioned station will have the greatest volume. The highest average monthly flow in 2013 was recorded in the measuring station Demir Kapija, in April and amounted 439.46m3/s, while the minimum was recorded in the measuring station Jegunovce and amounted 7.69m3/s. Other three measuring stations recorded the maximum average monthly flow in May. Minimum average monthly flow in 2013 in all stations was recorded in October.

Flow of the River Vardar in 2013

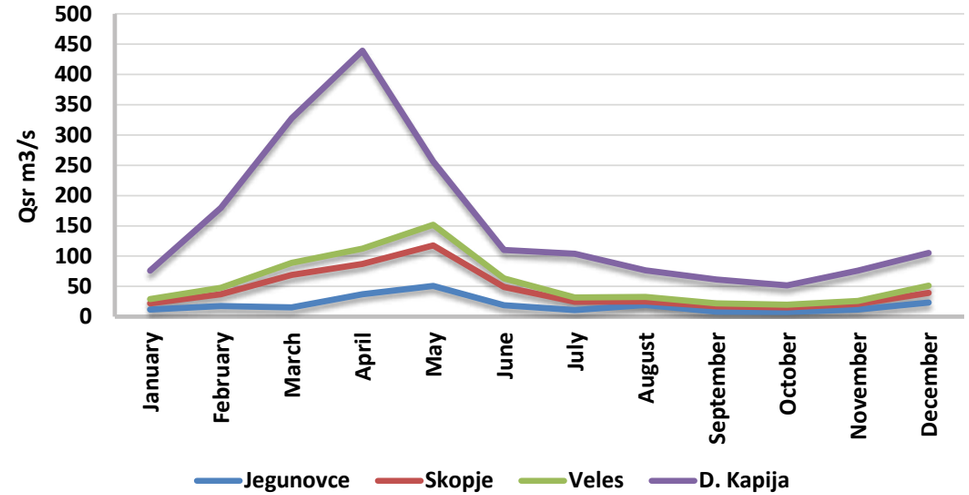


Diagram 1

2.1.2. Treska

The river Treska is right tributary of Vardar. In 2013, the river Treska reached the maximum average monthly flow in April and it amounted 41.08 m^3/s, while the minimum average monthly flow was recorded in August and amounted 4.77 m^3/s.

Flow in the river Treska in 2013

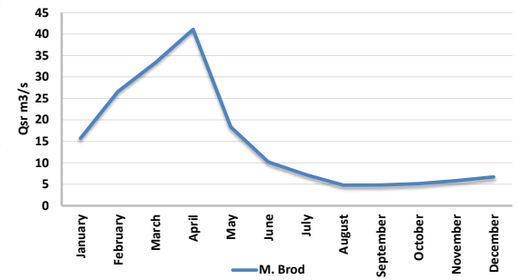


Diagram2

Flow in Crna Reka in 2013

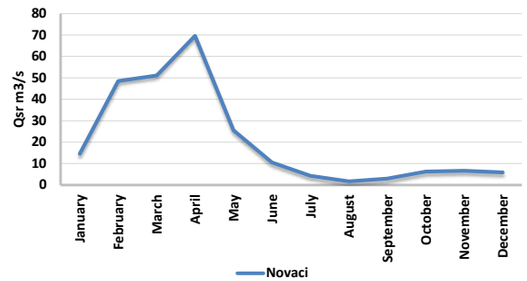


Diagram 3

2.1.3. Crna Reka

Crna Reka is also right tributary to the river Vardar. In 2013, the Crna Reka reached the maximum average monthly flow in April and it amounted 69.60 m^3/s, while the minimum average monthly flow was recorded in August and amounted 1.68 m^3/s.

2.1.4. Pchinja

Pchinja is left tributary of the river Vardar. Pchinja reached the maximum average monthly flow in 2013 in April and it amounted 30.59 m^3/s, while the minimum average monthly flow was recorded in August and amounted 0.97 m^3/s.

Flow in the river Pchinja in 2013

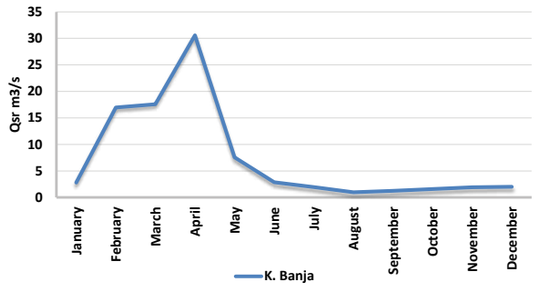


Diagram 4

Flow in the river Bregalnica in 2013

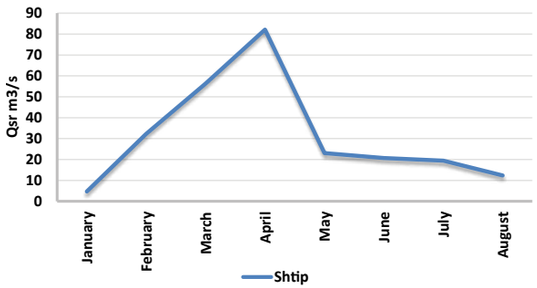


Diagram5

2.1.5. Bregalnica

Bregalnica is also left Vardar river tributary. For 2013, the average monthly flows for the months September to December are not available. During the observed period, Bregalnica reached the maximum average monthly flow in 2013 in April and it amounted 82.10 m^3/s, while the minimum average monthly flow was recorded in January and amounted 6.88 m^3/s.

From the observed 8 measuring stations, we may note that watercourses reach maximum water flows in the months April and May. The highest flows in May were recorded at 3 measuring stations on the river Vardar, the stations being: Jegunovce, Skopje and Veles, while at the station Demir Kapija on the river Vardar, as well as on the tributaries of Vardar, the maximum flows were recorded in April. Minimum water flows at all measuring stations on the river Vardar were recorded in October, while on Vardar's tributaries in August, with exception of the station Shtip on the river Bregalnica where the minimum flow was recorded in January (it should be noted that the last 4 months of 2013 lacked data from this monitoring station).

2.2. Hydrological status of natural lakes

2.2.1. Ohrid Lake

"0" elevation of Ohrid Lake is at 693,17 meters above sea level. The average annual water level of Ohrid Lake for 2013 was 693,61 meters above sea level, or the water in the lake had by 0,44 m higher than normal water level at an average.

Average annual water level of Ohrid Lake in 2013

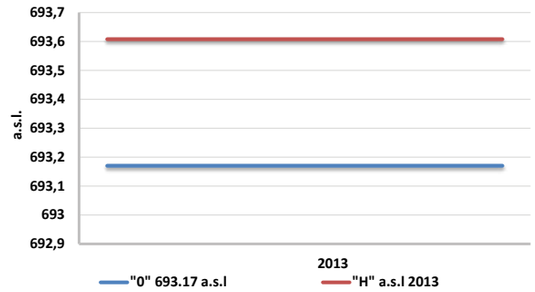


Diagram 6

Average annual water level of Prespa Lake in 2013

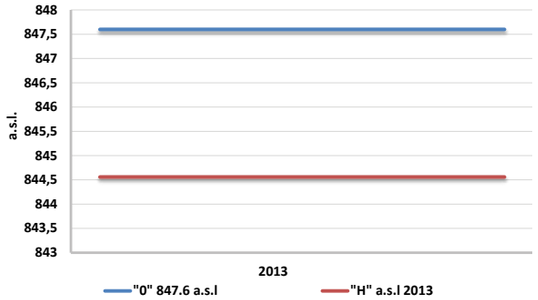


Diagram 7

2.2.2. Prespa Lake

"0" elevation of Prespa Lake is at 847,6 meters above sea level. The average annual water level of Prespa Lake in 2013 was 844,56 meters above sea level, or the water in the lake had by 3,04 m lower than normal water level at an average.

2.2.3. Dojran Lake

"0" elevation of Dojran Lake is at 144,93 meters above sea level. The average annual water level of Dojran Lake in 2013 was 144,80 meters above sea level, or the water in the lake had by 0,13 m lower than normal water level at an average.

Average annual water level of Dojran Lake in 2013

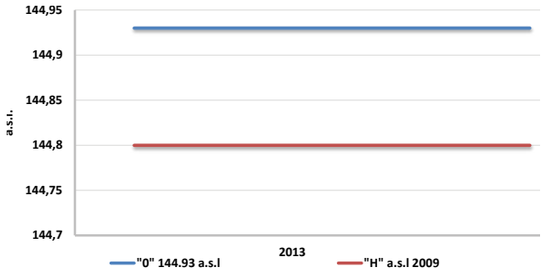


Diagram 8

2.3. Physical and chemical quality of rivers

Quality of watercourses in the Republic of Macedonia is monitored by the Administration of Hydrometeorological Matters. In the frames of the RIMSYS programme, 20 measuring points on rivers and the parameters monitored were defined. In 2013, continuous monitoring was performed for organoleptic, mineralization, oxygen and acidity parameters, eutrophication determinants, organic micro-pollutants and harmful and dangerous matters on the following measuring points:

Table 1. Measuring points on rivers

Station	River
Sveta Bogorodica	Treska
Border, Ustie (Delta)	Lepenec
Radusha, Taor, Nogaevci, Demir Kapija, Gevgelija, Bashino Selo	Vardar
Pelince, Katlanovska Banja (spa)	Pchinja
Trnovec	Kriva Reka
Balvan	Bregalnica
Brod	Eleshka
Skochivir, Palikura	Crna Reka
Novo Selo	Strumica
HP Shpilje	Crn Drim
Boskov Most	Radika

2.3.1. Oxygen parameters

Quality of the water in rivers with reference to oxygen parameters will be presented through analysis of dissolved oxygen, biological oxygen demand for five days - BOD5 and chemical oxygen demand - COD, compared to specified values for waters classification (Decree on waters classification, hereinafter only Decree). Figures presented below indicate that the quality of rivers for oxygen parameters is compliant with the values specified in the Decree.

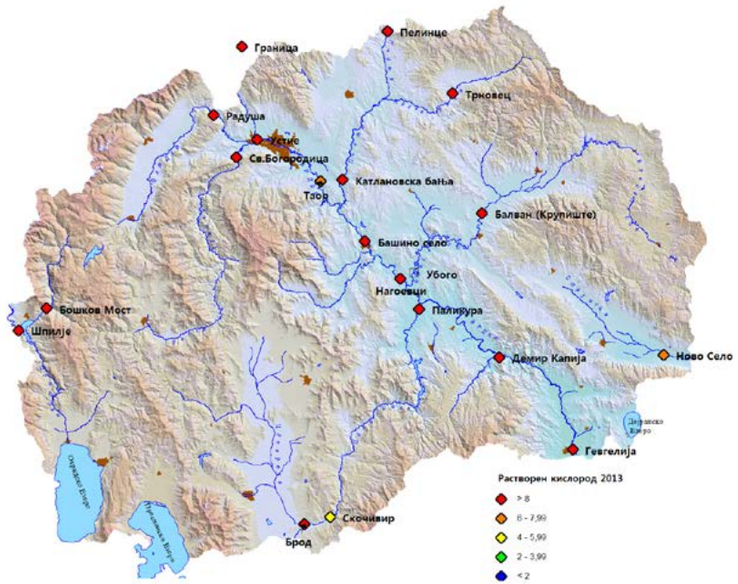


Figure 1: Quality of rivers measured for concentration of dissolved oxygen (mg/L) in 2013

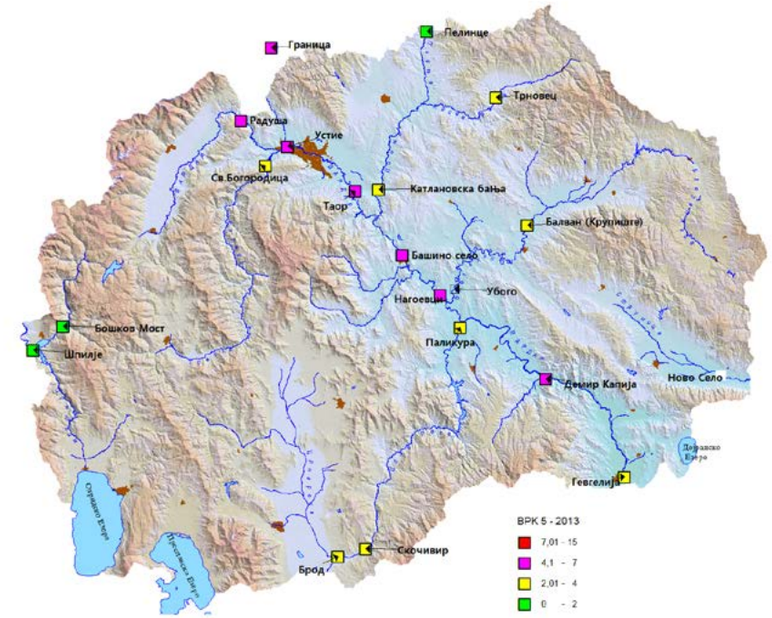


Figure 2: Quality of rivers measured for concentration of five day biological oxygen demand (mg/L) in 2013

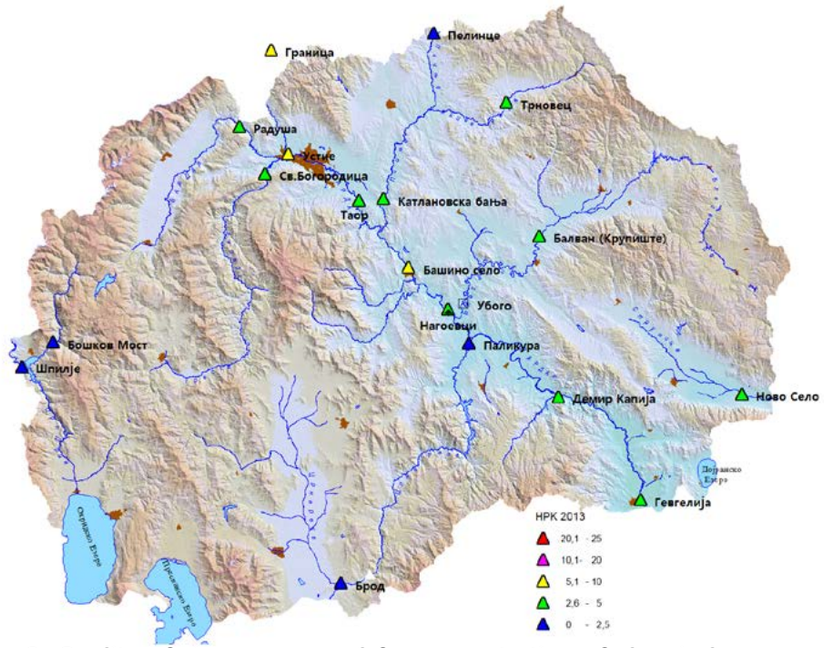


Figure 3: Quality of rivers measured for concentration of chemical oxygen demand (mg/L) in 2013

2.3.2. Nutrients

With reference to nutrients, quality of rivers is presented by monitoring of the average annual concentrations of nitrates and nitrites (Figure 4 and 5). Analyzed data indicates that the quality of rivers for nitrates and nitrites is within the values specified in the Decree.

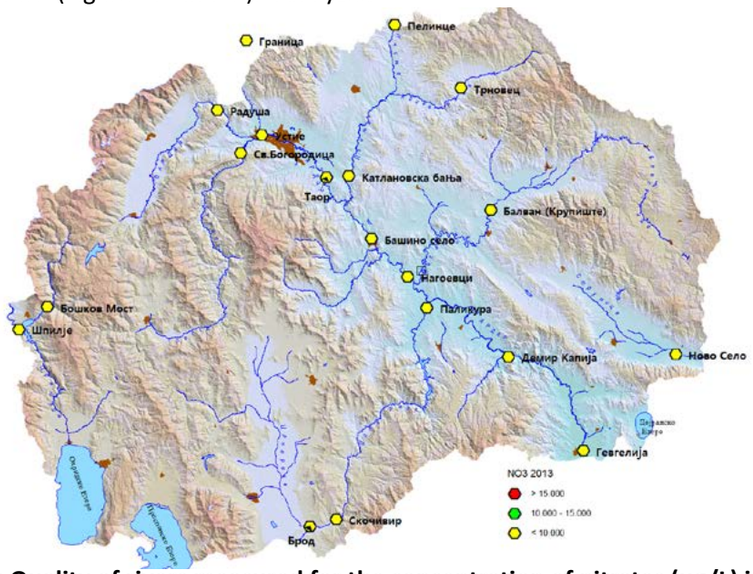


Figure 4: Quality of rivers measured for the concentration of nitrates (µg/L) in 2013

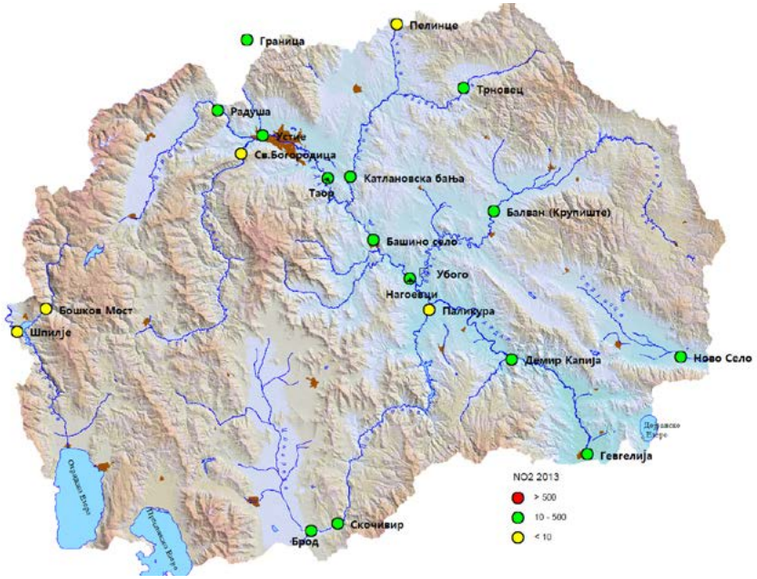


Figure 5: Quality of rivers measured for the concentration of nitrites (µg/L) in 2013

2.3.3. Heavy metals

With reference to data obtained from the monitoring of heavy metals in rivers on 20 measuring points, we may note that concentration of dangerous and harmful matters measured through concentrations of iron, cadmium, zinc, lead, copper, nickel, chromium and manganese, on almost all measuring points indicate quality of I-II class relative to values specified for waters classification in the Decree. Quality of III-IV class was recorded for the following parameters:

- Manganese, in the following measuring points: Balvan Brod, Novo Selo and Skochivir
- Cadmium, in the following measuring points: Brod, Bashino Selo, Demir Kapija, Gevgelia, Novo Selo, Skochivir, Palikura and Ustie
- Iron, in the measuring point Skochivir

The analysis of heavy metals showed that there were no major deviations in the values of the concentrations of examined heavy metals compared to measurements in 2012, when concentrations of these indicators were also within the concentrations specified for waters classification.

Average annual concentrations of heavy metals in rivers 2013

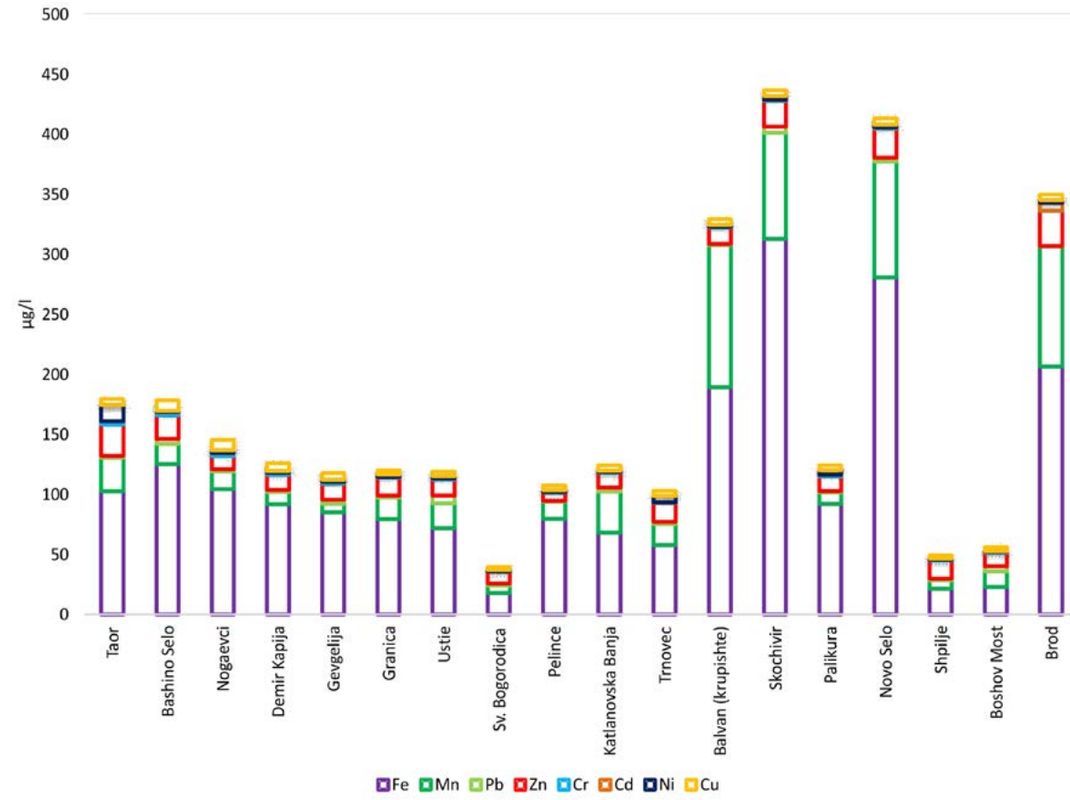


Diagram 9

2.4. Biological quality of rivers

Biomonitoring is integral part of systematic monitoring of the quality of waters performed by the Hydrometeorological Administration. Biomonitoring is performed on 9 watercourses in Macedonia at 17 measuring points presented in the Table below.

Table 2: Measuring points for biological quality of rivers

No.	Watercourse	Measuring points
1	Vardar	Radusha
2		Taor
3		Bashino Selo
4		Nogaevci
5		Demir Kapija
6		Gevgelija
7	Treska	Saraj
8	Lepenec	Border (Cheshma)
9		Zlokukjani
10	Kriva Reka	Trnovec
11	Pchinja	Pelince
12		Katlanovo
13	Bregalnica	Dolni Balavan
14	Crna Reka	Skochivar
15	Eleshka	Brod
16	Strumica	Novo Selo

By using organisms as bioindicators, namely determining the presence of organisms indicators and determining the status of biocenosis, the status of a given biotope is established.

Collection of biological material is performed 5 times in a year (February, April, June, August and October) covering the four seasons and selecting the most suitable index period for material sampling. Index period is determined on the basis of the information from monitoring for a longer period with higher sampling frequency (10 times a year) in the four seasons.

The assessment of the quality of surface waters is done according to the criteria defined in the existing legislation, including "Decree on waters classification" and Decree for categorization of watercourses, lakes and ground waters".

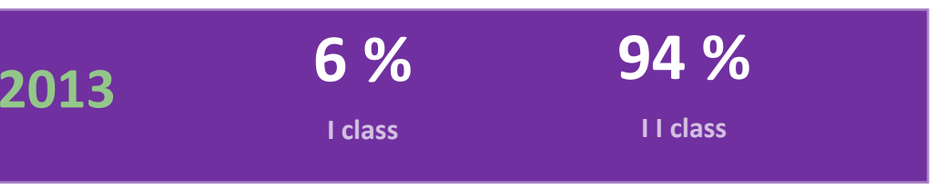
The following biological elements are used for quality assessment:

- Composition and abundance of aquatic flora
- Composition and abundance of benthos invertebrate fauna

Table 3:. Classification of rivers with reference to index of saprobity.

Index of saprobity	0 - 1.49	1.5 - 2.5	2.51 - 3.5	3.51 - 4.5	> 4.5
Class	I	II	III	IV	V

Diagram below shows that 94% of analyzed samples from rivers for 2013 belong to second class, and remaining 6 % belong to first class.



2.5. Physical and chemical investigations in Ohrid Lake for 2012

Data on qualitative status of Ohrid Lake is obtained from the PSI Hydrobiological Institute from Ohrid. Measuring points for the reporting period of 2012 were defined in accordance with the conclusions resulting from researches in the previous years. According to the Programme for waters monitoriong in Ohrid_Prespa region, in 2012 measurements were conducted in Ohrid Lake lithoral.

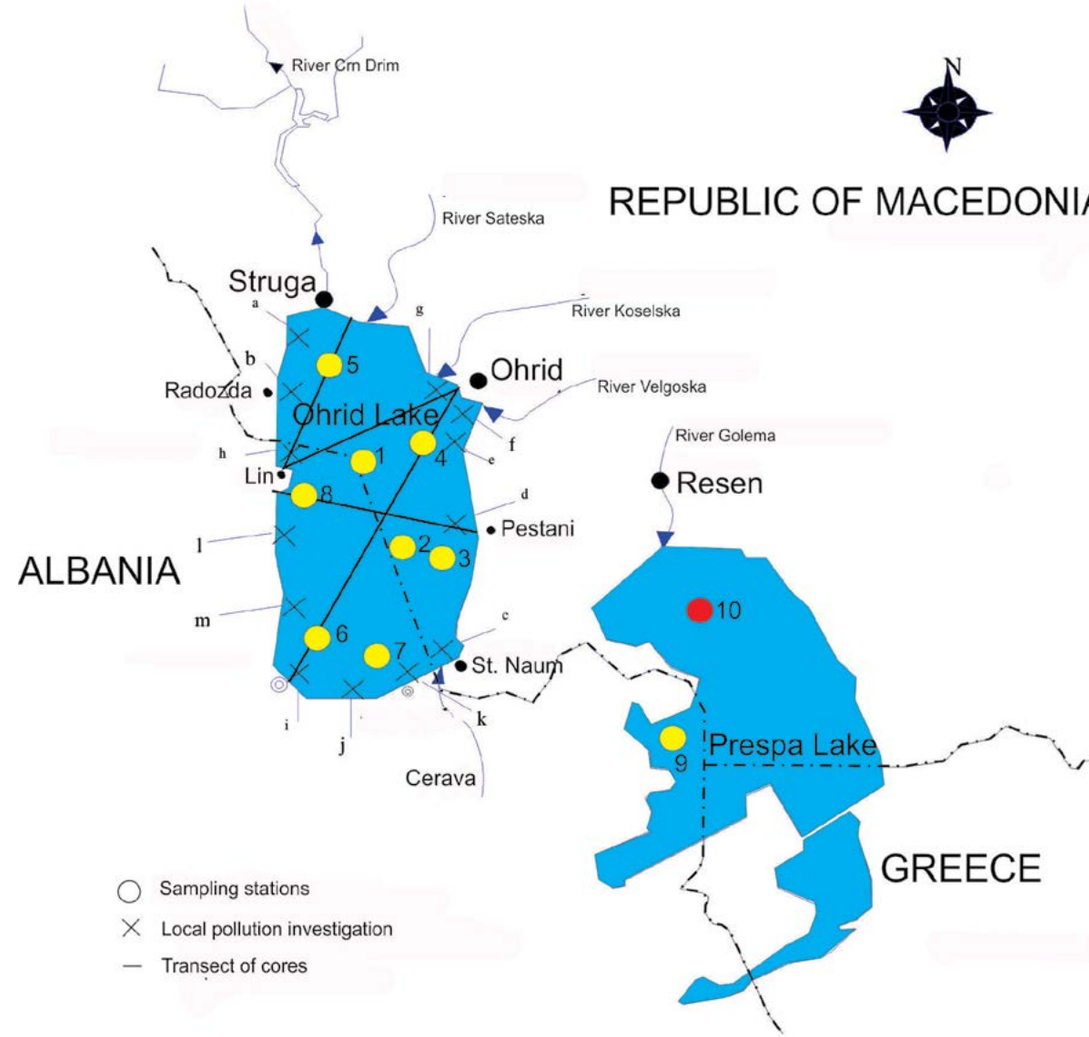


Figure 6: Measuring points of Ohrid-Prespa region

In Ohrid watershed area, in this reporting period, the lithoral was covered by five measuring points, through which PSI Hydrobiological Institute from Ohrid, in the course of 2012, in the waters of Ohrid Lake measured the following parameters:

- Temperature,
- transparency,
- water reaction (pH),
- total alkalinity,
- free CO_2,
- oxygen (dissolved and saturation),
- biochemical oxygen demand,
- dissolved biodegradable organic matters through permanganate consumption,
- nitrogen compounds (ammonia, total organic nitrogen by Kjeldahl, nitrites and nitrates) and
- total phosphorous.

The quality of Ohrid Lake for 2012 will be presented through concentrations of dissolved oxygen, total phosphorous and chlorophyll a. Due to lack of financial resources, only one measurement was conducted in 2012 in November and its result is presented in Diagram 10.

According to data on average monthly concentration of oxygen in Ohrid Lake at five measuring points in the lithoral, we may conclude that the quality of water is compliant with the specified values for water quality of I class. (Diagram 10).

Dissolved oxygen in Ohrid Lake for 2012

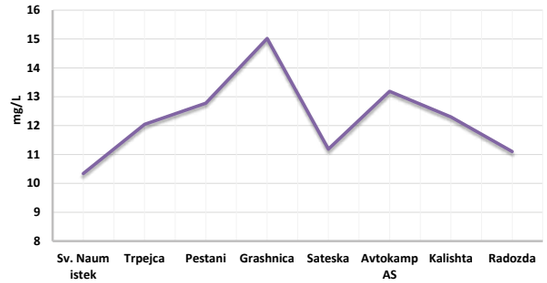


Diagram 10

According to data on average monthly concentration of phosphorous in Ohrid Lake, may conclude that the quality of water is compliant with the specified values for water quality of I class, except at the measuring point Grashnica where the quality of water complies with II class.

Total phosphorous in Ohrid Lake for 2012

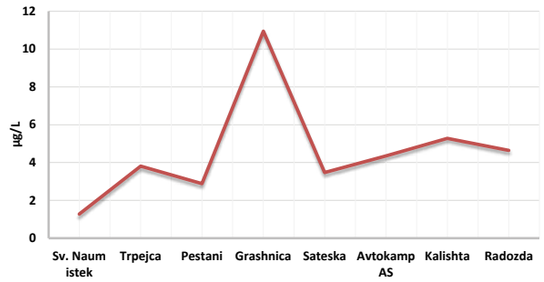


Diagram 11

Concentration of chlorophyll a in lithoral waters of Ohrid Lake is 1,42 µg/l and thus it is compliant with the specified values for water quality of I class.

2.6. PHI Public Health Center Veles

For 2013, Public Health Center Veles delivered data to the Macedonian Environmental Information Centre concerning safety of water in the water bodies, Dojran Lake, Lake Mladost, rivers Vardar, Topolka and Babuna. Microbiological and physical-chemical analyses were conducted.

On Dojran Lake, measuring were made on the following measuring points: Partizan, Stara Mrdaja, Aleks Beech and City Beech, and it was concluded that water at all measuring points was in accordance with the Decree for categorization of watercourses, lakes, reservoirs and ground waters, and could be used.

On the lake Mladost, measurements were performed at two measuring points in 2013, namely on the beech Romantik and City Beech, and it was found out that water could be used for bathing and recreation for people, irrigation of agricultural land and for the cattle.

On the river Vardar, PHI Veles, in 2013 conducted measurements on the measuring points Bashino Selo and Kapalishte Gevgelia, and found out that water could not be used for the above purposes.

On Topolka, two measurements were conducted as well, so that water at the measuring point Pashin Most may, while water on the measuring point before entry into Vardar, water may not be used for the above purposes.

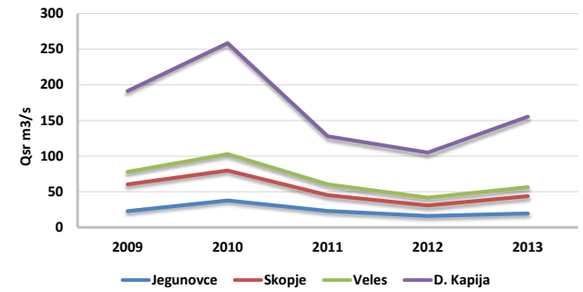
On river Babuna, in 2013, measuring was made on the measuring point Plazha (beech), and it was concluded that water could be used for bathing and recreation for people, irrigation of agricultural land and for the cattle.

3. Trend in surface waters

3.1. Trend in hydrological status of rivers

3.1.1. Vardar

The Diagram shows that, during the five year period of monitoring from 2009 to 2013, river Vardar had the highest water flow in 2010. The average annual water flow for 2010 in the measuring station with highest flow, Demir Kapija, was 258,45 m^3/s while in the measuring station with the lowest flow Jegunovce it was 37,77 m^3/s. In the observed period, 2012 was the year with the lowest flow. With the average annual water flow for the measuring station Demir Kapija it was 104,93 m^3/s, and for the station Jegunovce 16,12m^3/s.



Trend in the flow of river Vardar

Diagram 12

3.1.2. Treska

In the reporting period 2009 – 2013, the highest average annual water flow with the river Treska was reached in 2010 and it was 28,32 m^3/s, while the lowest one was in the year to follow and amounted 10,98 m^3/s. Data is from the measuring station Makedonski Brod.

Trend in the flow of river Treska

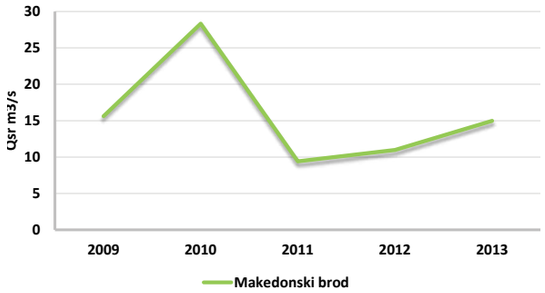


Diagram 13

3.1.3. Crna Reka

In the reporting period 2009 – 2013, the highest average annual water flow with the river Crna Reka was reached in 2010 and it was 38,72 m^3/s, while the lowest one in 2012 and amounted 10,96 m^3/s. Data is from the measuring station Novaci.

Trend in the flow of river Crna Reka

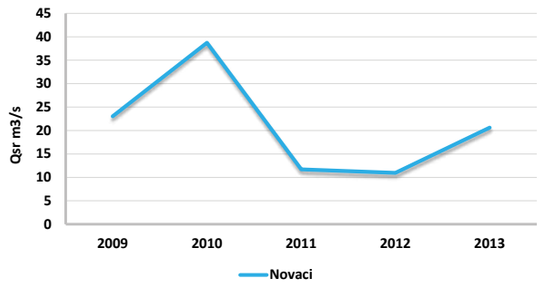


Diagram 14

3.1.4. Pchinja

In the reporting period 2009 – 2013, the highest average annual water flow with the river Pchinja was reached in 2010 and it was 19,71 m^3/s, while the lowest one in 2011 and amounted 5,02 m^3/s. Data is from the measuring station Katlanovska Banja.

Trend in the flow of river Pchinja

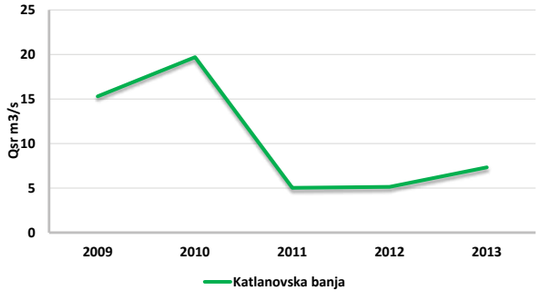


Diagram 15

3.1.5. Bregalnica

In the reporting period 2009 – 2013, the highest average annual water flow with the river Bregalnica was reached in 2010 and it was 33,89 m^3/s while the lowest one in 2012 and amounted 6,36 m^3/s. Data is from the measuring station Shtip.

Trend in the flow of river Bregalnica

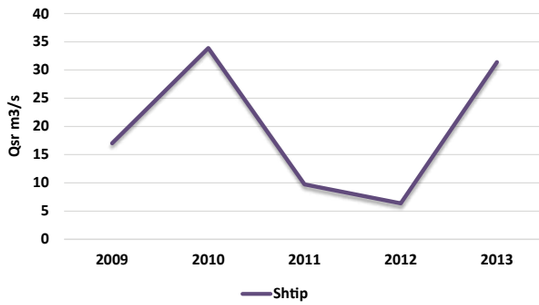


Diagram 16

The five rivers observed, Vardar, Pchinja, Treska, Bregalnica and Crna Reka, had the highest average annual water flow in 2010. The minimum average annual water flow with the river Vardar and its northern tributaries Treska and Pchinja was recorded in 2012, while with southern tributaries of Vardar, Crna Reka and Bregalnica, the minimum average annual water flow in the observed period was recorded in 2011.

3.2. Trend in hydrological status of natural lakes

3.2.1. Ohrid Lake

Diagram below shows the average monthly water levels in Ohrid Lake during the last five year period 2009 - 2013. Only in November 2011, the Ohrid Lake water level was below zero elevation, being 693,13 m a.s.l. In each other month of the presented five year period, the water level in Ohrid Lake was higher than the zero elevation.

The maximum was reached in April 2013, when the average monthly water level was 693,98 m a.s.l., or by 0,81 meters higher than the normal water level. The Diagram shows that the water level in Ohrid Lake is the highest in the months March to June, and the lowest from November to January.

Water level of Ohrid Lake

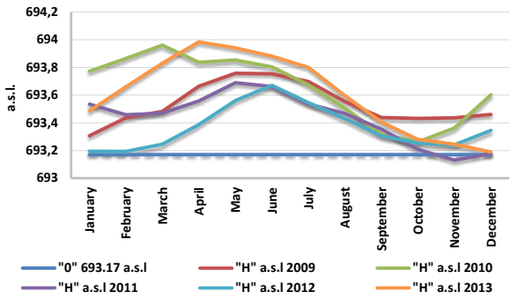


Diagram 17

3.2.2. Prespa Lake

Diagram below shows the average monthly water levels in Prespa Lake during the last five year period 2009 - 2013. The Diagram shows that Prespa Lake's water level throughout the presented five year period was lower than zero elevation. However, 2009 was characterized with particularly low water level. The lowest values were measured in October 2009 when the water level was at 842,68 meters above sea level. The highest value was recorded in January 2011 when it was at 845,17 meters above sea level and the water level was still by 2,44 meters lower than normal water level.

Water level of Prespa Lake

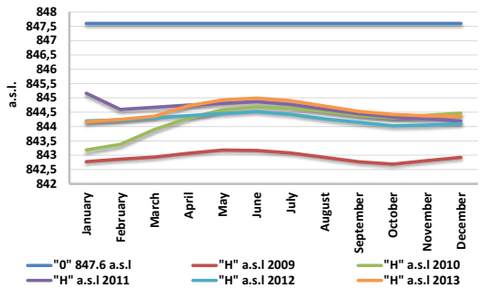


Diagram 18

3.2.3. Dojran Lake

Diagram below shows the average monthly water levels in Dojran Lake during the last five year period 2009 - 2013. The Diagram shows that the water level in the Lake was in most of the cases lower than zero elevation. However, there is a trend of continuous increase in the water level between 2009 and 2013 and encouraging fact is that the water level for the last 3 years in Dojran Lake has been approaching the "0" elevation. During the presented period, the water level was above zero elevation only in June 2011 and April, May, June and July 2013. The highest average monthly water level was recorded in May 2013 and amounted 145,19 m a.s.l.

Water level of Dojran Lake

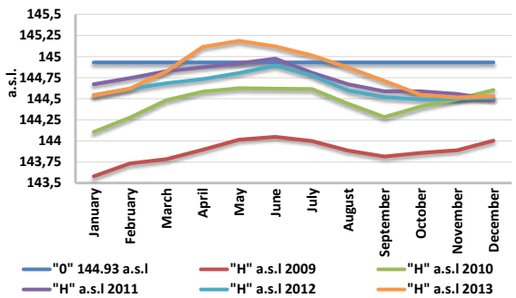


Diagram 19

3.3. Trend in physical-chemical parameters in rivers

3.3.1. Oxygen parameters

The trend in oxygen parameters in rivers is presented through measurement of average annual concentrations of oxygen parameters in rivers Vardar, Crna Reka and Strumica for the period 2008-2013, at 5 measuring points on the river Vardar, at 2 measuring points on the river Crna Reka and one measuring point on the river Strumica. Measuring points are part of the monitoring network operated by Hydrometeorological Administration. Oxygen parameters are measured once per month, i.e. 12 times in a year. In order to determine the trend in oxygen parameters in rivers in a year, the following measurements were carried out:

- 360 measurements on the rivera Vardar
- 144 measurements on the river Crna Reka
- 72 measurements on the river Strumica

Data obtained from the monitoring of oxygen parameters in rivers is compared with the values stipulated in the Decree.

3.4. Dissolved oxygen

Dissolved oxygen is important component for the life in waters. High concentrations of dissolved oxygen indicate clean waters. While analyzing the data on the average annual concentrations of dissolved oxygen, we may note that waters at most of the measuring points correspond with water quality of I class, with an exception of the measuring points Novo Selo localized on the river Strumica which corresponds with water quality of II class and measuring point Skochivir on Crna Reka which corresponds with water quality for III class.

Average annual concentrations of dissolved oxygen in rivers for the period 2008 – 2013

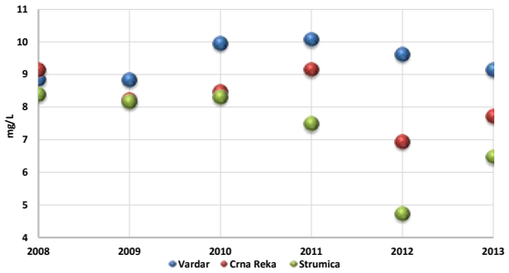
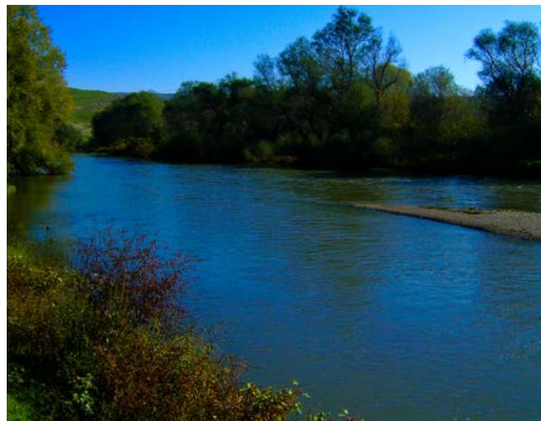


Diagram 20

Biochemical oxygen demand - BOD

Biochemical oxygen demand is the amount of oxygen required to achieve oxidation of the present biologically degradable ingredients of waters. BOD is carried out for a period of 5 days at a temperature of 20oC and results are presented in mg O2/L. High concentrations of BOD5 indicate poor quality of waters.

Analyses performed showed that higher concentrations of BOD5 corresponding to values for IV class under the Decree were recorded in 2008 in the three analyzed rivers. Then, decline in БПК5 concentrations followed in 2009 and 2010 to values corresponding to values stipulated for III class. From 2010 to 2013, no significant variations in the concentrations of BOD5 were recorded in relation to previous years.



Average annual concentrations of BOD5 in rivers for the period 2008 – 2013

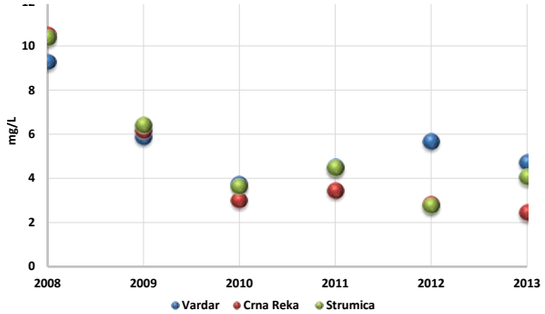


Diagram 21

Average annual concentrations of COD in rivers for the period 2008 - 2013

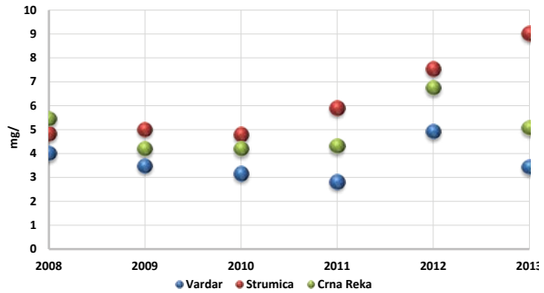


Diagram 22

Chemical oxygen demand - COD

Chemical oxygen demand is used as measure determining the quality of waters. It is determined by oxidation of organic components in the water sample and measurement of quantity of oxygen demand for this process. High COD concentrations indicate poor water quality.

With reference to trend, changes in COD concentrations were recorded in the analyzed rivers. Measured values of COD at the measuring points on the river Vardar show quality of II class for the analyzed period, with 2012 being exception when concentrations corresponding for III class were recorded. In the rivers Crna Reka and Strumica, quality of water for COD corresponded for III class in the period 2008 – 2011, followed by deterioration in the quality, namely in 2012 and 2013 quality for IV class was recorded.

3.4.1. Inorganic parameters

Nitrates and nitrites

Nitrates are a form of the substantial element nitrogen, easily absorbed into plants, which is the reason why they are frequently used in artificial fertilizers. Higher concentrations of nitrates are expected in waters that are close to agricultural areas.

The analysis of data measured for average annual concentrations of nitrates in rivers show that they correspond with values for the water quality of I-II class. With regard to average annual concentrations in rivers, it can be noted that the quality of water at most of the measuring points corresponds with the quality of water of III – IV class. Diagrams show that the data analyzed for the average annual concentrations of nitrates and nitrites in rivers show a trend of reduction.

Average annual concentrations of nitrites in rivers for the period 2008 – 2013

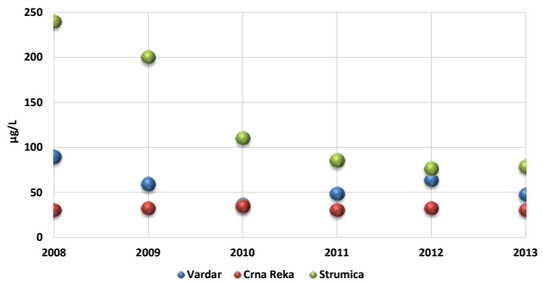


Diagram 23

Average annual concentrations of nitrates in rivers for the period 2008 – 2013

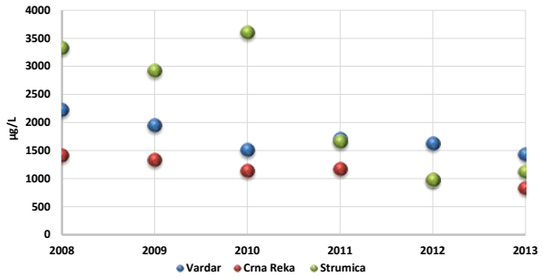


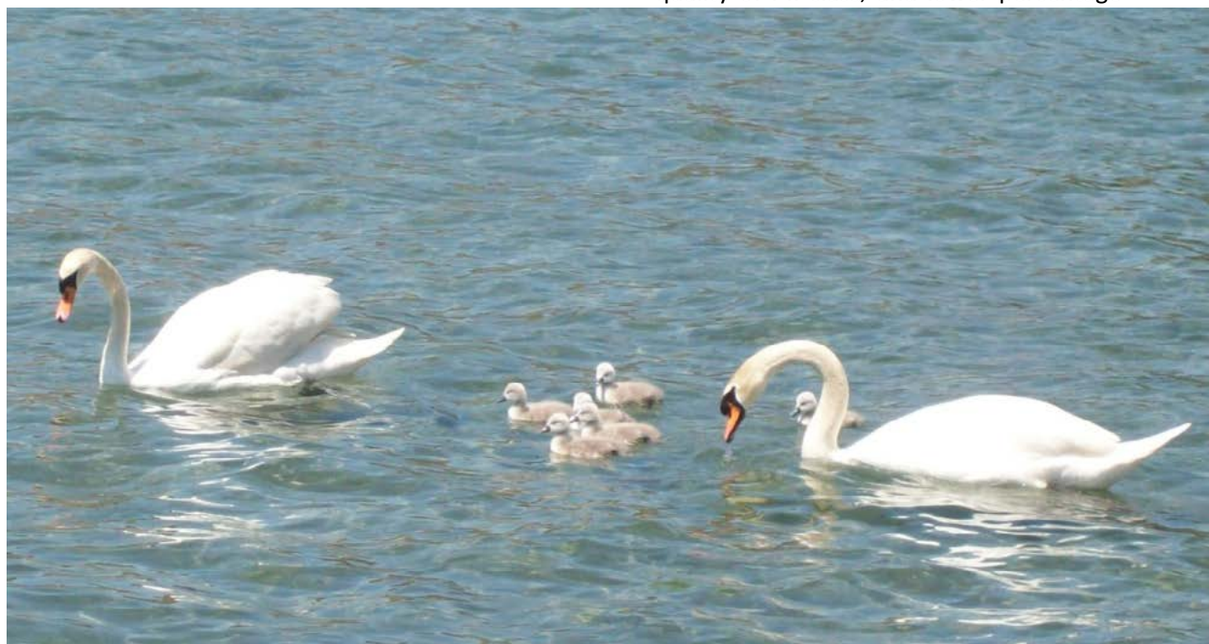
Diagram 24

3.4.2. Heavy metals

The trend in heavy metals in the rivers Vardar, Crna Reka and Strumica is presented through measurement of average annual concentrations of heavy metals in the rivers for the period 2008-2013. In the river Vardar, heavy metals are measured at 5 measuring points, on Crna Reka at two measuring points and on the river Strumica the quality is monitored at one measuring point of the monitoring network of the Hydrometeorological Administration. To determine heavy metals in rivers, the following number of measurements are completed during the year:

- 360 measurements on the rivera Vardar
- 144 measurements on the river Crna Reka
- 72 measurements on the river Strumica

Data obtained from the monitoring of heavy metals in rivers is compared with the values stipulated in the Decree. Completed analyses show that higher percentage of analyzed samples correspond to river water quality of I-II class, and lower percentage



correspond with water quality of class III-IV.

Iron

Iron is important element for algae and other organisms in aquatic ecosystems. Due to abundance of iron in land cover, it is almost always present in bigger concentrations compared to other heavy metals.

The Figure below indicates that the average annual concentrations of iron correspond with water quality of I-II class in the three rivers. Furthermore, the Diagram also indicates a slight rising trend of iron in 2012 and 2013 in the three rivers, which does not exceed the values for quality of I-II class stipulated in the Decree. However, we should point out that the quality of III-IV class for the average annual concentrations of iron was recorded at the measuring point Skochivir on Crna Reka and the measuring point Novo Selo on the river Strumica.

Average annual concentrations of Fe in rivers for the period 2008 – 2013

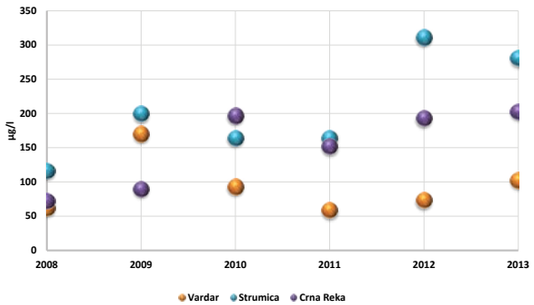


Diagram 25

Manganese

Manganese causes lack of iron in certain algae, especially blue-green algae and this can lead to inhibition of chlorophyll synthesis.

The analysis of data on the average annual concentrations of manganese in rivers showed that quality of water in the rivers corresponded with I-II class, except at the measuring point Skochivir on Crna Reka and the measuring point Novo Selo on the river Strumica, where water quality of III-IV class was recorded. This is shown on Diagram 26.

Average annual concentrations of Mn in rivers for the period 2008 – 2013

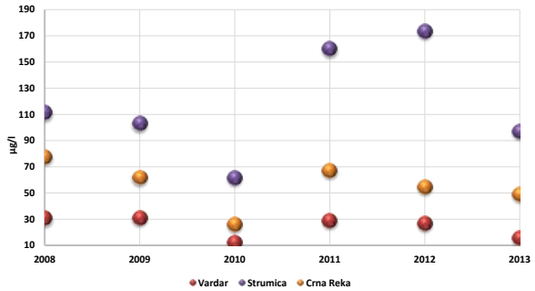


Diagram 26

Lead

Lead belongs to the group of heavy metals composing the group of priority substances due to their toxicity. In the past, it was used as fuel additive, in water supply installations and production of paints.

As far as the trend in lead concentrations is concerned, we may note that there have been no exceeded values compared to values stipulated for I-II class under the Decree. This means that the analyses made for lead for the period 2008 – 2013 for the waters of the three rivers indicate that these waters correspond with water quality of I-II class. In the period 2012 – 2013, slight increase in lead concentrations was recorded, though the limit values stipulated for I-II class under the Decree were not exceeded.

Average annual concentrations of Pb in rivers for the period 2008 – 2013

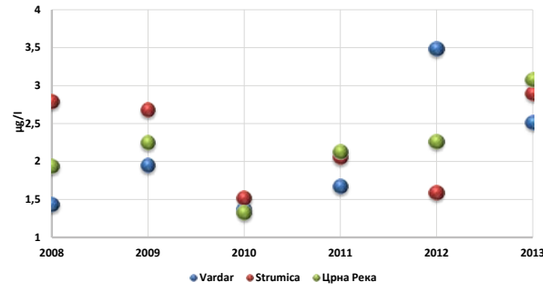


Diagram 27

Total chromium

Chromium also belongs to the group of heavy metals composing the group of priority substances due to their toxicity.

As shown on the Diagram below, quality of rivers with regard to average annual concentrations of total chromium corresponds with I-II class. Higher values were recorded in 2012 in the river Vardar, but these still do not exceed the values stipulated for I-II class.

Chromium in rivers for the period 2008 – 2013

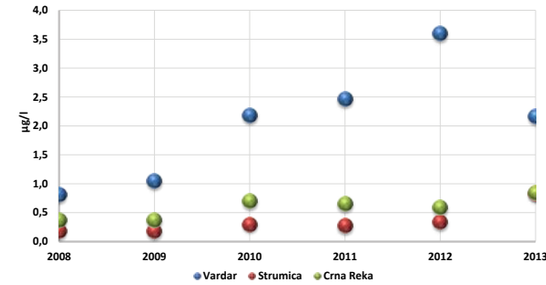


Diagram 28

Cadmium

Cadmium exists naturally in surface and ground waters. It can enter aquatic ecosystems through atmospheric influences, soil erosion, direct discharges from industry, use of slug and artificial fertilizers in agriculture, etc.

Diagram no. 29 indicates that the quality of water in the three rivers for the measured average annual concentrations of cadmium corresponds to III-IV class. The highest values of cadmium concentrations were measured in the river Vardar in 2012.

Average annual concentrations of Cd in rivers for the period 2008 – 2013

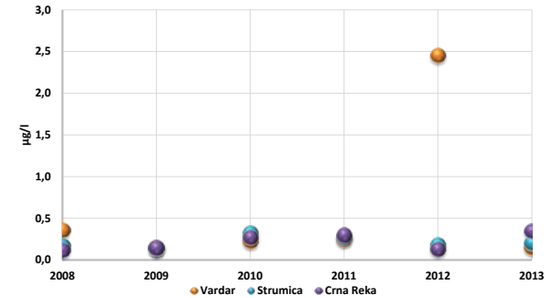


Diagram 29

Nickel

Nickel is important nutrient additive for high number of organisms, but it can be toxic if present in higher concentrations in rivers.

Diagram no. 29 indicates that the quality of rivers for average annual concentrations of nickel corresponds to I-II class.

Average annual concentrations of Ni in rivers for the period 2008 – 2013

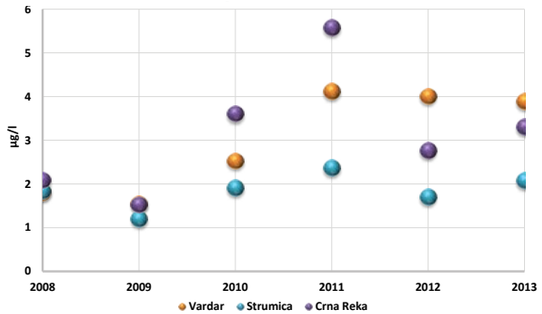


Diagram 30

Zinc

Elementary zinc in waters is not toxic, but certain compounds of zinc are very toxic. If zinc salts are present in higher concentrations, they will cause turbidity and undesired taste of the water.

Analyzed data on the average annual concentrations of zinc in rivers indicate that they have quality of water of I-II class. River Crna Reka at the measuring points Skochivir was exception in 2011, when the measured concentration of zinc corresponded with values specified for III-IV class.

Average annual concentrations of Zn in rivers for the period 2008 – 2013

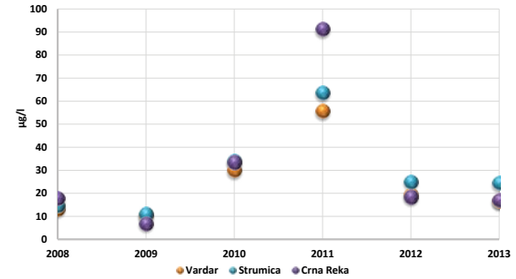


Diagram 31

Copper

Copper present in higher concentrations in rivers can have negative effect on the growth and development of fish, plants, invertebrates and amphibians.

Diagram no. 31 shows that rivers for the average annual concentrations of copper correspond with the values specified for I-II class. Higher concentrations of copper were recorded in the three rivers in 2011. Quality corresponding with III-IV class was recorded at the measuring point Palikura on Crna Reka, as well as at the measuring points Bashino Selo and Nogaevci, both on the river Vardar in 2011 and at Nogaevci and Demir Kapija, both on Vardar in 2010.

Average annual concentrations of Cu in rivers for the period 2008 – 2013

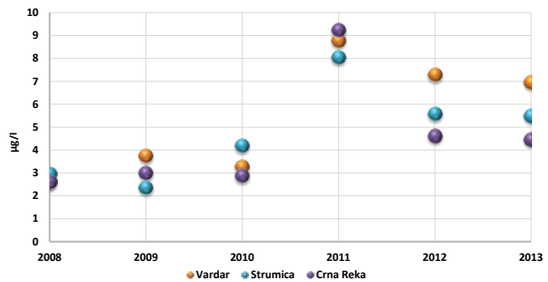


Diagram 32

3.5. Trend in biological quality of rivers

Trends in biological parameters in rivers are shown through measurements of average annual concentrations of composition and abundance of aquatic flora and benthos fauna in the rivers for the period 2008-2013 at 18 measuring points of the monitoring network of the Hydrometeorological Administration. Sampling of biological materials is done 5 times in a year (February, April, June, August and October). For the period of analysis, 30 measurements were used. The results obtained from the monitoring of biological parameters in rivers are compared with the values specified in the Decree. The Diagram below shows the results of the analysis providing the following findings:

- 20-30 % of analyzed samples correspond with water quality of I class,
- 60-70 % of analyzed samples correspond with water quality of II class,
- Other percentage of analyzed samples correspond with water quality of III class.

Classification of rivers by saprobiological index for the period 2009 – 2013

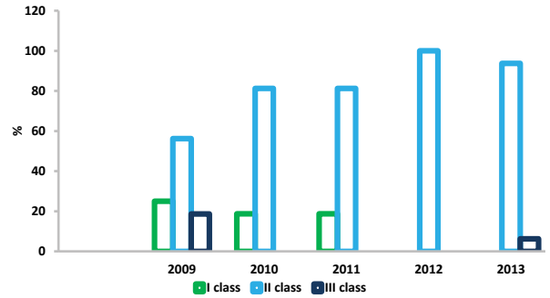


Diagram 33

3.6. Trend in physical-chemical parameters in lakes

The trend in the quality of waters in Ohrid Lake was observed for the period 2008-2012, through measurement of concentrations of dissolved oxygen, total phosphorous and chlorophyll. In the period 2008-2011, samples were taken at one measuring point on a vertical column at ten depths (0, 10, 20, 30, 40, 50, 75, 100, 150, 240), from the plagial of Ohrid Lake, while samples in 2012 were taken at 5 measuring points of the Lake's lithoral.

3.6.1. Dissolved oxygen

Considering the nature of this lake ecosystem, selection of dissolved oxygen as parameter was not by chance.

Production and sustenance of life, as well as biochemical decomposition of organic matters and chemical oxidation of organic waste are not possible in absence of this parameter. Oxygen occurs in water in dissolved condition. It comes into water from atmosphere by absorption (depending on temperature, pressure and water surface area in contact with the atmosphere) and photosynthesis.

As shown on the Diagram below, Ohrid Lake waters correspond with values stipulated for water quality of I class.

Dissolved oxygen in Ohrid Lake for the period 2008 – 2012

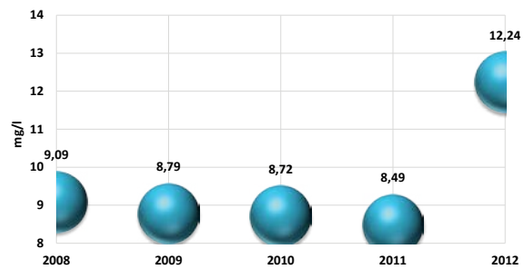


Diagram 34

3.6.2. Total phosphorous

To define phosphorous load, the state of the total phosphorous was monitored. The essential role of phosphorous in biological metabolism on one side, and its low presence on the other, attracts specific interest in it. Primary anthropogenic sources of phosphorous in aquatic bodies include runoffs from urban environments, more precisely waste waters from households, industrial wastewaters, as well as runoff waters from agricultural areas.

The Diagram below shows that, based on the measured concentrations of total phosphorous in the period 2008-2010, the water corresponded with the quality of II class, while improvement in the quality was recorded in 2011 and 2012, when the quality of water was of I class.

Total phosphorous in Ohrid Lake for the period 2008 – 2012

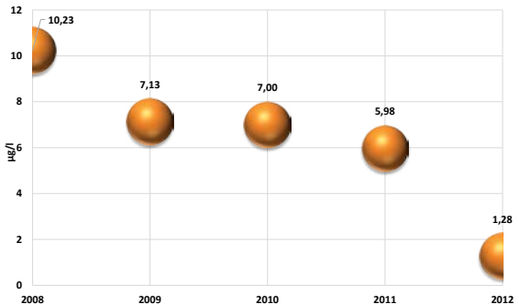


Diagram 35

3.6.3. Chlorophyll a

Chlorophyll enables the process of photosynthesis in algae. Algae grow naturally in lakes. Chlorophyll a is measured to determine the conditions for biological organisms growth and development in the lake.

The Table below presents the measured values of the average annual concentrations of Chlorophyll a in Ohrid Lake for the period 2004, 2005, 2008 and 2012 and lead to the conclusion that waters in Ohrid Lake correspond with the values for quality of I class.

Table 4: Chlorophyll a

Year	Chlorophyll µg/l
2004	1,04
2005	0,79
2008	0,60
2012	1,42

3.7. Trend in the quality of watercourses from environmental health point of view

3.7.1. PHI Veles

This annual report presents data on the safety of water in the following five water bodies: Dojran Lake, Lake Mladost, rivers Vardar, Topolka and Babuna. The safety of water at the measuring points presented here is monitored by the Public Health Center Veles. Data is shown on five Diagrams, for each water body separately and refers to the period 2009 – 2013.

Dojran Lake

In the period 2009 to 2013, all samples taken in the Lake Dojran are in accordance with the Decree on categorization of watercourses, lakes, reservoirs and ground waters and may be used for bathing and recreation for people, irrigation of agricultural land and for the cattle.

Dojran Lake

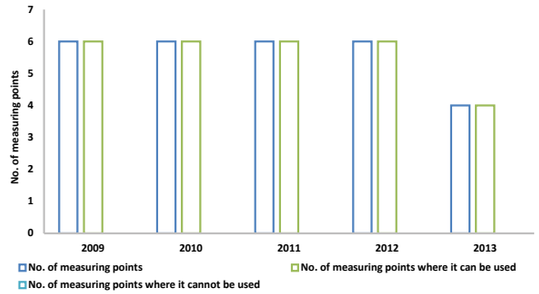


Diagram 36

Lake Mladost

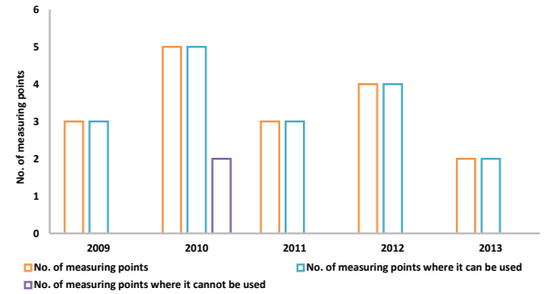


Diagram 37

Lake Mladost

Depending on the year in the period 2009 to 2013, the quality of water in Lake Mladost was monitored at two to five measuring points. All samples taken are in accordance with the Decree on categorization of watercourses, lakes, reservoirs and ground waters and may be used for bathing and recreation for people, irrigation of agricultural land and for the cattle.

River Vardar

PHI Veles monitors the quality of water along the course of the river Vardar at two to eight measuring points, from environmental health point of view. In the analyzed period 2009 – 2013, the results obtained were not in accordance with the Decree on categorization of watercourses, lakes, reservoirs and ground waters and may not be used for bathing and recreation for people, irrigation of agricultural land and for the cattle.

River Vardar

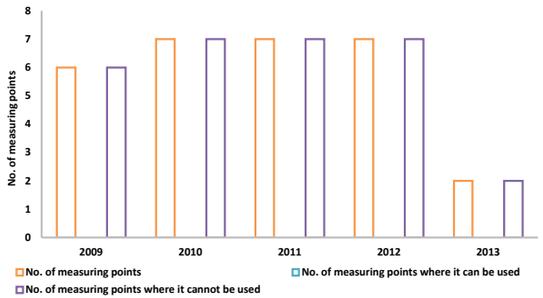


Diagram 38

River Topolka

As shown on the Diagram below, in the period 2009 – 2013, depending on the measuring point along the course of the river Topolka, certain samples are and certain are not in accordance with the Decree on categorization of watercourses, lakes, reservoirs and ground waters.

River Topolka

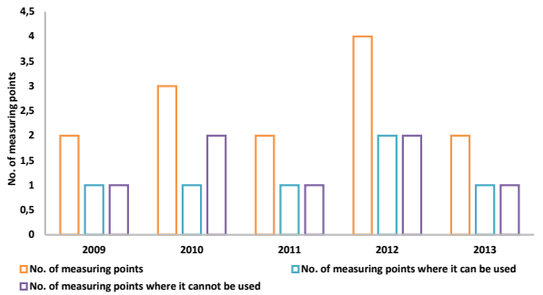


Diagram 39

River Babuna

As shown on the Diagram below, in the analyzed period 2009 – 2013, only in 2009 and 2011 at only one measuring point, water was not in accordance with the Decree on categorization of watercourses, lakes, reservoirs and ground waters, while in 2011,2012 and 2013, water in the river Babuna at all measuring points may be used for bathing and recreation for people, irrigation of agricultural land and for the cattle.

River Babuna

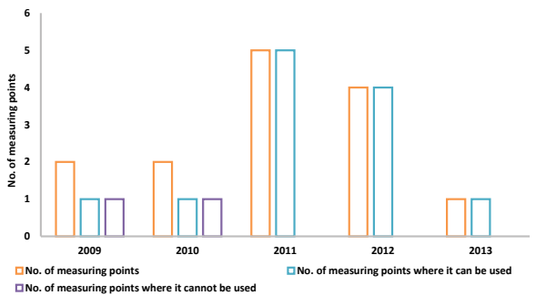


Diagram 40

4. Physical – chemical parameters in Ohrid Lake for 2013

According to the Programme, in the course of 2013, Public Health Institute performed monitoring of water in Ohrid Lake on monthly basis, immediately next to the shore at a depth of 1,5 m, 50 cm beneath water level. Compared to the previous year (2012), no significant deviations were recorded in the composition, i.e. quality of surface water in the Lake.

Table 5

Parameter	Unit	Annual average
pH	/	7.817
KMnO4	mg/L	4.588
El. conductivity	µS/cm	214.333
NH4	mg/L	0,004
NO2	mg/L	0,000
NO3	mg/L	0,360
Cl	mg/L	6.171
SO4	mg/L	8.287
Fe	mg/L	0,255
Mn	mg/L	0,013
F	mg/L	0,131
Cu	mg/L	0,003
Zn	mg/L	0,007
Pb	mg/L	0,001
Cd	mg/L	0,000
Co	mg/L	0,002
Ni	mg/L	0,007
Cr total	mg/L	0,003

5. Status of ground waters

Ground waters are located mainly beneath larger river valleys. There is no sufficient data on the quantity and quality of ground waters. There is limited data on the change in the level of ground waters in Polog valley, Ovche Pole, Kochani Valley, Strumica Fields and Struga Fields. There is also limited information and data on the quality of ground waters in Skopje Fields. Data on water levels was provided by the Hydrometeorological Administration, while data on the quality of ground waters was provided by Public Utility "Water supply and sewerage" - Skopje.

5.1. Quality of ground waters in Skopje Fields

Based on the Decision of the City of Skopje no. 07- 4222/1 dated 24.09.2012, under which the piezometric network built in accordance with legal obligations was transferred by the City of Skopje to Public Utility "Water supply and sewerage" - Skopje for operation and maintenance. Accordingly, the application of ground waters quality monitoring was performed in accordance with the law.

The measured values obtained from the completed monitoring indicate that the quality of ground waters corresponds with the values of water quality specified for quality of water intended for drinking. We should point out that higher concentration of calcium, silica, magnesium, sodium, potassium, chlorides,

sulphates, etc. was due to geological structure, hydrogeological characteristics, nature and origin of waters feeding the ground waters, anthropogenic impacts and mineralization.

Quality of ground waters in Skopje Fields is presented in this report through the concentration of nitrates for 2012 and 2013 (Table). The Table indicates that measured values of nitrates correspond with the values specified for ground waters quality in the Decree on waters classification.

Completed analyses indicate that there are no big changes in the quality of ground waters, except on the measuring points Jurumleri, Brazda – Niva, Creshevo and Nerezi, where improvement in the quality was recorded in 2013, and deterioration in quality compared to 2012 was recorded at the measuring point Kapishtec.

Table 6

Measuring points and period of sampling		Nitrates mg/l			
Period	**Measuring point**	**2012**	**Class- 2012**	**2013**	**Class - 2013**
Autumn / Winter	Radusha - Skolo	53,19	V	38,22	V
Autumn / Winter	Nerezi	12,74	III-IV	2,32	I-II
Autumn / Winter	Grchec	27,08	V	16,10	V
Autumn / Winter	Saraj	no data	/	39,11	V
Autumn / Winter	Kondovo	49,54	V	33,87	V
Autumn / Winter	Volkovo	0,59	I-II	1,41	I-II
Autumn / Winter	Zlokukani	no data	/	10,92	III-IV
Autumn / Winter	Momin Potok	31,31	V	33,09	V
Autumn / Winter	Vizbegovo - Orman	no data	/	14,62	III-IV
Autumn / Winter	Brazda - Niva	23,34	V	9,80	I-II
Autumn / Winter	Brazda - Kuka	13,79	III-IV	12,71	III-IV
Autumn / Winter	Kapishtec	5,08	I-II	16,43	III-IV
Autumn / Winter	Shento	no data	/	6,93	I-II
Autumn / Winter	Creshevo	64,75	V	7,52	I-II
Autumn / Winter	Jurumleri	15,25	V	14,35	III-IV
Autumn / Winter	Oreshani	2,18	I-II	12,56	I-II
Autumn / Winter	Ohis	34,49	V	43,60	V

6. Emissions in waters

Macedonian Environmental Information Centre (MEIC) maintains and updates cadastre of water resources polluters. The first cadastre was made in 2004-2005, and it was upgraded and updated in 2008-2009. The Cadastre contains data on 1000 facilities, including industry, public companies, hospitals, hotels, etc. In 2012, Cadastre updating was made with data only on installations that had obtained or applied for A and B integrated environmental permits located in major cities (Skopje and Bitola) in Macedonia. The analysis indicated that low percentage of received responses was in accordance with the legal requirements, and therefore the report will include only available data.

The Diagram below shows calculated data on the quantities of nutrients (BOD5, COD and nitrates) discharged from the industry into the river basin of Vardar for 2012. The Diagram shows the quantities of discharged nutrients as follows:

- BOD5 - 1947,97 t/year
- COD - 6170,0 t/ year
- Nitrates - 448,865 t/ year

Emissions of nutrients from plants with A and B integrated environmental permit in 2012

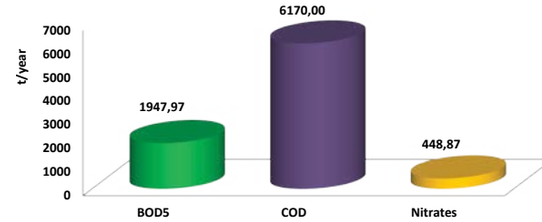


Diagram 41

As for the trend, it is difficult to determine it because the Cadastre was not updated for the whole territory of Macedonia. Full updating and maintenance of the Cadastre is not performed due to lack of financial and human resources, software solution and appropriate legislation to regulate the manner of Cadastre establishment, maintenance and updating.

7. Assessment

This analysis has revealed interesting trends. Although the purpose of this analysis was to identify trends, and not explain them, driving forces are evident. For example, the results obtained support the thesis that climate change affects the available water resources in Macedonia.

As far as oxygen parameters, nutrients and heavy metals are concerned, we may conclude that no significant exceeding was recorded during years, but it is necessary to implement legal obligations under the national law on waters and achieve compliance with the requirements of the EU in order to improve the quality of waters. The analysis completed indicates that the most polluted measuring point is Skochivir located on the river Crna Reka.

We should also point out that monitoring of waters in Macedonia is still carried out on the basis of the legislation of 1999. The new Law on Waters requires preparation of programmes and rulebooks on water monitoring in accordance with the European Framework Water Directive which has been transposed in the national legislation.

This assessment should be further elaborated and investigated in depth. We maintain that the results of this analysis will encourage initiative for further development and analysis of trends by the relevant institutions and organizations.

8. Recommendations

The main point of Macedonia is the management and protection of available water resources, i.e. preservation of existing waters and improvement of their ecological and hydromorphological status.

For that purpose, the following should be accomplished:

- Development of river basin management plans in Macedonia (Vardar, Crn Drim and Strumica)
- Establishment of comprehensive monitoring programme for water quality and quantity
- Development of legislation to establish the method, form and the manner of monitoring performance
- Strengthening of public awareness of water resources protection
- Implementation of legal obligations specified in the Law on Waters
- Procurement of modern technical equipment and accreditation of existing laboratories
- Strengthening of cooperation between relevant institutions
- Establishment of policies and instruments for efficient and cost-effective use of water resources.

SOIL

SOIL

1. Introduction

Soil is defined as top layer of earth cover formed by mineral particles, organic matters, water, air and living organisms. Soil formation is extremely slow process and therefore it can be regarded non-renewable resource. Soil is very dynamic system which performs many functions and provides services that are vital for human activities and ecosystems survival.

- Soil provides food, biomass and other raw materials,
- It is a platform for human activities and archives of geological and archeological heritage,
- It plays central role as habitat and depot of living organisms genes,
- Soil keeps, filtrates and transforms many substances, including water, nutrients and carbon,
- Soil accommodates the greatest carbon depot in the world.

Soil is extremely complex and variable medium. Structure of the soil plays an important role in determination of its abilities for its functions performance. Any damage on soil structure also damages other environmental media and ecosystems.

Soil is susceptible to severe degradations. These include erosion, decline in organic matters, local and diffuse contamination, sealing, biodiversity reduction, salination, flooding, etc. Impacts on soil caused by human activities are constantly increasing and this leads to serious socio-economic consequences.

Dominant type of soil degradation in our country is water erosion, more specifically erosion caused by rain falls and running waters. Furthermore, we should also stress contamination of soil by solid wastes in industry and inadequate disposal of municipal waste, as well as inappropriate use of fertilizers and pesticides in agriculture. Productive stock of arable land in our environment is also declining due to land sealing, for example for construction of settlements and industrial facilities and for construction of different infrastructure projects by which soils becomes permanently unusable for other purposes and uses. Reducing and preventing soil degradation is a great challenge. This should be achieved through introduction of specific policy measures for soil protection and management, as well as integration of soil protection issues into other sectoral policies, namely in agriculture, forestry, waste management, waters management, etc.

2. Defined goals in soil management and protection

The goal which needs to be achieved through soil management and protection has been defined in the 2006 Second National Environmental Action Plan, namely:

- Improvement of the status of soil towards its sustainable use through reduction of erosion, contamination and other types of soil degradation.

Protection of the soil is regulated in several laws concerning protection of environment and nature, as well as management of agricultural land, pastures and forests. Yet, the need to adopt specific law for soil protection in the Republic of Macedonia to treat soil as environmental medium from different points of view has been recognized.

3. State and trends

3.1. Monitoring of soil, cadastre of polluters and soil indicators development

Permanent monitoring, i.e. systematized measurement, monitoring and control of the state, quality and changes in soil as well as environmental media in the Republic of Macedonia does not exist.

With reference to data and information on the status and processes of soil degradation in the Republic of Macedonia, there is erosion map in a 1:50 000 scale produced in 1992, but its digital version was finalized in 2002. There is a map of irrigation network and its data combined with the data from the climate map can be used to assess the areas of soil suspected to salination. Through the project Phare Corina Land Cover 2000 (1996 data), land cover data of the Republic of Macedonia was obtained, based on land cover satellite images decoding. All thus obtained maps of land cover are of scale 1:100 000. On the basis of these data, we may identify areas vulnerable for land erosion, as well as changes incurred through different uses of land. Digital soil map in a scale 1:50 000 is still under elaboration.

In the area of soil degradation and protection monitoring, we should mention the National Waste Management Plan and Feasibility Study prepared under the same name project financed by the European Union and implemented through the European Agency for Reconstruction. In the frames of this project, study for industrial hot-spots was developed in the frames of this project, where based on certain parameters, investigations and application of algorithm, contaminated sites were ranked by the risk they carry for environment and human health.

The second project related to soil monitoring implemented with the support of the Japanese International Cooperation Agency (JICA) was the Study for capacity building in soil contamination management associated with mining in the Republic of Macedonia. This project offers detailed analysis of soil with regard to presence of heavy metals as pollutants generated by mining activities in the eastern part of Macedonia on area of 201.5 km2, as well as capacity in mining concerning pollution management.

Through the process of development and upgrading of the process on national level covering all municipalities in Macedonia of the cadastre of polluters and pollutants of waters and waste generators (2008-2009), general picture of potentially contaminated sites in the Republic of Macedonia and their management was obtained indirectly through data on the type and the quantity of discharged waste waters.

With regard to elaboration and development of soil quality and status indicators, we may conclude that indicators of Progress in contaminated sites management, as well as Land intake, have been developed successfully in Macedonia and information of the mentioned indicators are also delivered to the European Environmental Agency for comparative analyses with other European Environmental Agency member states and collaborating countries.

4. Recommendations

- It is necessary to adopt specific law on soil protection where monitoring of the soil state, protection mechanisms, mechanisms for contaminated soil remediation, etc., will be defined; furthermore, maximum permissible concentrations of heavy metals, certain substances like pesticides, polycyclic aromatic hydrocarbons, halogen hydrocarbons, etc. in soil will be specified;
- Existence of sites with confirmed contamination in the Republic of Macedonia poses the need for undertaking measures and activities for soil remediation on those sites and undertaking of activities to prevent further contamination;
- Prevention of uncontrolled land use change results in sealed soil and its permanent loss;
- Particular attention should be paid to soil erosion and its adequate reduction and prevention through undertaking of appropriate and specific measures and activities;
- Establishment and maintenance of permanent monitoring of soil, as well as public awareness and education level rising of the importance of soil.

BIOLOGICAL DIVERSITY AND NATURE PROTECTION

BIOLOGICAL DIVERSITY AND NATURE PROTECTION

1. Introduction

Biological diversity incorporates the variety of the entire living world on earth, including diversity at the level of ecosystems, species and genes. Biological diversity and ecosystem services contribute to human well-being in different ways.

Abundance and heterogeneity of species and ecosystems are the main features of biological diversity in the Republic of Macedonia.

2. State and trends

2.1. Project activities for nature protection

In January 2013, with financial support from GEF, MEPP initiated the implementation of the Project "Support to Macedonia for revision of the National Biodiversity Strategy with Action Plan and preparation of the Fifth National Report to the Convention on Biological Diversity". Implementation Agency of the project is UNEP Vienna Office. In the frames of this project, in 2013, analysis of the state of biological diversity in the Republic of Macedonia was made for the period 2003-2013, relevant stakeholders were identified and analysis of the main threats to biological diversity was made. Furthermore, analysis of the legal and institutional setup for biological diversity protection was made and list of the relevant strategic documents in the area of biological diversity was composed.

In the frames of the project for protection and sustainable use of Prespa, Ohrid and Scadar Lakes, funded by the German Government (through GiZ Project Office) under the component for wild fauna and flora monitoring, final List of selected key species of the flora and the fauna in Ohrid and Prespa Lakes was made for the purposes of monitoring in a period of one year.

In the frames of the project for Prespa Lake Protection, Study of revalorization of the natural values and Draft Management Plan for Nature Monument Prespa Lake were prepared.

International Day of Biodiversity – 22 May – was marked through cooperation between MEPP and Municipality of Resen, GiZ Project Office – Skopje, Macedonian Ecological Society (MES)-Skopje, National Parks, non-governmental sector, etc.

2.2. National Emerald Network

According to the provisions of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern 1979) and the Law on Nature Protection, four projects were implemented in the period from 2002 to 2008, towards establishment of the National Emerald Network of Areas of Special Conservation Interest (ASCIs). The National Emerald Network covers 35 areas covering an area of 752.223 ha or 29% of the territory of the Republic of Macedonia.

According to international criteria, 42 Important Plant Areas (IPAs), 77 areas as Corine biotopes, 22 Important Bird Areas (IBAs) and 8 Primary Butterfly Areas (PBAs) have been identified on the territory of the Republic of Macedonia.

2.3. National System of Protected Areas in the Republic of Macedonia

Under the Law on Nature Protection, the system of protected areas is established for the purposes of protection of biological diversity within natural habitats, processes going on in nature, as well as abiotic characteristics and landscape diversity.

Designation of an area for protected awards to it the status of natural heritage.

The Law on Nature Protection, which has transposed the criteria of the International Union for Conservation of Nature (IUCN) for protected areas categorization provides for establishment of six categories of protected areas, namely:

1a. Strict Natural Reserve (SNR)

1б. Wilderness Area (WA)

2. National Park (NP)

3. Natural Monument (NM)

4. Park of Nature (PN)

5. Protected Landscape (PL)

6. Multi-Purpose Area (MPA).

Presently, the system of protected areas in the Republic of Macedonia includes 86 areas covering around 9% of the national territory (source of data: CDDA, WDPA, 2013).

On national level, Category Ib - Wilderness Area has not been established yet in accordance with IUCN criteria.

The system of protected areas is in transitional phase, including areas designated in different time periods under different categorizations of IUCN (areas designated under the old categorization of IUCN, areas designated under the new categorization, re-designated areas, areas in a process of re-designation, areas in a process of designation). Namely, according to the Law on Nature Protection, MEPP is obliged to carry out revalorization of protected areas designated prior to the application of this Law (2005) and prepare new acts for designation.

Current status of the number of protected areas distributed in different categories and overall area covered by them is presented in Table 1.

Table 1: Protected areas

	Number of areas	Area ha	% of the territory of Macedonia
Ia - - Strict Natural Reserve (SNR)	2	7787	0,30%
II - National Park (NP)	3	114870	4,50%
III - Natural Monument (NM)	67	78967,49	3,07%
IV - Park of Nature (PN)	12	3045	0,11%
V - Protected Landscape (PL)	1	108	0,01%
VI - Multi-Purpose Area (MPA)	1	25305	0,98%
Total	86	230083	8,94%

Protected areas in the Republic of Macedonia, 2013

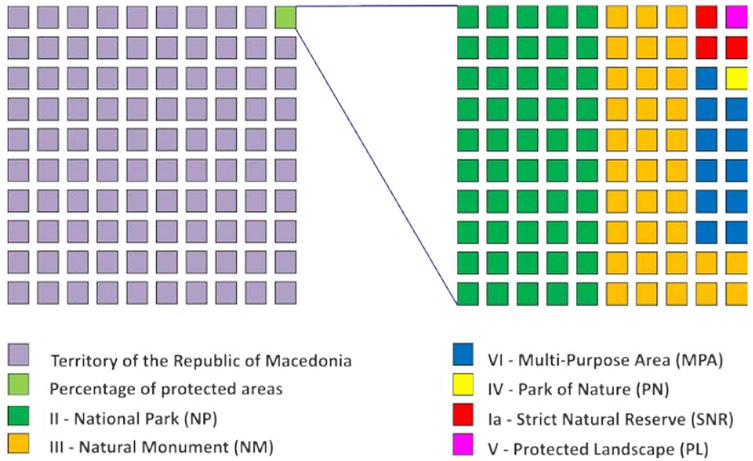


Diagram 1

Most of the protected areas belong to National Parks with around 4.50 %, then Natural Monuments with around 3.07 % and Multi-Purpose Area Jasen with around 0.98 % of the national territory. Relatively small area of 0.30% is occupied by Strict Natural Reserves, then Parks of Nature with 0.11 % of the national territory, and the smallest area of 0.01% is covered by Protected Landscape.

According to Sectoral Study of Natural Heritage (1999) prepared for the purposes of the Spatial Plan of the Republic of Macedonia (2004) for the period by 2020, increase of the portion of protected areas has been envisaged from the current 9% to 11.5% of the territory of the Republic of Macedonia.

2.4. Protected areas of internationally recognized status

2.4.1. UNESCO Sites

On international level, UNESCO's list includes Ohrid region as world natural and cultural heritage (1979), while the tentative list of UNESCO also includes Monuments of Nature Markovi Kuli (King Marco's Towers) and Slatinski Izvor (springs) (2004).

2.4.2. Ramsar Sites

Ramsar list of wetlands of international importance includes two protected areas, Prespa Lake with riparian marsh belts (1995) and Dojran Lake (2007).

2.5. Ecosystems/Habitats (represented by plant communities)

Richness of ecosystem types, habitat types, communities and species position Macedonia at the very top of the list of countries with important biodiversity in Europe (Hot spot).

Namely, based on the explorations completed so far, it has been established that several ecosystem types have formed on the territory of the Republic of Macedonia distributed in seven groups: aquatic, riparian, grass, montane, steppe-like, forest and mountainous ecosystems.

Also, more than 260 plant communities have been registered with domination of grass and forest communities. Species diversity is represented by more than 17.600 taxa of wild flora, fungi and fauna. It is especially significant that as many as 976 endemic species exist in Macedonia, of which 870 species are Macedonian endemites.

2.6. Habitat types

Investigations performed (1993-2013) in the frames of several projects – project to establish CORINE biotopes in the Republic of Macedonia, Catalogue of wetlands, Establishment of National Emerald Network and creation of the National Ecological Network (MAK-NEN) in the frames of the Pan-European Ecological Network (PEEN) identified 32 types of natural habitats.

2.7. Vegetation communities

The number of vegetation communities in Macedonia is high reaching above 270 communities. Forest wood communities with more than 55% dominate, followed by grass communities, lake and river vegetation communities, while smallest areas are occupied by marshy communities and temporal communities.

The analysis made of the structure of forest communities concluded that communities of Kermes oak and white hornbeam (35%) dominate, followed by the community of Pubescent oak and white hornbeam (27.5%), community of Sessile oak (13.5%), then montane beech community (10.6%), submontane beech community (9.7%) and community of five-leaves pine-molika, spruce and Bosnian pine (3.8%).

2.8. Species diversity

Despite of the fact that the overall territory of the Republic of Macedonia covers an area of 25.713 km^2 which is 0.26% of the territory of the European continent, major portion of biodiversity is found in the Republic of Macedonia and it ranges from 33.64% for vascular plants, 14% for freshwater fish, 20.3% for amphibians, 25.2% for reptiles, 64% for birds and 29% for mammals. Biodiversity of the Republic of Macedonia accounts for 70-90% of the overall Balkan biodiversity.

Species biodiversity is represented by more than 17.600 taxa of the wild flora, fungi and fauna. It is especially important that as many as 976 endemic species exist in Macedonia, of which 870 species are Macedonian endemites.

Flora of the Republic of Macedonia is very rich and diverse, represented by 4.028 species, of which 2.169 algae, 354 species of lichens, and 3.674 species of

plants. Recent flora of higher plants is mosaic of most diverse floral elements (Tertiary relicts, Mediterranean, Greek-Asia Minor, Ilyrian, Caucasian, Central European, Scardo-Pinean, Euroasian, Arcto-Alpine, Cosmopolitan), out of which 228 species are endemic (Balkan, South Balkan, Macedonian). Most of the endemic plant species 0 114 – are registered as angiosperm plants.

Fungi represent very heterogeneous group of organisms and thus explorations have been so far targeted at phyla Ascomycota and Basidiomycota, while others are poorly explored. The total number of studied and registered self-sown fungi on the territory of the Republic of Macedonia is 1245 species. Most of those belong to the phyla Myxomicota (10), Oomycota (20), Zygomicota (35), Ascomycota (130) and Basidiomycota (1.050).

The main feature of faunal diversity is the high extent of taxonomic diversity represented by 10.354 species and 228 subspecies or 10.582 taxa in total.

The group of invertebrate wild animals (Invertebrata) is represented with 9.819 species, 635 of which are endemic. However, detailed analyses of the state of threat to species by taxonomic groups have not been completed yet, and therefore only 25 invertebrate animals are mentioned preliminary.

The group of vertebrate wild animals (Vertebrata) is represented with 535 species, 31 of which are endemic. Class of fish (Pisces) includes 78 species, of which 27 species are endemic (34.5%). No endemic species have been registered in the classes of amphibians (Amphibia), reptiles (Retilia) and birds (Aves), while in the class of mammals (Mammalia) 4 endemic species have been registered. Furthermore, with regard to the extent of threat to populations of vertebrate animals, the class of fish has 17 species in the category of globally threatened species. It is of particular importance that the fauna of vertebrate animals includes 113 species enrolled in the European Red List, including: 30 species of fish, 66 species of birds, 16 species of mammals and 1 species of reptiles. The National Red List of threatened species of fauna is in a process of elaboration. Data on the number of species is presented on Diagrams 2 – 4.

Number of endemic and endangered wild plant species

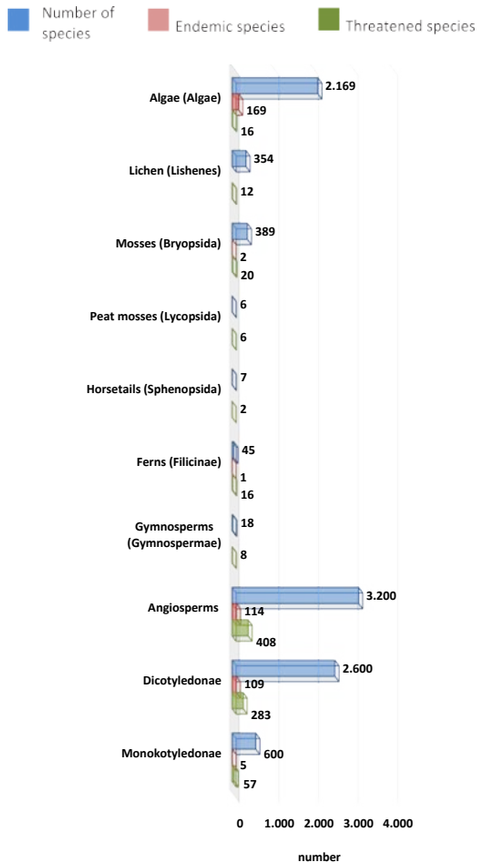


Diagram 2

Number of endangered fungi

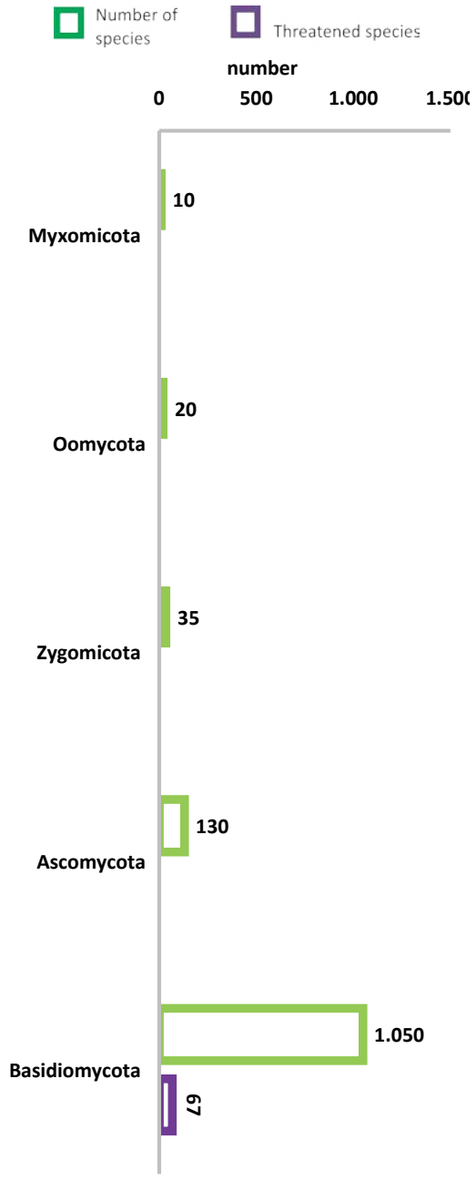


Diagram 3

Number of endemic and endangered species

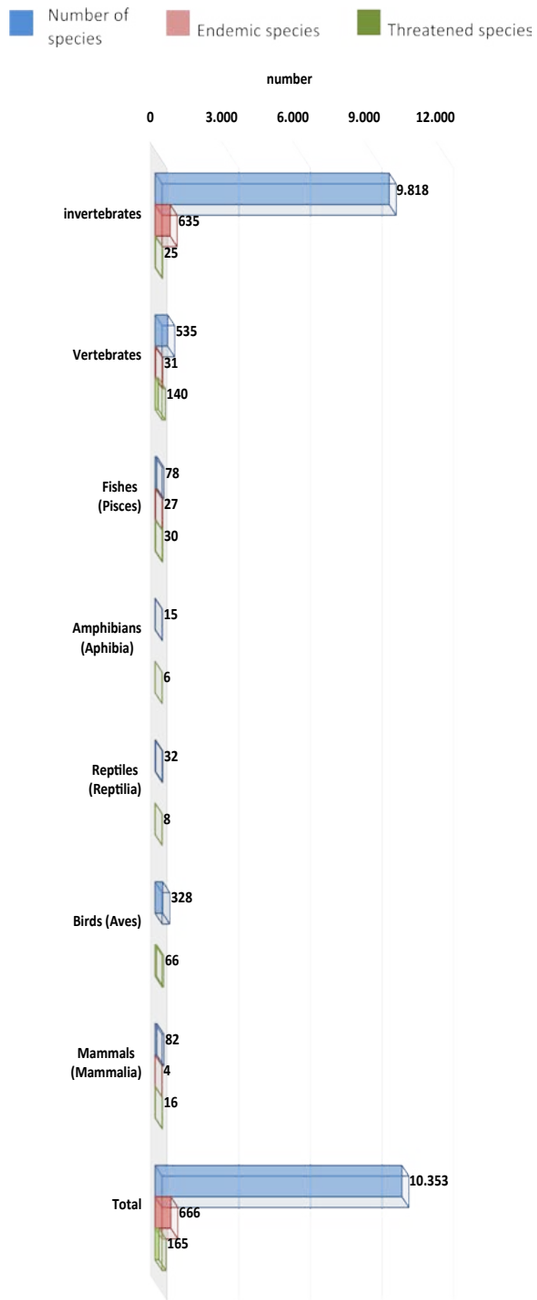


Diagram 4

Identified "Emerald" species have particular importance in species diversity. Namely, total of 165 species have been identified, of which: 6 species of invertebrate animals, 154 species of vertebrate animals (12 species of fish, 3 species of amphibians, 7 species of reptiles, 115 species of birds and 17 species of mammals) and 5 plant species. Data is presented on Diagram 5.

Number of Emerald types identified in Macedonia

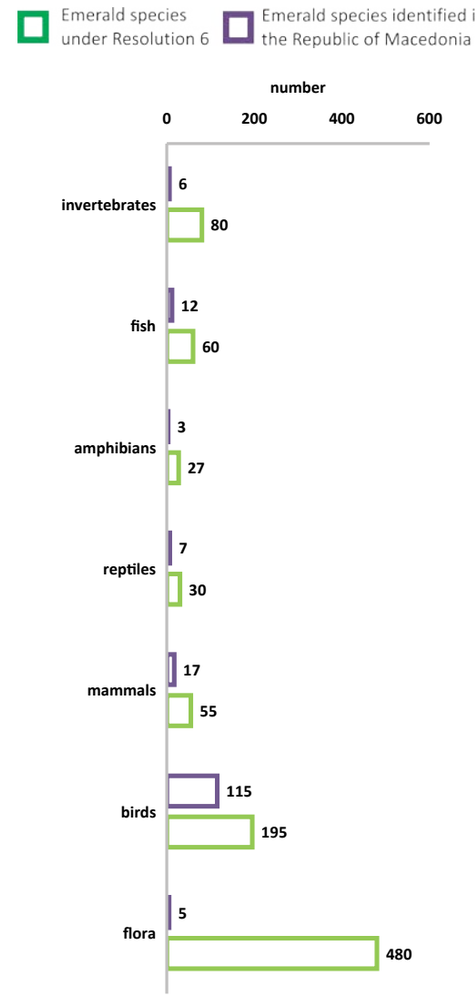


Diagram 5

2.9. Scientific research in nature

Significant contribution on national level in the Bo Republic of Macedonia is provided by scientific and technical institutions and non-governmental expert organizations working in the field of protection and study of the natural heritage and biodiversity in Macedonia.

In the course of 2013, a number of scientific research was carried out in nature with regard to biological diversity components, namely: research of the populations of White Stork from Prilep, Pelagonia and Tikvesh region (Manastirec and Rosoman), especially to establish genetic link with populations of the same species in other regions; research of the populations of several reptile species in NP Mavrovo, NP Galichica, Shar Planina and area of Dojran; research of the populations of Macedonian bees of the native Macedonian subspecies (Apis melifera macedonica) on the island of Golem Grad; research of the changes in the communities of butterflies and moths caused by abandonment of arable land areas in Prilep and its surroundings; researches aimed at conserving the populations of Egyptian vulture in Taor Gorge, Babuna Mountain and Mariovo.

Multi-annual research included in the Programme for Balkan lynx recovery was implemented through the project: "Status, ecology and occupation of territory by the critically endangered Balkan lynx in Macedonia and Albania", enabling detailed approach to the survey of biology and ecology of one of the most endangered populations of cat family in the world.

Society for Birds Study and Protection of Macedonia (SBSPM) organized trainings in the Information Centre in the village Asamati on Prespa Lake for research groups for birds and bats monitoring.

Speleological Society “Peopni Skopje” in cooperation with scientific experts from Tur de Valat, Belgium and PNMM, Macedonia, carried out training of research groups in monitoring performance for bat populations in underground morphological structures – caves in Skopje and Gostivar regions, and issued prospects on bats monitoring with bat detectors.

3. Brief assessment and possible development

3.1. Legislation on nature protection

The basic Law regulating nature protection through conservation of biological and landscape diversity and protection of natural heritage in and outside protected areas, as well as protection of natural rarities is the Law on Nature Protection (Official Gazette of the Republic of Macedonia no. 67/04, 14/06, 84/07, 35/10, 47/11, 148/11 и 59/12, 13/13, 163/13 and 41/14).

The main goals of the Law on Nature Protection are as follows:

1. Determination and monitoring of the state of nature;
2. Conservation and restoration of the existing biological and landscape diversity in a state of natural balance;
3. Establishment of a network of protected areas for the purpose of sustainable protection of the features on the basis of which they have acquired the status of natural heritage;
4. Providing for sustainable use of natural wealth in the interest of the present and future development, without significant damage of parts of the nature and with the least possible disturbance of natural balance;
5. Prevention of harmful activities of individuals and legal entities and disturbance in nature as a result of technological development and performance of activities, i.e. providing for the best possible conditions for protection and development of the nature;
6. Providing for the citizen to exercise their right to healthy environment.

In 2013, Assembly of the Republic of Macedonia adopted the Law amending the Law on Nature Protection (Official Gazette of the Republic of Macedonia no.13/13), by which further transposition was made of the provisions of Directive on Wild Birds Conservation (2009/147/EC) and Directive on the Conservation of Natural Habitats and Wild Fauna and Flora (92/43/EEC).

In the segment of more efficient enforcement of the Law on Nature Protection concerning provision of financial resources in protected areas, the Government of the Republic of Macedonia took Decision for issuance of consents to the Decisions of the Public Institutions of the National Parks Pelister, Mavrovo and Galichica to set the level of the fees for entry and visit, parking, stay and collection of wild plant species in the National Park.

In the course of 2013, cooperation of MEPP with the Public Institutions of the National Parks Pelister, Mavrovo and Galichica and other protected areas managing entities, local self-governments, inspection services, scientific and technical institutions, other stakeholders (farmers, land owners, hunters and fishermen), non-governmental sector involved in nature protection, was strengthened, through organization of meetings, workshops and trainings.

4. Recommendations

In order to ensure promotion in the protection of biological diversity and nature protection, it is necessary to:

- finalize the inventory and assessment of threatened species;
- adopt Red list of threatened species and respective Red Book for these species protection and conservation.
- finalize re-evaluation and re-designation of all protected areas in accordance with the Law on Environment.
- proceed with the expansion of the system of protected areas in a way representing the key habitats of importance for biodiversity conservation to be supported by local rural communities.
- Adopt management plan for individual protected areas.

GENERAL ENVIRONMENTAL ISSUES

INTERNATIONAL COOPERATION

1. Introduction

Environment does not recognize administrative borders and cross-border cooperation for natural goods preservation is also an obligation towards generations to come. To that end, the Ministry of Environment and Physical Planning, since its foundation to present, has been nourishing bilateral cooperation with particular attention as crucial part of its work programme. Protection, promotion and sustainable development of the three natural lakes and border mountain massifs shared by the Republic of Macedonia with its direct neighbours is imperative in the exercise of bilateral and trilateral cooperation.

Cooperation in the area of environment in global and Pan-European context is carried out in the frames of international organizations, such as United Nations Economic Commission for Europe (UNECE), United Nations Development Programme (UNDP) United Nations Environmental Programme (UNEP), United Nations Industrial Development Organization (UNIDO), Global Environmental Facility (GEF), UNESCO's Man and Biosphere Programme, Council of Europe and Organization for Security and Cooperation in Europe (OSCE) and international financial institutions (IFIs), such as World Bank, European Investment Bank (EIB) and European Bank for Reconstruction and Development (EBRD); in parallel with this, it carries out technical cooperation with Japanese Government through Japanese International Cooperation Agency – JICA.

2. Multilateral and Bilateral Cooperation

The Ministry has continued with the implementation of current projects, as well as negotiations for future possible projects in the area of environment. It has maintained regular contacts on bilateral level and taken part in international and regional events in line with the obligations deriving from conventions and bilateral memoranda for cooperation signed and ratified by the country, as well as in meetings on bilateral level.

Bilateral cooperation:

- Analysis has been planned for areas of interest to individual donors towards continuation of the cooperation with Sweden and potential bilateral projects with Check Republic, Slovakia, Turkey, Hungary, Croatia, Slovenia, Kosovo, Montenegro, Serbia and Bulgaria.

Continuous

- establishment of internal system for coordination of bilateral cooperation and current coordination with the MFA with regard to bilateral cooperation of MEPP in the area of environment – communication of information for preparation of political consultations of the President of the country, Prime Minister, MFA.

Continuous

- work in the Operational team for IPA programming for Component 2 – Cross-border cooperation, permanent coordination and participation in Common Committees for monitoring of cross-border Programmes where MEPP is a voting member, in coordination with the Ministry of Local Self-government. MEPP contributes actively to the implementation of the Cross-border programme through participation in meetings of the Management bodies of the Operational programmes, Component 2, in cross-border cooperation with Albania, Bulgaria, Kosovo and Greece.

- Regular coordination of Japanese assistance – activities are carried out in cooperation with JICA and active participation in the adjustment of the implementation of different projects and trainings of MEPP's staff in Japan.

Multilateral cooperation:

- Implementation of the World Heritage Convention on national and international levels (part on natural heritage) and Law on Ohrid region as World natural and cultural heritage.

- Participation of Macedonian representatives in UNESCO and MAB Programme (Man and Biosphere) in sessions and workshops.

- Established National Commission for implementation of MAB Programme (Man and Biosphere), initiated activities for establishment of the First Transboundary Biosphere Reserve; prepared Draft Application for Transboundary Biosphere Reserve between Macedonia and Albania for Ohrid-Prespa Region.

- Cooperation with UNEP:
  - participation in the work of individual bodies of UNEP, Governing Council, etc.
  - payment of membership fees to Global UNEP Facility per international agreements (Bonn Convention, Bats Agreement, CITES, Basel Convention, Stockholm Convention, Agreement on African and Eurasian Water Birds).

Multilateral agreements:

- Monitoring and analysis of activities in the frames of the three Rio Conventions (Convention on Biological Diversity, Convention on Climate Change and Convention to Combat Desertification)

Continuous

- Monitoring and analysis of activities in the frames of the 5 UNECE Conventions.

Continuous

- Cooperation with GEF
  - Following GEF Council meetings and analysis of adopted decisions
  - proposing activities on national level upon adopted decisions
  - programming of projects in the frames of GEF Star 5 2010-2014

Continuous

- Cooperation with the Council of Europe
  - Following the meetings of the Council of Europe and analysis of adopted decisions
  - proposing activities on national level upon adopted decisions
  - participation in CEMAT Conference

- cooperation with the centre of NATUROPA
- participation in the work of PEBLDS
- participation in the meeting of the expert group for Emerald network development
- participation in the meeting of the expert group for PEEN network development
- following activities that derive from Landscape Convention
- following activities that derive from Bern Convention;

Continuous

- Cooperation with REC
  - participation in the work of the General Assembly of REC
  - participation in regional projects
  - cooperation with REC Country Office in Skopje

Continuous

- ENV SEC Initiative – Coordination and following the activities on national level and participation in the work of the Initiative;

Continuous

ENVIRONMENTAL LEGISLATION IN THE REPUBLIC OF MACEDONIA

In the frames of the EU integration process, the Ministry of Environment and Physical Planning has noted high progress in the approximation of the national legislation with the EU law. So far, all framework laws in the area of environment have been adopted upon their approximation with the EU law and most of the national legislation has been completed in all areas of environment.

According to the 8th completed Progress monitoring – screening (which is under direct supervision of the Directorate General of Environment of the European Commission), monitoring the process of approximation of the national environmental legislation with the EU law and its implementation for 2013, the status of transposition of the EU law for the area of environment is as follows (average value of percentage per area):

- Horizontal legislation - 79 %
- Quality of air- 66.35 %
- Waste management - 81 %
- Quality of water – 60.53 %
- Nature protection - 55 %
- Control of industrial pollution - 75 %
- Climate change - 37 %
- Noise – 100%

For the coming period, it has been envisaged to continue with further approximation of the national legislation with the EU law in order to reach full transposition in the Chapter of Environment, concerning especially transposition of EU law of later date.

The List of laws and bylaws in the area of environment is enclosed in Annex 2 of this document.

STAKEHOLDERS IN THE PROTECTION OF THE ENVIRONMENT

In the implementation of its annual activities, the Ministry of Environment and Physical Planning cooperates with many institutions on national and local level. Active cooperation has been exercised with almost all ministries, especially with the Ministry of Agriculture, Forestry and Water Economy, Ministry of Transport and Communications, Ministry of Economy, Ministry of Health, Ministry of Education and Science, Ministry of Labour and Social Policy, Ministry of Local Self-Government, Ministry of Culture, Ministry of Finance, as well as institutions of the Assembly of the Republic of Macedonia:

- Commission for transport, communications and ecology, President of the Republic of Macedonia, People's Ombudsman, and from among educational institutions with Macedonian Academy of Science and Arts, institutes, universities, then Centre for Crisis Management, Directorate for Rescue and Protection, units of the local self-government, HMA, economic chambers, different agencies, State Statistical Office, National and regional institutes for health protection, National Parks, Customs Administrations, etc.

Furthermore, MEPP has established notable cooperation with civil associations acting in the area of environment, based on the Strategy of the Government for cooperation with civil associations, postulates of the Aarhus Convention, Law on Environment and MEPP's Annual Programme. The database elaborated and updated in the Public Relations Department includes around 80 active organizations working in the area of environment, as well as Organization of the Red Cross of Macedonia as the largest voluntary organization in the country. Particularly fruitful cooperation has been accomplished with the regional network – Regional Environmental Centre for Central and Southeastern Europe (REC) – Country Office in Skopje.

For the purpose of improved communication, facilitated implementation of joint initiatives towards protection and improvement of the conditions in the environment, as well as for easier involvement of the public in decision and policy making, Coordinative Body was established in 2013 for cooperation and dialogue between the Ministry of Environment and Physical Planning and civil associations working in the area of environment.

Macedonian Green Centre has the function of administrative support with person in charge from among civil organizations as Chair person of the Body, while on the side

of MEPP administrative support is provided by the Public Relations Department through person delegated by MEPP. Cooperation and coordination have been defined by the following themes:

- Public communication and information
- Spatial planning and Strategic Environmental Assessment
- Sustainable development and environmental investments
- EU integration and legislation
- Climate change
- Sustainable energy sources/Energy
- Environmental inspections
- Water
- Air (noise)
- IPPC, EIA
- Biodiversity
- Waste

During 2013, new form was prepared to update data of civil associations and these organizations are clustered by the field of interest.

EDUCATION AND PROMOTION OF THE ENVIRONMENT

With regard to education and public awareness rising, MEPP through Public Relations Department, carried out series of activities (in accordance with the Programme) with direct effect on the increase in the level of environmental education, as well as development of positive habits towards environment, among children, youth and general public.

1. "Green Package – Junior"

Development of ecological education in the frames of educational system is carried out in cooperation with the Ministry of Education and Science and Ministry of Labour and Social Policy. We should point out the implementation of educational programme "Green Package-Junior" as an extension of the existing programme "Green Package" which covered children at primary school. Particular contribution was achieved through development of this multi-media educational package with Braille alphabet thus enabling its use by children with sight impediments.

Thematic workshops were organized in several pre-school institutions, including New Year's Eco-Workshop and workshop on climate change. During visits organized for groups of children from kindergartens from Skopje and surrounding populated places in the Public Relations Department, thematic lectures were made on climate change and waters treatment.

2. GLOBE PROGRAM

GLOBE is global scientific and educational programme coordinating the work of students, teachers and scientists, in order to study and understand global environment. The Program involves countries from all over the world and it is led by US Government in partnership with other countries. So far, the Program was joined by 112 countries with 25 258.

GLOBE Program in Macedonia started back in 1998. During the period of the GLOBE network presence in Macedonia, the interest in the Program among students and teachers has increased significantly. So far, it has comprised 19 schools, of which 5 primary and 14 secondary schools. GLOBE

Program in Macedonia has five main topics of exploration:

- Atmosphere
- Hydrology
- Land cover
- Soil and
- Phenology.

Macedonian Environmental Information Centre prepared and published the publication - GLOBE Teachers' Guide available to all teachers and students in printed and electronic form through the web site of GLOBE Program.

While implementing the GLOBE Program, students learn through observation of the state of environment in areas explored, deliver data on daily basis via the Internet to GLOBE server in USA from where they receive maps with data from measurements, analyze data and cooperate with GLOBE scientists and other students in the world.

Teachers involved in the GLOBE Program receive appropriate training in new procedures and protocols for collection, processing and delivering data through Internet to the central server in USA, educational materials, video tapes, CDs, communication with teachers from other countries and communication with scientists from all over the world.

In the past period, seven GLOBE seminars were organized resulting in training of 71 GLOBE teachers who implement the Program in their schools in the country.

In 2010, Macedonia hosted the 6th Annual Conference of GLOBE Europe and Eurasia (1-6 June, Ohrid). The event was attended by around 70 participants from 23 countries from Europe and Asia.

3. Campaigns to protect the environment

The following national campaigns were implemented in the course of 2013.

3.1. "Macedonia Free of Waste 2013"

"Macedonia Free of Waste 2013" is a campaign carried out for the second time in 2013 under the Decision of the Government in order to reduce the quantities of inadequately disposed waste and raise the public awareness of proper waste treatment. Activities were carried out in two phases. The first phase in August focused on cleaning activities in national parks (NP Pelister, NP Galichica and NP Mavrovo), involving the four units of local self-government, namely: Bitola, Ohrid, Resen and Mavrovi Anovi, public utilities, high number of civil associations, including mounteneering and bicycling associations, Red Cross, scout squads, children staying on Pelister for rehabilitation and high number of state institutions.

The second phase was carried on 5 October with great action for waste cleaning on the whole territory of the country, by which Macedonia joined the global action - Let's do it! World Cleanup 2013. The action was officially supported by the European Parliament and in 2013 involved 107 countries from all over the world.

The national campaign took place at total of 386 registered locations in 70 municipalities in the country and resulted in 19.685 m3 and 12.801 tons of waste collected. Besides municipalities and their public utilities, activities also involved around 70 schools with over 3700 students, 21 civil associations, 11 companies, and the total number of recorded participants was 61.637. Also, institutions whose representatives are members of the Coordinative Body took active part, namely: Centre for Crisis Management, Directorate for Protection and Rescue, General Headquarters of ARM, Ministry of Education and Science, ZELS, Ministry of Agriculture, Forestry and Water Economy, Ministry of Health, etc. Support was also granted by the Office of the President of Macedonia, representatives' groups, as well as representatives of diplomatic offices in the country.

The action consisted of activities for waste cleanup, education and promotion. All events were recorded on the web site of the association "Come on Macedonia" and international network "Let's do it world 2013".

The action was announced intensively in media which secured its wide participation by the general public. Also, the action itself was well covered by electronic and printed media, with numerous media presentations, and information was distributed through social networks, too. Media partner of the campaign was Media Print Macedonia which distributed flyer through their editions.

It was generally assessed that the campaign achieved great massiveness and interest among national and local institutions, but also among general public. This will definitely improve the attitudes and the awareness of citizens for proper management of the waste and contribute to the development of mechanisms for support by citizens, municipalities and other interested parties for better coping with unorganized and illegal waste throwing in their communities.

3.2. Days of actions for climate

Particular progress was achieved in public awareness raising and education in the area of climate change, by way of organizing activities under the Strategy for communication and public awareness rising in the area of climate change. As support to the 19th Meeting of the Parties to the UN Convention on Climate Change (COP 19) held in Warsaw from 11 to 22 November 2013, MEPP through its Public Relations Department and UNDP carried out the campaign under the title "Climate changes – adapt! – Days of actions for climate 11-22 November 2013".

In the course of the 12 days, series of activities were carried out intended for general public, as well as specific activities to mobilize and educate media as target group. In accordance with the Action Plan, the following activities were carried out within the campaign:

- Briefing of journalists – involving the Minister of Environment and Physical Planning, National Focal Point of UN Framework Convention on Climate Change (UNFCC), UNDP Programme Manager for Environment and Energy;
- Series of daily broadcasting of articles and programs on national television;
- Half an hour discussion with the Minister of Environment and Physical Planning, National Focal Point of UN Framework Convention on Climate Change (UNFCC) in contact program in the peak term at the national

television;

- Participation of the Minister in the afternoon news in Albanian;
- Round Table “Climate change impact on tourism sector and possibilities for adaptation”;
- Training of representatives of institutions dealing with cultural heritage: “Assessment of vulnerability of cultural heritage to climate change”;
- Promotion of the Report on climate change impact on cultural heritage;
- Promotion of documentary film “After the rain” on climate change in the frames of the film festival Cinedays.
- The film was tailor-made in the frames of the Project “Third National Communication on Climate Change”.

4. Marking the days of ecological calendar

Specific activities of public environmental awareness rising are those marking the days of the eco-calendar. Notable activities were carried out on the occasion of 5 June – the Day of Environment, 16 September – Day of Ozone Layer Protection and 22 September – Car Free Day.

On the occasion of the European Mobility Week 2013 (16-22 September), the Ministry of Environment and Physical Planning in cooperation with the Delegation of the European Union and in partnership with the City of Skopje organized cycling parade in a length of 10 kilometers through the main streets of the city. The event under the title “Clean air – it is your turn” was aimed at influencing the awareness of the value and benefits of the use of alternative and sustainable means of urban transport. The event was supported by ministers, MPs, mayors, representatives of diplomatic corps in Macedonia, students, cycling associations, civil societies and citizens.

The Ministry of Environment and Physical Planning, in its annual programme activities aimed at supporting projects for environmental awareness promotion has incorporated the requirements and the goals of the National Youth Strategy and Action Plan for its implementation and cooperates actively with the Ministry of Education and Science and Coordinative Body to implement the set goals.

Furthermore, the Ministry of Environment and Physical Planning, in the frames of its competences and in cooperation with the Ministry of Education and Science, contributes to and supports the implementation of the Action Plan and activities proposed in the Strategy for gradual increase of the level of students’ participation in school sports for the period 2014-2016 in the segment of involving the students in the climbing along delineated mountaineering paths and organization of cross-country at secondary school level.

ANNEX 1

Bilateral Agreements

NAME OF INTERNATIONAL AGREEMENT	STATUS
TRILATERAL AGREEMENTS	
Declaration on the creation of the Prespa Park and the Environmental Protection and Sustainable Development of the Prespa Lakes and their Surrounding (Macedonia, Greece and Albania, 02. 02. 2000, Agios Germanos, Greece) A greement on the Protection and Sustainable Development of the Prespa Park Area (Macedonia, Greece, Albania and European Commission, 02. 02. 2010, Pili, Greece) – Ratification envisaged in 2011	Planned activities: Establishment of Management Committee
BILATERAL AGREEMENTS	
Agreement between the Government of the Republic of Macedonia and the Government of the Republic of Croatia on Cooperation in the Field of Environmental and Nature (2002, Zagreb) Protection	Agreement was signed on 01.03.2002 in Zagreb, Republic of Croatia. Agreement was ratified by Law on Ratification (Official Gazette of RM no. 13/2003).
Agreement on Cooperation in the Field of Environment and Nature Protection between the Government of the Republic of Macedonia and the Government of the Russian Federation (1998, Moscow)	Agreement was signed on 27.01.1998 in Moscow, Russian Federation. Agreement was ratified by Law on Ratification (Official Gazette of RM no. 16/98).
Agreement between the Government of the Republic of Macedonia and the Government of the Federal Republic of Yugoslavia on Cooperation in the Field of Environment (2002, Belgrade)	Agreement was signed on 19.07.2002 in Belgrade, SR Yugoslavia. Agreement was ratified by Law on Ratification (Official Gazette of RM no. 13/2003)
Agreement between the Ministry of Environment of the Republic of Macedonia and the Ministry of the Environment and Waters of the Republic of Bulgaria on Cooperation in the Field of Environmental Protection (2000, Sofia)	Agreement was signed on 09.06.2000 in Sofia, Republic of Bulgaria. The Agreement is not ratified as it is concluded between ministries.
Memorandum of Understanding concerning Cooperation in the Field of Environmental Protection and Sustainable Development between the Macedonian Ministry of Environment and Physical Planning and the Albanian Environmental Agency (2000, Pogradec)	Memorandum was signed on 07.09.2000, in Pogradec, Republic of Albania. It is not ratified as it is concluded between ministry and agency.
Memorandum of understanding and cooperation in sustainable development and the environment between the Party of the Second Part to the New York Interim Accord, of September 13, 1995 and The Party of the First Part to the above Interim Accord (2000, Skopje)	Memorandum was signed on 04.09.2000 in Skopje, Republic of Macedonia. It is not ratified as it is concluded between ministries.
Letter of Intent between Republic of Macedonia and Province of Low Austria on Establishment of Friendship and Cooperation in the Field of Environmental Protection (06.11.2000, St.Pelten)	
Protocol on Cooperation in the field of Environmental Protection between the Ministry of Environment and Physical Planning of the Republic of Macedonia and Ministry of Environment of the Czech Republic	Protocol was signed on 17.06.2004 in Prague, Check Republic.
Memorandum of Understanding between the Ministry of Environment and Physical Planning of the Republic of Macedonia and the Ministry of Environment and Territory of the Republic of Italy on cooperation in the field of environment and Sustainable Development	Memorandum was signed on 23 August 2005, Rimini, Republic of Italy.

NAME OF INTERNATIONAL AGREEMENT	STATUS
Agreement on cooperation in field of Environmet between the Ministry of Environment and Physical Planning of the Republic of Macedonia and the Ministry of Environment and Waters of the Republic of Hungary	Agreement was signed on 14 October 2005, Skopje, Republic of Macedonia.
Agreement on cooperation in field of Environmet between the Ministry of Environment and Physical Planning of the Republic of Macedonia and the Ministry of Environmental protection and Physical Planning of the Republic of Montenegro	Agreement was signed on 18 March 2006, Podgorica, Montenegro.
Memorandum of Understanding on Cooperation in the field of Environment between the Ministry of Environment and Physical Planning of the Republic of Macedonia and the Ministry of Environment and Forests of the Republic of Turkey	Memorandum was signed on 19 March 2007, Skopje, Republic of Macedonia.
Memorandum of Understanding between the Ministry of Environment and Physical Planning of the Republic of Macedonia and Ministry of Environment and Physical Planning of the Republic of Slovenia on Cooperation for the implementation of the Kyoto Protocol to the UN Framework Convention on Climate Change	Memorandum was signed in 2006.
Memorandum of Understanding between the Ministry of Environment and Physical Planning of the Republic of Macedonia and Ministry of Environment and Physical Planning of the Republic of Slovenia for Technical Cooperation in the Project "Environmental Impact Assessment of the Army Training Polygon Krivolak" and its management (2006)	
Agreement on the cooperation in the field of environmental protection between the Ministry of Environment and Physical Planning of the Republic of Macedonia and the Ministry of Environmental Protection of Ukraine	Agreement was signed in November 2010 in Kiev, Ukraine.
Agreement between the Government of the Republic of Macedonia and the Council of Ministers of the Republic of Albania for the Protection and Sustainable Development of Lake Ohrid and its Watershed	Agreement was signed on 17.06.2004 in Skopje, Republic of Macedonia.
Agreement between the Government of the Republic of Macedonia and the Government of the Federal Republic of Yugoslavia on Cooperation in the Field of Environment (2002, Belgrade)	Agreement was signed on 19.07.2002 in Belgrade, SR Yugoslavia. Agreement was ratified by Law on Ratification (Official Gazette of RM no. 13/2003).
Memorandum of understanding on cooperation in the field of environment protection and spatial planning between the Ministry of Environment and Physical Planning of Republic of Macedonia and the Ministry of Environment and Spatial planning of Republic of Kosovo	Memorandum was signed on 09.03.2012 in Pristine, Kosovo.
Memorandum of Understanding between the Ministry of Environment and Physical Planning of the Republic of Macedonia and the Ministry of Rural Development of Hungary on Cooperation in the field of Water Management	Memorandum was signed on 05.12.2013 in Skopje, Republic of Macedonia.

Multilateral Agreements acceded to by the Republic of Macedonia

NAME OF INTERNATIONAL AGREEMENT	STATUS
FRAMEWORK CONVENTIONS IN THE AREA OF ENVIRONMENT	
Convention on Environmental Impact Assessment in a Transboundary Context (ESPO) Convention, February 1991)	The Convention was ratified by the Law on Ratification (Official Gazette of RM no. 44/99)
Protocol on Strategic Environmental Assessment (2003)	This Protocol was adopted under the Espoo Convention. Republic of Macedonia signed the Protocol in Kiev, Ukraine, May 2003, at the 5th "Environment for Europe" Ministerial Conference. The Protocol has not been ratified.
Multilateral Agreement between countries of Southeastern Europe concerning implementation of the Convention on Environmental Impact Assessment in a Transboundary Context (2008)	This Agreement was adopted under the Espoo Convention. Republic of Macedonia signed the Agreement in Bucharest, Romania, May 2008 during the 4th Meeting of Parties to the Espoo Convention. The Agreement was ratified by Law on Ratification (Official Gazette of RM no. 157/10).
Convention on Access to Environmental Information, Public Participation in Environmental Decision Making and Access to Justice in Environmental Matters (Aarhus)	The Convention was ratified by Law on Ratification (Official Gazette of RM no. 40/99).
Protocol on the Pollutants Release and Transfer Registry	This Protocol was adopted under the Aarhus Convention. Republic of Macedonia signed the Protocol in Kiev, Ukraine, May 2003, at the 5th "Environment for Europe" Ministerial Conference. The Protocol was ratified by Law on Ratification (Official Gazette of RM no. 135/2010).
TCONVENTIONS IN THE AREA OF NATURE PROTECTION	
Convention on Biological Diversity (Rio)	The Convention was ratified by the Law on Ratification ("Official Gazette of RM" No.54/97). It entered into force in 1998
Cartagena Protocol on Biosafety (Cartagena Protocol)	This Protocol is based on the Convention on Biological Diversity. It was adopted at the last meeting of the Expert Task Force in Montreal, on 29.01.2000. Republic of Macedonia signed it on 26 July 2000. The Protocol was ratified by the Law on Ratification ("Official Gazette of RM" no. 40/2005).
Convention on Wetlands of International Importance, Especially as Waterfowl Habitats (Ramsar,1971)	The Convention was ratified by the Decree on Ratification ("Official Gazette of SFRY" No. 9/77).
Convention on the Conservation of Migratory Species of Wild Animals (Bonn, 1979)	The Convention was ratified by the Law on Ratification ("Official Gazette of RM" No. 38/99). It entered into force in November 1999.
Agreement on the European Bats Protection (London, 1991) Amendment to the Agreement on the European Bats Protection	This Agreement was concluded under the Bonn Convention on the Conservation of Migratory Species of Wild Animals. The Agreement was ratified by the Law on Ratification ("Official Gazette of RM" no. 38/99), and entered into force for the Republic of Macedonia on 10.09.1999. The Amendment was ratified by the Law on Ratification ("Official Gazette of RM" no. 13/2002).
Agreement on the African and Eurasian Migratory Species of Birds (Hague, 1995)	This Agreement was concluded under the Bonn Convention on the Conservation of Migratory Species of Wild Animals. The Agreement was ratified by the Law on Ratification ("Official Gazette of RM" no. 32/99), and entered into force on 01.11.1999.

NAME OF INTERNATIONAL AGREEMENT	STATUS
Memorandum of Understanding concerning conservation and management of Central European population of Great Bustard (Otis tarda)	This Memorandum was concluded under the Bonn Convention on the Conservation of Migratory Species of Wild Animals. Republic of Macedonia signed the Memorandum on 07.10.2000 in Amman, Jordan.
European Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979)	The Convention was ratified by the Law on Ratification ("Official Gazette of RM" No.49/97). It entered into force in April 1999.
Convention on the World Cultural and natural Heritage Protection (Paris, 1972)	The Convention was ratified by the Law on Ratification ("Official Gazette of SFRY" No. 58/74). Republic of Macedonia became Party on 08.09.1991, by act of succession.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington, 1973, amended in Bonn in 1979)	The Convention was ratified by the Law on Ratification ("Official Gazette of RM" No. 82/99). Republic of Macedonia became Party on 02.10.2000.
European Landscape Convention (Florence, 2000)	The Convention was ratified by the Law on Ratification ("Official Gazette of RM" No. 44/2003).
CONVENTIONS IN THE AREA OF AIR PROTECTION	
Vienna Convention for the Protection of Ozone Layer (Vienna, March 1985) Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal, September 1987) Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer – London Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer – Copenhagen Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer – Montreal Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer – Beijing 1999	Ratified by the Law on Ratification ("Official Gazette of SFRY" No. 1.1990). Ratified by the Republic of Macedonia on 10 March, 1994. ("Official Gazette of SFRY" No. 16/90). Ratified by the Republic of Macedonia on 10.03.1994. The Amendment was ratified by the Law on Ratification ("Official Gazette of RM" No. 25/98). The Amendment was ratified by the Law on Ratification ("Official Gazette of RM" No. 25/98). The Amendment was ratified by the Law on Ratification ("Official Gazette of RM" No. 51/99). The Amendment was ratified by the Law on Ratification ("Official Gazette of RM" No. 13/2002).
United Nations Framework Convention on Climate Change (New York, May 1992)	The Convention was ratified by the Law on Ratification ("Official Gazette of RM" No. 6/97). It entered into force for the Republic of Macedonia on 28 April 1998.
Kyoto Protocol to the United Nations Framework Convention on Climate Change	The Protocol was ratified by the Law on Ratification ("Official Gazette of RM" No. 49/2004)
Convention on the Long Range Transboundary Air Pollution (Geneva, November 1979)	The Convention was ratified by the Law on Ratification ("Official Gazette of SFRY" No. 11/86. Republic of Macedonia ratified it by act of succession. The List of the status of countries with regard to this Convention specifies that the Republic of Macedonia signed it on 17.11.1991. From the time of entry of this Convention into force, it has been supplemented by eight (8) Protocols.
Protocol to the 1979 Convention on the Long Range Transboundary Air Pollution concerning the Long-Term Financing of the Cooperation Program for Monitoring and Evaluation of the Long-Range Transfer of Air Pollutants in Europe (EMEP)	The Protocol was ratified by the Law on Ratification ("Official Gazette of RM" No. 24/2010).
Protocol to the 1979 Convention on the Long Range Transboundary Air Pollution concerning the control of sulfur emissions or their transboundary transfer by at least 30 percent (Helsinki, July 1985)	The Protocol was ratified by the Law on Ratification ("Official Gazette of RM" No. 24/2010).

NAME OF INTERNATIONAL AGREEMENT	STATUS
Protocol to the 1979 Convention on the Long Range Transboundary Air Pollution concerning the control of nitrogen oxides release or their transboundary transfer (Sofia, October 1988)	The Protocol was ratified by the Law on Ratification ("Official Gazette of RM" No. 24/2010).
Protocol to the 1979 Convention on the Long Range Transboundary Air Pollution concerning the control of volatile organic compounds emissions or their transboundary transfer (Geneva, November1991)	The Protocol was ratified by the Law on Ratification ("Official Gazette of RM" No. 24/2010).
Protocol to the 1979 Convention on the Long Range Transboundary Air Pollution concerning further reduction of sulphur emissions (Oslo, June 1994)	The Protocol was ratified by the Law on Ratification ("Official Gazette of RM" No. 24/2010).
Protocol to the 1979 Convention on the Long Range Transboundary Air Pollution concerning the persistent organic pollutants (Aarhus, June 1998)	The Protocol was ratified by the Law on Ratification ("Official Gazette of RM" No. 135/2010).
Protocol to the 1979 Convention on the Long Range Transboundary Air Pollution concerning the air pollution for heavy metals (Aarhus, June 1998)	The Protocol was ratified by the Law on Ratification ("Official Gazette of RM" No. 135/2010).
Protocol to the 1979 Convention on the Long Range Transboundary Air Pollution concerning the reduction of acidification, eutrophication and ground ozone (Goteborg, November 1999)	The Protocol was ratified by the Law on Ratification ("Official Gazette of RM" No. 135/2010).
CONVENTIONS IN THE AREA OF SOIL CONSERVATION	
United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/ or Desertification, Particularly in Africa	The Convention was ratified by the Law on Ratification (Official Gazette of RM no. 13/2002). Convention entered into force on 6 June 2002.
CONVENTIONS IN THE AREA OF WASTE MANAGEMENT	
Basel Convention on the Transboundary Movements of Hazard Waste and their Disposal Amendment to the Basel Convention on the Transboundary Movements of Hazard Waste and their Disposal and Amendment to Annex I, Annex VIII and Annex IX (Kichen, Malesia, 23-27.02.1998)	The Convention was ratified by the Law on Ratification (Official Gazette of RM no.49/97). The Amendment was ratified by the Law on Ratification (Official Gazette of RM no. 49/2004).
CONVENTIONS IN THE AREA OF PROTECTION FROM CHEMICALS	
Stockholm Convention on Persistent Organic Pollutants	Republic of Macedonia signed the Convention in Stockholm, Sweden, on 22 May 2001. The Convention was ratified by the Law on Ratification (Official Gazette of RM no. 17/2004)
Rotterdam Convention on Prior Informed Consent Procedure for Certain Dangerous Chemicals and Pesticides in International Trade (Rotterdam,1998)	The Convention was ratified by the Law on Ratification (Official Gazette of RM no. 83/2010)
CONVENTIONS IN THE AREA OF PROTECTION FROM INDUSTRIAL ACCIDENTS	
Convention on Transboundary Effects of Industrial Accidents	The Convention was ratified by the Law on Ratification (Official Gazette of RM no. 19/2010)

ANNEX 2

LIST OF LAWS AND BYLAWS IN THE AREA OF ENVIRONMENT

ENVIRONMENT	
LAW ON ENVIRONMENT	
Law on Environment	Official Gazette of RM no. 53/05 of 05.07.2005.
Law amending the Law on Environment	Official Gazette of RM no. 81/05 of 27.09.2005.
Law amending the Law on Environment	Official Gazette of RM no. 24/07 of 01.03.2007.
Law amending the Law on Environment	Official Gazette of RM no. 159/08 of 22.12.2008.
Law amending the Law on Environment	Official Gazette of RM no. 83/09 of 03.07.2009.
Law amending the Law on Environment	Official Gazette of RM no. 48/10 of 09.04.2010.
Law amending the Law on Environment	Official Gazette of RM no. 124/10 of 20.09.2010.
Law amending the Law on Environment	Official Gazette of RM no. 51/11 of 13.04.2011.
Law amending the Законот за животна средина	Official Gazette of RM no. 123/12 of 02.10.2012.
Law amending the Law on Environment	Official Gazette of RM no. 93/13 of 03.07.2013.
Law amending the Law on Environment	Official Gazette of RM no. 187/13 of 30.12.2013.
Law amending the Law on Environment	Official Gazette of RM no. 42/14 of 03.03.2014.
ORDERS RESTRICTING TRADE	
Order prohibiting production, trade and use of detergents for machine washing of textile products containing phosphorus in organic or inorganic form with a weight exceeding 0.5 %	Official Gazette of RM no. 27/05 of 26.04.2005.
Order prohibiting import of used refrigerators, freezers and other cooling or freezing devices and import of ozone depleting substances	Official Gazette of RM no. 87/06 of 01.08.2006.
Order terminating the validity of the prohibition for internal trade, purchase and export of wastes and residues of iron, steel, aluminium, copper, lead, zinc, tin bronze and brass	Official Gazette of RM no. 113/07 of 20.09.2007.
Order prohibiting use of bags for transport of goods made of plastic masses in shops, commercial premises and markets where retail sale of food products and small size products for general use is performed	Official Gazette of RM no. 109/08 of 29.08.2008.
Order prohibiting use of bags for transport of goods made of plastic masses in shops, storehouses, store yards, commercial premises, green markets and special markets where retail sale of food products and in shops and kiosks where trade in small size products for personal and general consumption is performed	Official Gazette of RM no. 48/09 of 13.04.2009
Order restricting import of air conditioning devices containing hydrochlorofluorocarbon (HCFC)	Official Gazette of RM no. 92/10 of 09.07.2010.
Order restricting import of ozone depleting substances	Official Gazette of RM no. 92/10 of 09.07.2010.
Order prohibiting production of and trade in ozone depleting substances, as well as production of and trade in ozone depleting substances containing products	Official Gazette of RM no. 92/10 of 09.07.2010.
Order prohibiting import and export of products containing hydrochlorofluorocarbon (HCFC)	Official Gazette of RM no. 92/10 of 09.07.2010.

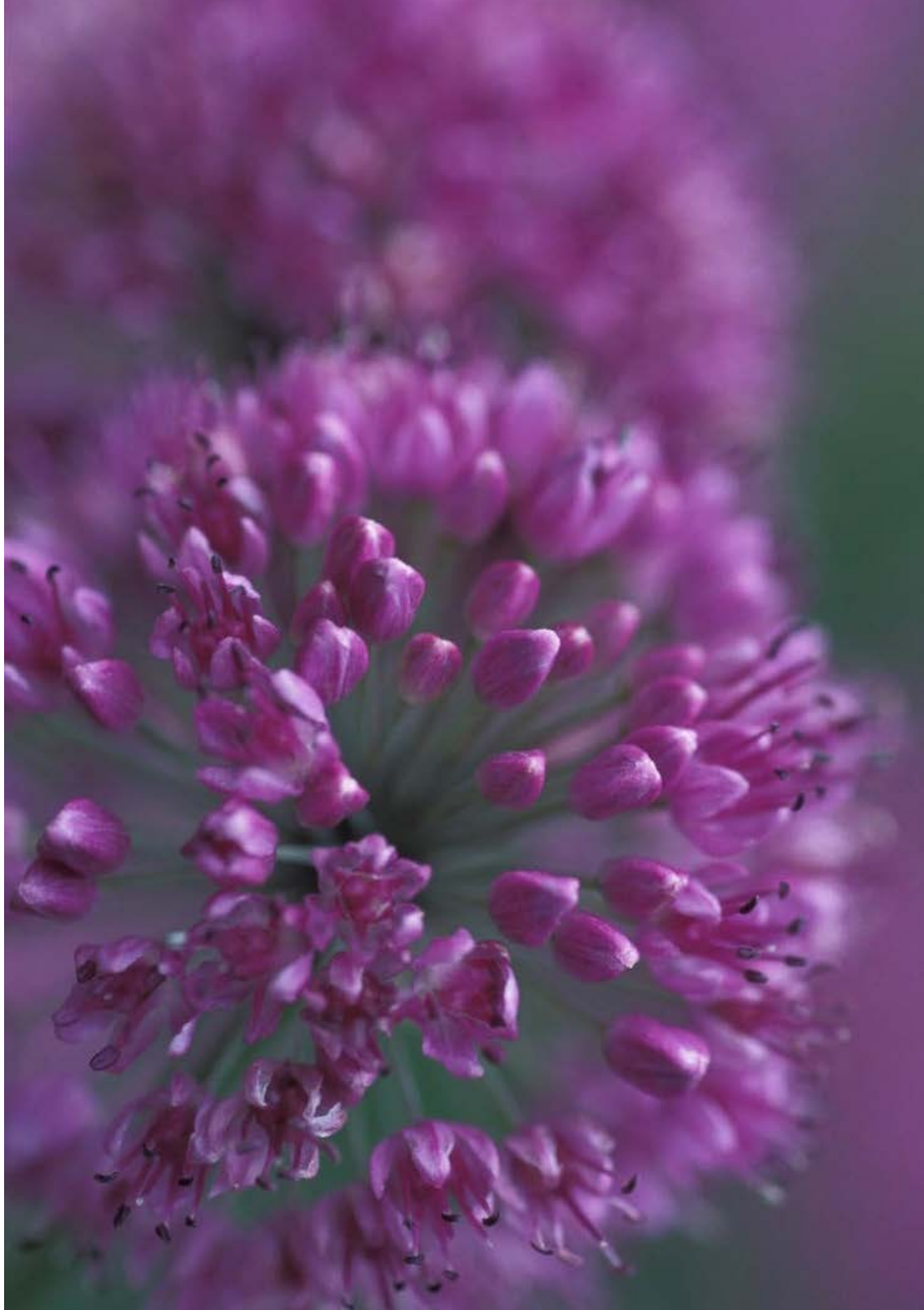
Order prohibiting internal trade in, purchase and export of wastes and residues of iron, steel, aluminium, copper, lead, zinc, tin, bronze and brass	Official Gazette of RM no. 41/12 of 26.03.2012.
Order terminating validity of the Order prohibiting internal trade in, purchase and export of wastes and residues of iron, steel, allumimium, copper, lead, zinc, tin, bronze and brass	Official Gazette of RM no. 56/12 of 07.05.2012.
Order amending the Order restricting import of ozone depleting substances	Official Gazette of RM no. 150/12 of 29.11.2012.
Order prohibiting internal trade in and purchase of copper, brass, aluminium and metallic wire obtained by cable and automobile tires burning	Official Gazette of RM no. 40/13 of 14.03.2013.
Order prohibiting trade in cooling devices in cylinders for single use	Official Gazette of RM no. 140/13 of 14.10.2013.
PERMITS	
Guideline on detailed data for issuance of permit for goods exported-imported under D4 declaration	Official Gazette of RM no. 91/04 of 23.12.2004.
FEES	
Decision determining products subject to payment of fees at trade, import/export	Official Gazette of RM no. 75/05 of 07.09.2005.
Rlebook on conditions, manner and procedre for returning the fee for production of tobacco products, oil derivatives and plastic products and packaging made of plastic masses	Official Gazette of RM no 115/05 of 28.12.2005.
Rlebook on the manner, procedure and deadlines for determination, calculation and payment of fees; manner and procedure for managing, maintaining and keeping the records on calculated and paid fees; on the content, manner and deadlines for establishment, maintaining and keeping the records of persons under obligations to pay fees, as well as the manner of submitting data for records keeping	Official Gazette of RM no. 115/05 of 28.12.2005.
Decision determining the type of material for packaging making for which fee is calculated for plastic products and packaging of plastic masses, manner of calculation of the fee and its presentation, types of products packed in packaging and types of bags for which fee is calculated	Official Gazette of RM no. 65/07 of 30.05.2007.
Rulebook on detailed conditions on the manner and procedure establishing, calculating and payment of the fee for energy production from fossil fuels	Official Gazette of RM no. 77/07 of 20.06.2007.
Decree on the type and scale of installations producing energy from fossil fuels combustion	Official Gazette of RM no. 84/07 of 04.07.2007.
Decree on the methodology of allocation of funds gained as revenue from the fee for production of energy from fossil fuels	Official Gazette of RM no. 12/08 of 23.01.2008.
Environmental Investment Programme for 2008	Official Gazette of RM no. 13/08 of 25.01.2008.
Programme amending the Environmental Investment Programme for 2008	Official Gazette of RM no. 37/08 of 19.03.2008.
Rulebook amending the Rulebook on the manner, procedure and deadlines for fees establishment, calculation and payment; manner and procedure of keeping and maintaining the records of calculated and paid fees; on the content, manner and deadlines of for establishment, maintenance and keeping the records of persons obliged to pay, as well as the manner of delivery of the data for records keeping	Official Gazette of RM no. 152/08 of 05.12.2008.
Environmental Investment Programme for 2009	Official Gazette of RM no. 6/09 of 15.01.2009

Environmental Investment Programme for 2010	Official Gazette of RM no. 8/10 of 21.01.2010
Environmental Investment Programme for 2011	Official Gazette of RM no. 6/11 of 17.01.2011.
Decree amending the Decree on the methodology of allocation of funds gained as revenue from the fee for production of energy from fossil fuels	Official Gazette of RM no. 22/11 of 23.02.2011.
Environmental Investment Programme for 2012	Official Gazette of RM no. 16/12 of 02.02.2012.
Environmental Investment Programme for 2014	Official Gazette of RM no. 7/14 of 13.01.2014.
Rulebook on the form, format and content, as well as the manner and procedure of issuance and withdrawal of the identity card of the state environmental inspector, nature protection inspector and authorized environmental inspector	Official Gazette of RM no. 80/05 of 23.09.2005.
Rulebook on the costs for matters carried out beyond administrative procedure upon request by the client	Official Gazette of RM no. 100/05 of 21.11.2005.
Rulebook on the content of the annual report of completed inspection supervision and manner and deadline for its submission	Official Gazette of RM no. 71/06 of 08.06.2006
Rulebook on the content, format and manner of adoption of the plan for inspection supervision performance	Official Gazette of RM no. 128/07 of 19.10.2007.
Rulebook on the format and content of the invitation for education, manner of education performance, as well as the manner of keeping the central records for completed education	Official Gazette of RM no. 118/11 of 01.09.2011.
ECOLOGICAL LABEL	
Rulebook on the form and content of ecological label, manner, conditions and procedure for its awarding and use, as well as composition and manner of establishment and work of the commission for ecological label	Official Gazette of RM no. 109/05 of 14.12.2005.
Rulebook on the criteria to be met to obtain ecological label for manual dish washing detergent	Official Gazette of RM no. 165/08 of 30.12.2008.
Rulebook on the criteria to be met to obtain ecological label for tourist accomodation	Official Gazette of RM no. 2/09 of 05.01.2009.
Rulebook on the criteria to be met to obtain ecological label for furniture	Official Gazette of RM no. 44/10 of 31.03.2010.
Rulebook on the criteria to be met to obtain ecological label for textile products	Official Gazette of RM no. 44/10 of 31.03.2010.
Rulebook on the criteria to be met to obtain ecological label for dyes and lacquers	Official Gazette of RM no. 46/10 of 09.04.2010.
Rulebook on the criteria to be met to obtain ecological label for hygiene paper	Official Gazette of RM no. 117/10 of 02.09.2010.
Rulebook on the criteria to be met to obtain ecological label for shoes	Official Gazette of RM no. 117/10 of 02.09.2010.
Rulebook on the criteria to be met to obtain ecological label for soaps, shampoos and hair conditioners	Official Gazette of RM no. 117/10 of 02.09.2010.
AWARDS AND ACKNOWLEDGEMENTS	
Rulebook on the procedure, manner and conditions for granting awards and acknowledgements for achievements in the area of environment protection and improvement, as well as the manner of work and composition of the commission for awards and acknowledgements	Official Gazette of RM no. 109/05 of 14.12.2005.
ACCESS TO INFORMATION	
Decision to publish list of entities possessing or for which environmental information is possessed	Official Gazette of RM no. 82/07 of 29.06.2007.

Rulebook on the manner and procedure for provision of access to environmental information	Official Gazette of RM no. 93/07 of 26.07.2007.
STRATEGIC ENVIRONMENTAL ASSESSMENT	
Rulebook on the composition of the commission and manner of its work, programme and manner of passing the expert examination, the level of the compensation for expert examination passing and for the compensation for establishment and maintenance of the list of strategic environmental assessment experts and manner of acquiring and loosing the status of strategic environmental assessment expert, as well as the manner and the procedure for enrolment in and exclusion from the list of experts	Official Gazette of RM no. 129/07 of 24.10.2007.
Decree on the criteria on the basis of which decisions are taken whether certain planning documents could have significant environmental and human health impacts	Official Gazette of RM no. 114/07 of 30.11.2007.
Decree on the content of the strategic environmental assessment report	Official Gazette of RM no. 153/07 of 20.12.2007.
Decree determining strategies, plans and programmes, including modifications of such strategies, plans and programmes for which procedure for assessment of their impact on environment and human health is compulsory	Official Gazette of RM no. 153/07 of 20.12.2007.
Decree on public participation in the preparation of regulations and other acts, as well as plans and programmes in the area of environment	Official Gazette of RM no. 147/08 of 26.11.2008.
Decree amending the Decree on public participation in the preparation of regulations and other acts, as well as plans and programmes in the area of environment	Official Gazette of RM no. 45/11 of 07.04.2011.
Decree amending the Decree determining strategies, plans and programmes, including modifications of such strategies, plans and programmes for which procedure for assessment of their impact on environment and human health is compulsory	Official Gazette of RM no. 45/11 of 07.04.2011.
Rulebook on the format, content and form of the Decision to carry out or not to carry out strategic assessment and of the forms for the requirement to carry out or not to carry out strategic assessment	Official Gazette of RM no. 122/11 of 07.09.2011.
ENVIRONMENTAL IMPACT ASSESSMENT	
Decree determining the projects and criteria on the basis of which the requirement for environmental impact assessment procedure is established	Official Gazette of RM no. 74/05 of 05.09.2005.
Rulebook on the content of the announcement of the intention to carry out the project, decision on the requirement for environmental impact assessment, of the environmental impact assessment study, report on the adequacy of the environmental impact assessment study, and of the decision granting consent or rejecting the implementation of the project upon public consultation	Official Gazette of RM no. 33/06 of 20.03.2006.
Rulebook on the format, content, procedure and manner of elaboration of the report on the adequacy of the environmental impact assessment study, as well as procedure for authorization of persons from the list of environmental impact assessment experts to prepare the report	Official Gazette of RM no. 33/06 of 20.03.2006.
Rulebook on the content of the requirements to be met by the environmental impact assessment study	Official Gazette of RM no. 33/06 of 20.03.2006.

Rulebook on information to be contained in the notification for project implementation and procedure determining the requirement for the project environmental impact assessment	Official Gazette of RM no. 33/06 of 20.03.2006.
Rulebook on the content of the state of environment report	Official Gazette of RM no. 35/06 of 23.03.2006.
Rulebook on the composition of the commission and manner of its work, programme and manner of passing the expert examination, the level of the compensation for expert examination passing and for the compensation for establishment and maintenance of the list of experts and manner of acquiring and loosing the status of environmental impact assessment expert for projects, as well as the manner and the procedure for enrolment in and exclusion from the list of experts	Official Gazette of RM no. 93/07 of 26.07.2007.
Rulebook on the form and the content of environment protection elaborate, procedure for their approval, as well as the manner of keeping the registry of approved elaborates	Official Gazette of RM no. 50/09 of 15.04.2009.
Decree on activities that are subject of compulsory elaborate the approval of which is under the competence of the Mayor of the municipality, the Mayor of the City of Skopje and the Mayor of the municipalities in the City of Skopje	Official Gazette of RM no. 80/09 of 26.06.2009.
Decree on activities that are subject of compulsory elaborate the approval of which is under the competence of the body responsible to perform expert matters in the area of environment	Official Gazette of RM no. 80/09 of 26.06.2009.
Decree amending the Decree determining the projects and criteria on the basis of which the requirement for environmental impact assessment procedure is established	Official Gazette of RM no. 109/09 of 02.09.2009.
Rulebook on the type and the level of costs for performance of environmental impact assessment procedure for projects, to be covered by the investor	Official Gazette of RM no. 116/09 of 22.09.2009.
Rulebook on the form and the content of the application for issuance of decision approving or rejecting the elaborate	Official Gazette of RM no. 130/11 of 26.09.2011.
Rulebook on the form and the content of the application for issuance of consent or rejecting the application for the project implementation	Official Gazette of RM no. 130/11 of 26.09.2011.
Decree amending the Decree on activities that are subject of compulsory elaborate the approval of which is under the competence of the Mayor of the municipality, the Mayor of the City of Skopje and the Mayor of the municipalities in the City of Skopje	Official Gazette of RM no. 32/12 of 06.03.2012
Decree amending the Decree on activities that are subject of compulsory elaborate the approval of which is under the competence of the body responsible to perform expert matters in the area of environment	Official Gazette of RM no. 36/12 of 16.03.2012
Decree amending the Decree determining the projects and criteria on the basis of which the requirement for environmental impact assessment procedure is established	Official Gazette of RM no. 164/12 of 24.12.2012
Rulebook on the format and the content of the environment protection elaborate in accordance with the types of activities that are subject to elaborate preparation, as well as in accordance with the activity and the scope performed by natural and legal persons, procedure for their approval, as well as the manner of keeping the registry of approved elaborates	Official Gazette of RM no. 44/13 of 22.03.2013.

INTEGRATED POLLUTION PREVENTION AND CONTROL	
Decree determining the activities of installations for which integrated environmental permit or adjustment permit with adjustment plan is issued and schedule for submission of application for adjustment permit with adjustment plan	Official Gazette of RM no. 89/05 of 21.10.2005
Rulebook on the procedure for issuance of A-integrated environmental permit	Official Gazette of RM no. 04/06 of 13.01.2006.
Rulebook on the procedure for issuance of B-integrated environmental permit	Official Gazette of RM no. 04/06 of 13.01.2006.
Rulebook on the procedure for issuance of adjustment permit with adjustment plan	Official Gazette of RM no. 04/06 of 13.01.2006.
Rulebook on detailed conditions to be met by the members of scientific and technical commission for the best available techniques	Official Gazette of RM no. 71/06 of 08.06.2006
Decree on the level of the compensation paid by operators of installations performing activities that are subject to issuance of adjustment permit with adjustment plan	Official Gazette of RM no. 117/07 of 01.10.2007.
Decree on the level of the compensation paid by operators of installations performing activities that are subject to issuance of B-integrated environmental permit	Official Gazette of RM no. 117/07 of 01.10.2007.
Decree on the level of the compensation paid by operators of installations performing activities that are subject to issuance of adjustment permit with adjustment plan	Official Gazette of RM no. 64/10 of 10.05.2010.
Decree on the level of the compensation paid by operators of installations performing activities that are subject to issuance of B -integrated environmental permit	Official Gazette of RM no. 64/10 of 10.05.2010.
Decree on the level of the compensation paid by operators of installations performing activities that are subject to issuance of A – integrated environmental permit	Official Gazette of RM no. 64/10 of 10.05.2010.
Rulebook on substances subject to emission limit values specified in A -интегрираната еколошка дозвола	Official Gazette of RM no. 72/10 of 27.05.2010.
Rulebook on the format and content of the application for non-issuance of permit or non-taking of decision for issuance of A – integrated environmental permit, or decision for rejecting to issue A – integrated environmental permit	Official Gazette of RM no. 130/11 of 26.09.2011.
Rulebook on the format and content of the application for non-issuance of permit or non-taking of decision for issuance of B – integrated environmental permit, or decision for rejecting to issue B – integrated environmental permit	Official Gazette of RM no. 131/11 of 28.09.2011.
INDUSTRIAL ACCIDENTS AND RISK MANAGEMENT	
Rulebook on the content of internal and external emergency plans, as well as the manner of their approval	Official Gazette of RM no. 50/09 of 15.04.2009.
Rulebook on dangerous substances, limit values (thresholds) for dangerous substances presence and criteria or properties by which a substance is classified as dangerous	Official Gazette of RM no. 25/10 of 19.02.2010.
Rulebook on the content of information on safety measures, as well as the manner of behavior of persons that might be affected by industrial accident caused in the system	Official Gazette of RM no. 22/11 of 23.02.2011.
Rulebook on the content of the report on safety measures	Official Gazette of RM no. 57/13 of 18.04.2013.
Rulebook on the content of the plan for industrial accidents prevention	Official Gazette of RM no. 60/13 of 24.04.2013



MISDEMEANOURS	
Rulebook on the manner of keeping the central records of misdemeanours, sanctions passed and decisions taken within misdemeanor procedure, as well as the manner of access to information contained in the records	Official Gazette of RM no. 144/08 of 18.11.2008.
Rulebook on the format and the content of the invitation for fine payment within mandatory procedure	Official Gazette of RM no. 16/09 of 04.02.2009
TRANSBOUNDARY CONSULTATIONS	
Rulebook on the manner of transboundary consultations performance	Official Gazette of RM no. 110/10 of 20.08.2010.
REPORTS	
Rulebook on the format, content, goals, manner of preparation and type of data sources used in report preparation, as well as the manner of the report evaluation	Official Gazette of RM no. 81/10 of 17.06.2010.
LIABILITY FOR ENVIRONMENTAL DAMAGE	
Rulebook on professional activities the performance of which may lead to occurrence of environmental damage, criteria for determining the existence of environmental damage, as well as cases in which liability for environmental damage will not incur	Official Gazette of RM no. 31/11 of 14.03.2011.
Rulebook on the measures for remediation of caused environmental damage	Official Gazette of RM no. 31/11 of 14.03.2011.
Methodology for evaluation of the value of goods and impacts on environment	Official Gazette of RM no. 11/12 of 24.01.2012.
Rulebook on methodology, manners, procedures and means for measurement of emissions from stationary sources	Official Gazette of RM no. 11/12 of 24.01.2012.
Rulebook on the manner of scoring the written part of the expert examination for evaluators of goods and impacts on environment	Official Gazette of RM no. 33/12 of 08.03.2012.
Programme for accomplishment of the first initial training for evaluators of the value of goods and impacts on environment	Official Gazette of RM no. 35/12 of 14.03.2012
Programme amending the Programme for accomplishment of the first initial training for evaluators of the value of goods and impacts on environment	Official Gazette of RM no. 102/12 of 13.08.2012
Rulebook amending the Rulebook on the manner of scoring the written part of the expert examination for evaluators of goods and impacts on environment	Official Gazette of RM no. 110/12 of 03.09.2012
REGISTRY OF POLLUTANTS	
Rulebook on the format, content, methodology and manner of keeping the pollutants release and transfer registry	Official Gazette of RM no. 27/11 of 03.03.2011.
STATE MONITORING NETWORK	
Decision to establish state environmental monitoring network	fficial Gazette of RM no. 122/11 of 07.09.2011.
NATURE PROTECTION	
LAW ON NATURE PROTECTION	
Law on Nature Protection	Official Gazette of RM no. 67/04 of 04.10.2004.
Law amending the Law on Nature Protection	Official Gazette of RM no. 14/06 of 03.02.2006.
Law amending the Law on Nature Protection	Official Gazette of RM no. 84/07 of 04.07.2007.
Law amending the Law on Nature Protection	Official Gazette of RM no. 35/10 of 12.03.2010.
Law amending the Law on Nature Protection	Official Gazette of RM no. 47/11 of 08.04.2011.

Law amending the Law on Nature Protection	Official Gazette of RM no. 148/11 of 21.10.2011.
Law amending the Law on Nature Protection	Official Gazette of RM no. 59/12 of 11.05.2012.
Law amending the Law on Nature Protection	Official Gazette of RM no. 13/13 of 23.01.2013.
Law amending the Law on Nature Protection	Official Gazette of RM no. 163/13 of 26.11.2013.
Law amending the Law on Nature Protection	Official Gazette of RM no. 41/14 of 27.02.2014.
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Order prohibiting collection for use and trade of plant species of gentiana lutea and gentiana punctata	Official Gazette of RM no. 86/06 of 26.07.2006.
Order prohibiting collection for use and trade of autochthonous species of self-sown fungi-morels of the genres morchella, verpa and pitchoverpa	Official Gazette of RM no. 161/08 of 24.12.2008.
Order amending the Order prohibiting collection for use and trade of autochthonous species of self-sown fungi-morels of the genres morchella, verpa and pitchoverpa	Official Gazette of RM no. 56/09 of 30.04.2009.
Order amending the Order prohibiting collection for use and trade of autochthonous species of self-sown fungi-morels of the genres morchella, verpa and pitchoverpa	Official Gazette of RM no. 86/10 of 01.07.2010.
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ADVISORY BODIES	
Decision to establish National Council for Nature Protection	Official Gazette of RM no. 113/09 of 11.09.2009.
PROTECTED AREAS	
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Correction of the Law proclaiming forest landscape around Mavrovo fields for National Park	Official Gazette of PRM no.20 of 01.10.1949.
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Law amending the Law proclaiming forest landscape around Mavrovo fields for National Park	Official Journal of SFRY no.16 of 06.04.1965
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Rulebook on the application of protection measures in the Strict Natural Reserve “Tikvesh” in the Gorge of Crna Reka	Official Gazette of RM no. 44/97 of 10.09.1997.
Decision supplementing the Decision determining the organization of protection, improvement and maintenance of the Strict Natural Reserve “Ezerani” on Prespa Lake	Official Gazette of RM no. 38/98 of 31.07.1998.
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Decision to establish the Public Enterprise for management and protection of the Multi-Purpose Area “Jasen”-Skopje	Official Gazette of RM no. 90/05 of 25.10.2005.
Decision supplementing the Decision to establish the Public Enterprise for management and protection of the Multi-Purpose Area “Jasen”-Skopje	Official Gazette of RM no. 101/05 of 24.11.2005.
Decision on the acceptability of the proposal for re-proclamation of the site “Markovi Kuli” for Natural Monument	Official Gazette of RM no. 109/05 of 14.12.2005.
Decision on the acceptability of the proposal for re-proclamation of the site “Smolarski Vodopad” for Natural Monument	Official Gazette of RM no. 109/05 of 14.12.2005.
Rulebook on the content of protected areas management plans and content of annual programmes for nature protection	Official Gazette of RM no. 117/05 of 29.12.2005.
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Decision to establish the Public Institution for management and protection of the National Park “Galichica”	Official Gazette of RM no. 09/06 of 25.01.2006.
Decision to establish the Public Institution for management and protection of the National Park “Pelister”	Official Gazette of RM no. 09/06 of 25.01.2006.
Law on the Proclamation of the Site “Smolarski Vodopad” for Natural Monument	Official Gazette of RM no. 35/06 of 23.03.2006.
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Decision to grant consent on the statute of the Public Institution National Park “Mavrovo”	Official Gazette of RM no. 64/06 of 25.05.2006.
Decision to grant consent on the statute of the Public Institution National Park “Pelister”, Bitola	Official Gazette of RM no. 68/06 of 31.05.2006.
Decision to grant consent on the statute of the Public Institution National Park “Galichica”, Ohrid	Official Gazette of RM no. 68/06 of 31.05.2006.
Decision on the acceptability of the proposal for re-proclamation of the site “Slatinski Izvor” for Natural Monument	Official Gazette of RM no. 74/06 of 16.06.2006.
Decision to establish the Public Institution for management and protection of the National Park “Galichica”	Official Gazette of RM no. 09/06 of 25.01.2006.

Decision to establish the Public Institution for management and protection of the National Park “Pelister”	Official Gazette of RM no. 09/06 of 25.01.2006.
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Decision to grant consent on the statute of the Public Institution National Park “Galichica”, Ohrid	Official Gazette of RM no. 68/06 of 31.05.2006.
Decision on the acceptability of the proposal for proclamation of the site “Kuklica” for protected area in the category of Natural Monument	Official Gazette of RM no. 18/07 of 15.02.2007.
Decision on the acceptability of the proposal for re-proclamation of part of the mountain Pelister for protected area in the category of National Park	Official Gazette of RM no. 40/07 of 30.03.2007.
Programme for support to the sustainable development of local communities in NP Pelister	Official Gazette of RM no. 58/07 of 11.05.2007.
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Decision to grant consent on the statute of the Public Enterprise for management and protection of the Multi-Purpose Area “Jasen”-Skopje	Official Gazette of RM no. 85/06 of 24.07.2006.
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Decision to grant consent on the statutory decision amending the statute of the Public Institution National Park “Pelister”, Bitola, Republic of Macedonia	Official Gazette of RM no. 157/07 of 27.12.2007.
Decision on the acceptability of the proposal for re-proclamation of the site Ploche-Litotelmi for protected area in the category of Strict Natural Reserve	Official Gazette of RM no. 16/08 of 31.01.2008.
Law on the Proclamation of the site Kuklica for Natural Monument	Official Gazette of RM no. 103/08 of 19.08.2008.
Decision on the acceptability of the proposal for re-proclamation of integrated area of Ostrovo for protected area in the category of Natural Monument	Official Gazette of RM no. 3/09 of 09.01.2009.
Decision on the acceptability of the proposal for re-proclamation of Lake of Prespa for protected area in the category of Natural Monument	Official Gazette of RM no. 31/09 of 02.03.2009.
Decision on the acceptability of the proposal for re-proclamation of Lake of Dojran for protected area in the category of Natural Monument	Official Gazette of RM no. 31/09 of 02.03.2009.
Decision on the acceptability of the proposal for proclamation of the site Monospitovo Swamp for protected area in the category of Natural Monument	Official Gazette of RM no. 33/09 of 06.03.2009.
Decision on the acceptability of the proposal for re-proclamation of Matka Canyon for protected area in the category of Natural Monument	Official Gazette of RM no. 80/09 of 26.06.2009.

Law on the Proclamation of the site Alshar for Natural Monument	Official Gazette of RM no. 83/09 of 03.07.2009.
Decision on the acceptability of the proposal for proclamation of the integrated area Ratkova Skala on Osogovo Mountains for protected area in the category of Natural Monument	Official Gazette of RM no. 138/09 of 17.11.2009.
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Rulebook on the measures and activities for natural monuments protection, the format and the content of the form of the permit for application of specific measures and activities for natural monument protection and recovery	Official Gazette of RM no. 126/10 of 22.09.2010.
Rulebook on the measures and activities for park of nature protection	Official Gazette of RM no. 126/10 of 22.09.2010.
Rulebook on the content of the Programme for passing professional examination for guard in protected area and manner and procedure for the professional examination passing	Official Gazette of RM no. 126/10 of 22.09.2010.
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Law on the Proclamation of part of the Mountain Galichica for National Park	Official Gazette of RM no. 171/10 of 30.12.2010.
Law on the Proclamation of the Cave “Slatinski Izvor” for Natural Monument	Official Gazette of RM no. 23/11 of 24.02.2011.
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Law on the Proclamation of Dojran Lake for Natural Monument	Official Gazette of RM no. 51/11 of 13.04.2011.
Decision to grant consent on agreements regulating mutual rights and obligations with entities performing activities in protected area – Galichica National Park	Official Gazette of RM no. 112/11 of 24.08.2011.
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Rulebook on the content of the study for valorization or re-valorization of protected area	Official Gazette of RM no. 26/12 of 21.02.2012
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Decision to grant consent on the agreement with entities performing activities in protected area – Galichica National Park	Official Gazette of RM no. 80/12 of 26.06.2012.
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Rulebook on records keeping on nature protection	Official Gazette of RM no. 102/12 of 13.08.2012.
Law amending the Law on the Proclamation of Prespa Lake for Natural Monument	Official Gazette of RM no. 79/13 of 31.05.2013.
Decision on the acceptability of the proposal for re-proclamation of Mavrovo for protected area in the category of National Park	Official Gazette of RM no. 81/13 of 03.06.2013.
Decision to grant consent on agreements regulating mutual rights and obligations with entities performing activities in protected area – Galichica National Park	Official Gazette of RM no. 167/13 of 02.12.2013.

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Rulebook on the issuance of permit for collection of threatened and protected wild species of plants, fungi and animals and their parts	Official Gazette of RM no. 102/09 of 13.08.2009.
Rulebook on the format and the content of the application, permit and certificate for trade in threatened and protected wild species of plants, fungi and animals and their parts, as well as documentation required to be enclosed to the application	Official Gazette of RM no. 134/10 of 07.10.2010.
Decree on the manner and procedure for issuance of permit or certificate, as well as the type of permit or certificate and determination of border crossings through which trade in threatened and protected wild species of plants, fungi and animals and their parts can be performed	Official Gazette of RM no. 135/10 of 08.10.2010.
Decree on the manner of treating the threatened and protected wild species of plants, fungi and animals and their parts by customs authorities, other competent bodies and services at border crossings and scientific and professional institutions, as well as authorized depositaries of specimens confiscated in illegal trade	Official Gazette of RM no. 177/11 of 22.12.2011.
Rulebook on the format and content of the application for non-issuance of permit for trade or certificate for import and/ or export and/or transit or re-export or non-taking of decision rejecting the issuance of permit for trade or certificate for import and/or export and/or transit or re-export	Official Gazette of RM no. 31/12 of 02.03.2012
List of strictly protected and protected wild species	Official Gazette of RM no. 139/11 of 07.10.2011.
Lists of threatened and protected wild species of plants, fungi, animals and their parts	Official Gazette of RM no. 15/12 of 31.01.2012.
INSPECTION SUPERVISION	
Rulebook on the format and content of the invitation for education, manner of education performance, as well as the manner of keeping the central records for completed education	Official Gazette of RM no. 103/12 of 17.08.2012.
OFFICIAL UNIFORM AND WEAPONS OF RANGER SERVICE	
Rulebook on the appearance and type of official uniform, its durability and manner of use – carrying of the equipment that needs to be carried by rangers and content and format of the official identification card and the manner of identity card issuance and withdrawal	„Службен весник на РМ“ бр. 103/12 од 17.08.2012 год.
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LAW ON THE PROTECTION AGAINST ENVIRONMENTAL NOISE	
Law on the Protection against Environmental Noise	Official Gazette of RM no. 79/07 of 25.06.2007.
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Law amending the Law on the Protection against Environmental Noise	Official Gazette of RM no. 163/13 of 26.11.2013.

INSPECTION SUPERVISION	
Rulebook on the format and content of the seal of the State Inspectorate of Environment, authorized inspector of environment of the municipality and municipality in the City of Skopje	Official Gazette of RM no. 112/07 of 19.09.2007
Decision determining conditions under which the peace of the citizens will be considered disrupted by harmful noise	Official Gazette of RM no. 1/09 of 01.01.2009
Rulebook on the format and content of the invitation for education, manner of education performance, as well as the manner of keeping the central records for completed education	Official Gazette of RM no. 118/11 of 01.09.2011.
NOISE INDICATORS	
Rulebook on the application of noise indicators, additional noise indicators, manner of noise measurement and methods for assessment with environmental noise indicators	Official Gazette of RM no. 107/08 of 29.08.2008.
Rulebook on environmental noise level limit values	Official Gazette of RM no. 147/08 of 26.11.2008.
Rulebook on the maximum permissible intensity of noise or maximum permissible amount of gases emission generated at take-off, during flight and landing of aircrafts	Official Gazette of RM no. 119/08 of 10.09.2010.
NOISE MONITORING	
Rulebook on the locations of measuring stations and measuring points	Official Gazette of RM no. 120/08 of 23.09.2008.
Rulebook on detailed conditions concerning the equipment to be possessed by authorized scientific professional organizations and institutions, as well as other legal and natural persons, to perform certain technical matters in noise monitoring	Official Gazette of RM no. 152/08 of 05.12.2008.
Rulebook on the manner, conditions and procedure for establishment and operation of networks, methodology and manner of monitoring, as well as conditions, manner and procedure for delivery of data and information from the monitoring of the status in the area of noise	Official Gazette of RM no. 123/09 of 09.10.2009.
Rulebook on detailed content of strategic noise maps and action plans for noise, manner of preparation and manner of collection of data for elaboration of strategic noise maps and action plans for noise, as well as the manner of their collection, keeping and recording	Official Gazette of RM no. 133/10 of 06.10.2010.
Rulebook on the cooperation of the bodies responsible for elaboration of strategic noise maps and action plans for noise with the bodies responsible for adoption of strategic noise maps and action plans for noise in the neighbouring country	Official Gazette of RM no. 163/10 of 17.12.2010.
Decree on agglomerations, main roads, main railroads and main airports for which strategic noise maps should be developed	Official Gazette of RM no.15/11 of 09.02.2011.
Plants, equipment, installations and devices used outdoors	
Rulebook on detailed types of specific sources of noise, as well as conditions that need to be fulfilled by plants, equipment, installations and devices used outdoors with regard to released noise and standards for protection against noise	Official Gazette of RM no.142/13 of 17.10.2013
WASTE MANAGEMENT	
LAW ON WASTE MANAGEMENT	
Law on Waste Management	Official Gazette of RM no. 68/04 of 05.10.2004.
Corrections of the Law on Waste Management	Official Gazette of RM no.71/04 of 13.10.2004.
Law amending the Law on Waste Management	Official Gazette of RM no 107/07 of 07.09.2007.

Law amending the Law on Waste Management	Official Gazette of RM no. 102/08 of 18.08.2008.
Law amending the Law on Waste Management	Official Gazette of RM no. 143/08 of 13.11.2008.
Law amending the Law on Waste Management	Official Gazette of RM no. 124/10 of 20.09.2010.
Law amending the Law on Waste Management (consolidated text)	Official Gazette of RM no. 09/11 of 25.01.2011.
Law amending the Law on Waste Management	Official Gazette of RM no. 51/11 of 13.04.2011.
Law amending the Law on Waste Management	Official Gazette of RM no. 123/12 of 02.10.2012.
Law amending the Law on Waste Management	Official Gazette of RM no. 147/13 of 28.10.2013.
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GENERAL RULES FOR WASTE TREATMENT	
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Rulebook on the level of costs where inspection supervision is conducted at the request of legal or natural person and manner of their collection	Official Gazette of RM no. 101/09 of 10.08.2009.
Rulebook on the quantity of biodegradable ingredients in waste allowed for landfilling	Official Gazette of RM no. 108/09 of 31.08.2009.
Rulebook on emission limit values at waste incineration and combustion and manner of operation of the installations for combustion and incineration	Official Gazette of RM no. 123/09 of 09.10.2009.
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Methodology for calculation of the price for collection, transportation and disposal of waste	Official Gazette of RM no. 30/13 of 26.02.2013.
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Correction of the Rulebook on the format and content of the forms for transboundary movement of waste	Official Gazette of RM no. 38/03 of 10.06.2003.
TYPES OF WASTES	
List of waste types	Official Gazette of RM no. 100/05 of 21.11.2005.
WASTE OPERATOR	
Rulebook on the programme according to which professional examination for performance of activities for waste management/treatment is taken and manner of the professional examination taking, format of the certificate, as well as level and manner of payment of the compensation for professional examination taking	Official Gazette of RM no. 153/10 of 26.11.2010
Rulebook on detailed conditions to be met by legal persons performing professional training, programme for the training performance and format and content of the certificate for participation in the course for professional training for waste management and/or treatment	Official Gazette of RM no. 74/11 of 02.06.2011

WASTE RECORDS	
Rulebook on the format and content of the journal for waste treatment recording, the format and the content of the forms for waste identification and transport and the format and the content of the forms of annual reports of waste treatment	Official Gazette of RM no. 7/06 of 19.01.2006.
Rulebook on the content and manner of keeping and maintaining the records in the registry of waste	Official Gazette of RM no. 39/09 of 20.03.2009
INTEGRATED NETWORK FOR WASTE DISPOSAL	
Rulebook on the manner and conditions for the performance of the integrated network for waste disposal	Official Gazette of RM no. 7/06 of 19.01.2006.
PERMITS FOR WASTE MANAGEMENT	
Rulebook on the format and content of the application, format and content of the permit for collection and transportation of municipal and other non-hazardous waste types, as well as the minimum technical conditions for performance of the activity of collection and transportation of municipal and other non-hazardous waste types	Official Gazette of RM no. 8/06 of 23.01.2006.
Rulebook on the format and content of the application for permit for waste recovery, treatment and/or storage, the format and the content of the permit, as well as the minimum technical conditions for performance of the activity of waste recovery, treatment and/or storage	Official Gazette of RM no. 23/07 of 27.02.2007.
Rulebook amending the Rulebook on the format and content of the application for permit for waste recovery, treatment and/or storage, the format and the content of the permit, as well as the minimum technical conditions for performance of the activity of waste recovery, treatment and/or storage	Official Gazette of RM no. 76/07 of 18.06.2007.
Rulebook on the format and the content of permit, application and registry of issued permits for trade in non-hazardous waste, manner and procedure for permit issuance, manner of records keeping, as well as conditions for performance of the activity of trade in non-hazardous waste	Official Gazette of RM no. 115/07 of 25.09.2007.
Rulebook amending the Rulebook on the format and content of the application, format and content of the permit for collection and transportation of municipal and other non-hazardous waste types	Official Gazette of RM no. 133/07 of 02.11.2007.
Rulebook on the format and content of the application for permit, as well as the format and the content of the permit for landfill operator	Official Gazette of RM no. 140/07 of 21.11.2007.
Rulebook amending the Rulebook on the format and content of the application for permit for waste recovery, treatment and/or storage, the format and the content of the permit, as well as the minimum technical conditions for performance of the activity of waste recovery, treatment and/or storage	Official Gazette of RM no. 122/08 of 29.09.2008.
Decision of the Constitutional Court of the Republic of Macedonia U.no. 132-2008 of 3 December 2008	Official Gazette of RM no. 162/08 of 25.12.2008.
Rulebook on the format and content of the application for permit, as well as the format and the content of the permit for performance of the activity of operator of installation for waste incineration or combustion	Official Gazette of RM no.108/09 of 31.08.2009.
Rulebook on the format and content of the permit for collection and transportation of hazardous waste	Official Gazette of RM no.118/10 of 06.09.2010.

Rulebook on the format and content of the application for non-issuance of permit or non-taking of decision rejecting the application for issuance of permit for collection and transportation of municipal and other non-hazardous waste types	Official Gazette of RM no. 146/11 of 19.10.2011.
Rulebook amending the Rulebook on the format and the content of permit, application and registry of issued permits for trade in non-hazardous waste, manner and procedure for permit issuance, manner of records keeping, as well as conditions for performance of the activity of trade in non-hazardous waste	Official Gazette of RM no. 55/12 of 03.05.2012.
Rulebook amending the Rulebook on the format and content of the application for permit for waste recovery, treatment and/or storage, the format and the content of the permit, as well as the minimum technical conditions for performance of the activity of waste recovery, treatment and/or storage	Official Gazette of RM no. 126/12 of 10.10.2012.
Rulebook amending the Rulebook on the format and content of the application for permit for waste recovery, treatment and/or storage, the format and the content of the permit, as well as the minimum technical conditions for performance of the activity of waste recovery, treatment and/or storage	Official Gazette of RM no. 09/13 of 15.01.2013.
Rulebook amending the Rulebook on the format and the content of permit, application and registry of issued permits for trade in non-hazardous waste, manner and procedure for permit issuance, manner of records keeping, as well as conditions for performance of the activity of trade in non-hazardous waste	Official Gazette of RM no. 41/13 of 15.03.2013.
WASTE TRANSFER STATIONS	
Rulebook on the minimum technical conditions for environment protection which need to be met by waste transfer stations, conditions to be met by locations on which transfer stations will be developed or positioned, as well as the terms for waste keeping in transfer stations depending on the types of waste	Official Gazette of RM no. 39/07 of 29.03.2007
TREATMENT OF SPECIAL WASTE TYPES	
Rulebook on the manner of treatment of asbestos waste and asbestos containing products	Official Gazette of RM no. 89/06 of 11.08.2006.
Rulebook on the manner of PCB treatment, manner and conditions to be met by installations and facilities for PCB removal and decontamination and manner of marking the PCB containing equipment	Official Gazette of RM no. 48/07 of 16.04.2007.
Rulebook on the manner of medical waste treatment, as well as the manner of medical waste packaging and marking	Official Gazette of RM no. 146/07 of 06.12.2007.
Rulebook on the procedures and manner of collection, transportation, storage, treatment and disposal of waste oils, manner of records keeping and data submission	Official Gazette of RM no. 156/07 of 26.12.2007.
Rulebook on detailed conditions for hazardous waste treatment and manner of hazardous waste packaging and marking	Official Gazette of RM no. 15/08 of 30.01.2008.
Rulebook on the manner of treatment of titanium dioxide waste, manner of monitoring performance and the format, content and manner of data submission	Official Gazette of RM no. 108/09 of 31.08.2009.
Rulebook on the manner of treatment of used tires, as well as conditions to be met by legal and natural persons that import used tires	Official Gazette of RM no. 108/09 of 31.08.2009.

Rulebook on the measures for environment protection that must be undertaken by producers, owners and entities that manage end-of-life vehicles, their components and materials, targets and deadlines for their achievement and manner and conditions for storage, the format and the content of the certificate for taking over the vehicle for destruction, the format and the content of the reporting form, as well as the manner of records keeping	Official Gazette of RM no. 108/09 of 31.08.2009.
Rulebook amending the Rulebook on the manner of PCB treatment, manner and conditions to be met by installations and facilities for PCB removal and decontamination and manner of marking the PCB containing equipment	Official Gazette of RM no. 130 of 28.10.2009ина
Correction of the Rulebook on the manner of treatment of titanium dioxide waste, manner of monitoring performance and the format, content and manner of data submission (Official Gazette of RM no.108/09)	Official Gazette of RM no. 142/09 of 25.11.2009.
Rulebook amending the Rulebook on the measures for environment protection that must be undertaken by producers, owners and entities that manage end-of-life vehicles, their components and materials, targets and deadlines for their achievement and manner and conditions for storage, the format and the content of the certificate for taking over the vehicle for destruction, the format and the content of the reporting form, as well as the manner of records keeping	Official Gazette of RM no. 164/10 of 20.12.2010.
Rulebook on the manner of keeping, as well as the format and the content of the forms of databases to monitor reuse and recovery of end-of-life vehicles and targets to be achieved by end-of-life vehicles reuse and recovery	Official Gazette of RM no. 74/11 of 02.06.2011.
Rulebook on the format and content of the application for non-issuance of permit or non-taking of decision rejecting the issuance of permit for trade in non-hazardous waste	Official Gazette of RM no. 129/11 of 23.09.2011.
Rulebook amending the Rulebook on the manner of PCB treatment, manner and conditions to be met by installations and facilities for PCB removal and decontamination and manner of marking the PCB containing equipment	Official Gazette of RM no. 52/13 of 08.04.2013.
Rulebook on the manner and conditions for waste storage, as well as conditions to be met by locations where waste storage is performed	Official Gazette of RM no. 29/07 of 09.03.2007.
LANDFILLS	
Rulebook on the format and the content of the application for establishment of landfill for non-hazardous and inert waste	Official Gazette of RM no. 133/07 of 02.11.2007.
Rulebook on the manner and procedure for operation, monitoring and control of the landfill during operation, as well as monitoring and control of the landfill during its closure and after care, as well as the conditions and the manner of taking care of landfills upon termination of their operation	Official Gazette of RM no. 156/07 of 26.12.2007.
Rulebook on criteria for acceptance of waste in landfills in each class, preparatory procedures for waste acceptance, general provisions for testing, sampling and accepting the waste	Official Gazette of RM no. 8/08 of 17.01.2008.
Rulebook on the conditions to be met by landfills	Official Gazette of RM no. 78/09 of 22.06.2009.
Rulebook on the conditions concerning technical conditions and equipment for performance of the activity of waste disposal, as well as the conditions and the manner of training and staff training programme	Official Gazette of RM no. 108/09 of 31.08.2009.

Decision to initiate procedure for awarding concession for funding, designing, construction and operation of regional landfill for municipal solid waste in Polog planning region	Official Gazette of RM no. 44/10 of 31.03.2010
WASTE MANAGEMENT STRATEGY	
Strategy for Waste Management of the Republic of Macedonia (2008-2020)	Official Gazette of RM no. 39/08 of 24.03.2008.
WASTE MANAGEMENT PLANS	
National Plan for Waste Management of the Republic of Macedonia (2009-2015)	Official Gazette of RM no. 77/09 of 19.06.2009.
Rulebook on the content of regional waste management plan	Official Gazette of RM no. 63/13 of 29.04.2013
INSPECTION SUPERVISION	
Rulebook on the format and the content of the invitation for education, manner of education performance, as well as the manner of keeping the central records for completed education	Official Gazette of RM no. 118/11 of 01.09.2011.
PACKAGING AND PACKAGING WASTE MANAGEMENT	
LAW ON PACKAGING AND PACKAGING WASTE MANAGEMENT	
Law on Packaging and Packaging Waste Management	Official Gazette of RM no. 161/09 of 30.12.2009.
Law amending the Law on Packaging and Packaging Waste Management	Official Gazette of RM no. 17/11 of 11.02.2011.
Law amending the Law on Packaging and Packaging Waste Management	Official Gazette of RM no. 47/11 of 08.04.2011.
Law amending the Law on Packaging and Packaging Waste Management	Official Gazette of RM no. 136/11 of 03.10.2011.
Law amending the Law on Packaging and Packaging Waste Management	Official Gazette of RM no. 6/12 of 13.01.2012.
Law amending the Law on Packaging and Packaging Waste Management	Official Gazette of RM no. 39/12 of 22.03.2012.
Law amending the Law on Packaging and Packaging Waste Management	Official Gazette of RM no. 163/13 of 26.11.2013.
BYLAWS	
Rulebook on the format and the content of the form for keeping records of legal persons managing packaging waste, producers and sole managers of packaging waste, manner of records keeping, as well as the format and the content of the form of the certificate for registration of sole manager of packaging waste	Official Gazette of RM no. 41/10 of 25.03.2010.
Rulebook on the conditions for durable packaging and types of packaging serving as indicators that it is durable packaging	Official Gazette of RM no. 48/10 of 09.04.2010
List of illustrative samples of packaging	Official Gazette of RM no. 52/10 of 16.04.2010.
Rulebook on the manner of enumeration and abbreviations on which the system of identification and marking of materials of which the packaging is made is based, as well as the format and the content of the mark for packaging handling	Official Gazette of RM no. 62/10 of 06.05.2010.
Rulebook on the manner of keeping, the format and detailed content of database and information system of packaging and packaging waste	Official Gazette of RM no. 113/10 of 27.08.2010.

Rulebook on the format and the content of the form of annual report on the types and quantities of packaging released or imported on the market in the Republic of Macedonia in the preceding calendar year and on the treatment of waste of this packaging, the format and the content of the form of manufacturing specification, the format and the content of the form of records of overall packaging released or imported on the market in the Republic of Macedonia, as well as the manner of records keeping	Official Gazette of RM no. 117/10 of 02.09.2010.
Rulebook on the format and the content of the form for exemption from payment of fee for packaging waste management	Official Gazette of RM no. 60/11 of 27.04.2011.
Rulebook on the manner and conditions for exceeding the levels of heavy metals content in packaging, as well as the manner of keeping and the content of records and report on packaging waste treatment	Official Gazette of RM no. 78/11 of 09.06.2011.
Decision to establish Commission for packaging waste management	Official Gazette of RM no. 112/11 of 24.08.2011.
Decree on the manner, procedure and required documentation for return of the fee for import or destruction of packed goods and export or destruction of bags for goods transportation	Official Gazette of RM no. 112/11 of 24.08.2011.
Rulebook on format and content of the invitation for education, manner of education performance, as well as the manner of keeping the central records for completed education in LPPWM	Official Gazette of RM no. 118/11 of 01.09.2011.
Rulebook amending the Rulebook on the format and the content of the form of annual report on the types and quantities of packaging released or imported on the market in the Republic of Macedonia in the preceding calendar year and on the treatment of waste of this packaging, the format and the content of the form of manufacturing specification, the format and the content of the form of records of overall packaging released or imported on the market in the Republic of Macedonia, as well as the manner of records keeping	Official Gazette of RM no. 184/11 of 29.12.2011.
Rulebook on the format and content of the application for non-issuance of permit for packaging waste treatment or non-taking of decision rejecting the issuance of permit for packaging waste treatment	Official Gazette of RM no. 3/12 of 09.01.2012.
Rulebook on the format and content of the application for non-definition of proposal for allocation of funds or non-adoption of act for non-selection	Official Gazette of RM no. 3/12 of 09.01.2012.
Rulebook amending the Rulebook on the format and the content of the form for exemption from payment of fee for packaging waste management	Official Gazette of RM no. 12/12 of 26.01.2012.
Rulebook on the format and the content of the application for permit for packaging waste treatment	Official Gazette of RM no. 35/12 of 14.03.2012
Rulebook on the manner and procedure of records keeping and maintaining with regard to calculated and paid fee for packaging waste management, as well as the format and content of the form for calculation of the paid fee for packaging waste management	Official Gazette of RM no. 110/12 of 03.09.2012.
Rulebook on the standards of biodegradability to be met by bags for goods transportation, manner of releasing and using of biodegradable bags for goods transportation on market	Official Gazette of RM no. 19/13 of 06.02.2013.

Rulebook on the format and the content of the form of certificate for exemption from payment of fee for packaging waste management	Official Gazette of RM no. 127/13 of 14.09.2013.
BATTERIES AND ACCUMULATORS	
LAW ON BATTERIES AND ACCUMULATORS AND WASTE BATTERIES AND ACCUMULATORS	
Law on the Management of Batteries and Accumulators and Waste Batteries and Accumulators	Official Gazette of RM no. 140/10 of 21.10.2010.
Law amending the Law on the Management of Batteries and Accumulators and Waste Batteries and Accumulators	Official Gazette of RM no. 47/11 of 08.04.2011.
Law amending the Law on the Management of Batteries and Accumulators and Waste Batteries and Accumulators	Official Gazette of RM no. 148/11 of 21.10.2011.
Law amending the Law on the Management of Batteries and Accumulators and Waste Batteries and Accumulators	Official Gazette of RM no. 39/12 of 22.03.2012.
Law amending the Law on the Management of Batteries and Accumulators and Waste Batteries and Accumulators	Official Gazette of RM no. 163/13 of 26.11.2013.
BYLAWS	
Rulebook on the format and the content of the annual report on the management of waste batteries and accumulators and manner of its submission, as well as the format and the content of the form for records keeping of the quantities and types of batteries and accumulators released on the market in the Republic of Macedonia	Official Gazette of RM no. 167/10 of 23.12.2010.
Rulebook on the format and the content of the reports on the quantities of collected waste batteries and accumulators and quantities of taken, treated or recycled waste batteries and accumulators , as well as the manner of their preparation and submission	Official Gazette of RM no. 167/10 of 23.12.2010.
Rulebook on the format, content and manner of submitting the application for registration of producers releasing on the market or importing batteries and accumulators in the Republic of Macedonia, manner of establishing registry number, as well as the format, content and manner of keeping the registry of producers releasing batteries and accumulators on the market in the Republic of Macedonia	Official Gazette of RM no. 36/11 of 23.03.2011.
Rulebook on the manner of marking batteries and accumulators and battery packaging, the form and the content of the symbol for separate collection, as well as the format and the content of the chemical symbol for metals	Official Gazette of RM no. 52/11 of 13.04.2011.
Rulebook on the format and the content of the certificate for registration of sole operator of waste batteries and accumulators	Official Gazette of RM no. 61/11 of 29.04.2011.
Rulebook on the format and the content of the form of certificate for exemption from payment of fee for waste batteries and accumulators management	Official Gazette of RM no. 61/11 of 29.04.2011.
Rulebook on the manner of monitoring and calculating the execution of the rates of collection of waste batteries and accumulators, as well as the format and the content of the form for monitoring and calculating	Official Gazette of RM no. 67/11 of 17.05.2011.
Decree on the manner, procedure and required documentation for return of the fee for exported quantity of batteries and accumulators	Official Gazette of RM no. 112/11 of 24.08.2011.

Rulebook on the format and the content of the invitation for education, manner of education performance, as well as the manner of keeping the central records for completed education in LMBAWBA	Official Gazette of RM no. 118/11 of 01.09.2011.
Rulebook on the format and the content of the application for failure to take decision for allocation of funds or failure to adopt an act for non-conducted selection	Official Gazette of RM no. 3/12 of 09.01.2012.
Rulebook on the format and the content of the application for failure to issue permit for waste batteries and accumulators management or failure to take decision rejecting the issuance of permit for waste batteries and accumulators management	Official Gazette of RM no. 3/12 of 09.01.2012.
Rulebook amending Rulebook on the format and the content of the form of certificate for exemption from payment of fee for waste batteries and accumulators management	Official Gazette of RM no. 12/12 of 26.01.2012.
Rulebook on the format and the content of the invitation for payment of fine in mandatory procedure	Official Gazette of RM no. 33/12 of 08.03.2012
Rulebook on the manner and procedure for keeping and maintaining the records of calculated and paid fee for waste batteries and accumulators management, as well as the format and the content of the form for calculation of the paid fee for waste batteries and accumulators management	Official Gazette of RM no. 110/12 of 03.09.2012

MANAGEMENT OF ELECTRIC AND ELECTRONIC EQUIPMENT AND WASTE ELECTRIC AND ELECTRONIC EQUIPMENT

LAW ON THE MANAGEMENT OF ELECTRIC AND ELECTRONIC EQUIPMENT AND WASTE ELECTRIC AND ELECTRONIC EQUIPMENT

Law on the Management of Electric and Electronic Equipment and Waste Electric and Electronic Equipment	Official Gazette of RM no. 6/12 of 13.01.2012.
Law amending the Law on the Management of Electric and Electronic Equipment and Waste Electric and Electronic Equipment	Official Gazette of RM no. 163/12 of 26.11.2013.

BYLAWS

Rulebook on the format and the content of the application for failure to issue permit or failure to take decision rejecting the issuance of permit for waste equipment management	Official Gazette of RM no. 24/12 of 27.02.2012.
Rulebook on the format and the content of the invitation for education, manner of education performance, as well as the manner of keeping the central records for completed education	Official Gazette of RM no. 33/12 of 08.03.2012.
Rulebook on the format and the content of the application for failure to issue permit or failure to take decision rejecting the issuance of permit for waste equipment management	Official Gazette of RM no. 38/12 of 21.03.2012.
Rulebook on the format and the content of the declaration of the obligation for separate collection of waste equipment	Official Gazette of RM no. 77/12 of 20.06.2012.
Rulebook on the format and the content of the invitation for fine payment in mandatory procedure	Official Gazette of RM no. 110/12 of 03.09.2012.
Rulebook on the format and the content of the form of the application for registration of producers releasing on the market or importing electric and electronic equipment as end users in the Republic of Macedonia, the format and the content of the registry of producers releasing on the market or importing electric and electronic equipment as end users in the Republic of Macedonia, manner of its keeping and maintenance, as well as the format and the content of the certificate for entry in the registry	Official Gazette of RM no. 133/12 of 26.10.2012.

List of types of products belonging to the categories of electric and electronic equipment	Official Gazette of RM no. 133/12 of 26.10.2012.
List of equipment for which measures for prohibition and restriction for release of electric and electronic equipment on the market of the Republic of Macedonia are not applicable, as well as maximum values for the concentration of hazardous substances, deadlines by which presence of certain hazardous substances in electric and electronic equipment is allowed, its constituent parts and materials	Official Gazette of RM no. 02/13 of 04.01.2013.
Rulebook on minimum requirements for separate treatment of waste equipment, materials and parts of waste equipment, as well as minimum technical requirements for storage and treatment of waste equipment which should be met by the installation for waste equipment treatment	Official Gazette of RM no. 09/13 of 15.01.2013.
Rulebook on the format and the content on the form for records keeping of the quantities by category and type of equipment released by the producer on the market in the Republic of Macedonia	Official Gazette of RM no. 127/13 of 14.09.2013.

AMBIENT AIR QUALITY

LAW ON AMBIENT AIR QUALITY

Law on Ambient Air Quality	Official Gazette of RM no. 67/04 of 04.10.2004.
Law amending the Law on Ambient Air Quality	Official Gazette of RM no. 92/07 of 24.07.2007.
Law amending the Law on Ambient Air Quality	Official Gazette of RM no. 35/10 of 12.03.2010.
Law amending the Law on Ambient Air Quality	Official Gazette of RM no. 47/11 of 08.04.2011.
Law amending the Law on Ambient Air Quality	Official Gazette of RM no. 59/12 of 11.05.2012.
Law on Ambient Air Quality (consolidated)	Official Gazette of RM no. 100/12 of 06.08.2012.
Law amending the Law on Ambient Air Quality	Official Gazette of RM no. 163/13 of 26.11.2013.

MEASUREMENT OF HARMFUL MATTERS

Rulebook on the required professional staff, equipment, instruments and premises to be possessed by organizations of associated labour appointed to perform control of air pollution and measurement of harmful matters released in the air	Official Journal of SFRY no. 7/76 of 20.02.1976.
Rulebook on the manner and deadlines for submission of reports on completed measurements, control and records of harmful matters released in the air	Official Journal of SFRY no. 9/76 of 5.03.1976.
Rulebook on the manner and deadlines for measurements, control and records of harmful matters released in the air from facilities, plants and devices that may pollute the air above the maximum permissible concentrations	Official Journal of SFRY no. 13/76 of 2.04.1976.
Rulebook on the manner and conditions for reporting the competent bodies for completed systematic observation and testing of air pollution on the territory of the Republic	Official Journal of SFRY no. 7/76 of 20.02.1976.

AMBIENT AIR QUALITY MONITORING

Rulebook on criteria, methods and procedures for ambient air quality assessment	Official Gazette of RM no. 82/06 of 13.07.2006.
Rulebook on methodology for ambient air quality monitoring	Official Gazette of RM no. 138/09 of 17.11.2009.
Rulebook on the content and the manner of transferring data and information on the state of ambient air quality management	Official Gazette of RM no. 138/09 of 17.11.2009.
Rulebook on the quantities of upper limits-ceilings of pollutant emissions in order to set projections for a given time period to reduce quantities of pollutant emissions on annual level	Official Gazette of RM no. 2/10 of 08.01.2010.

Rulebook on detailed conditions to perform certain types of professional activities with regard to equipment, devices, instruments and appropriate commercial premises to be fulfilled by entities performing certain types of professional activities of ambient air quality monitoring	Official Gazette of RM no. 69/11 of 23.05.2011.
Rulebook on the format and the content of the forms for delivery of emissions in ambient air from stationary sources, manner and time period of delivery in line with the installation capacity, content and manner of keeping the journal of ambient air emissions	Official Gazette of RM no. 79/11 of 13.06.2011
Rulebook amending the Rulebook on the quantities of upper limits-ceilings of pollutant emissions in order to set projections for a given time period to reduce quantities of pollutant emissions on annual level	Official Gazette of RM no. 156/11 of 09.11.2011.
Rulebook on the methodology, manners, procedures, methods and means for measuring the emissions from stationary sources	Official Gazette of RM no. 11/12 of 24.01.2012.
Rulebook on criteria, methods and procedures for ambient air quality assessment	Official Gazette of RM no. 169/13 of 05.12.2013.
MAXIMUM PERMISSIBLE EMISSIONS	
Rulebook on maximum permissible concentrations and quantities and other harmful matters that may be released into the air from individual sources of pollution	Official Journal of SFRY no. 3/90 of 19.01.1990.
Decree on the limit values for levels and types of pollutants in ambient air and alert thresholds, deadlines for achievement of limit values, margins of tolerance for limit value, target values and long-term targets	Official Gazette of RM no. 50/05 of 27.06.2005.
Rulebook on the methodology for inventory taking and setting the levels of pollutant emissions into the atmosphere in tons per year for all types of activities, as well as other data to be submitted to the Programme for air monitoring in Europe (EMEP)	Official Gazette of RM no. 142/07 of 26.11.2007.
Rulebook on the limit values of permissible levels of emissions and types of pollutants in exhaust gases and steams released by stationary sources into the air	Official Gazette of RM no. 141/10 of 25.10.2010.
Decree amending the Decree on the limit values for levels and types of pollutants in ambient air and alert thresholds, deadlines for achievement of limit values, margins of tolerance for limit value, target values and long-term targets	Official Gazette of RM no. 04/13 of 09.01.2013.
HARMFUL MATTERS MONITORING AND DETECTING	
Rulebook on the methodology for harmful matters monitoring and detecting in the air	Official Journal of SFRY no. 9/76 of 5.03.1976.
CLASSIFICATION OF AIR POLLUTING FACILITIES AND ZONES	
Rulebook on the classification of facilities which by release of harmful matters may pollute the air in populated places and formation of zones for sanitary protection	Official Journal of SFRY no. 13/76 of 2.04.1976.
List of zones and agglomerations for ambient air quality	Official Gazette of RM no. 23/09 of 19.02.2009.
PLANS AND PROGRAMMES	
Rulebook on the detailed content and manner of preparation of the action plan for ambient air protection	Official Gazette of RM no. 108/09 of 31.08.2009.
Rulebook on the detailed content and manner of preparation of the national plan for ambient air protection	Official Gazette of RM no. 108/09 of 31.08.2009.

Rulebook on the detailed content and manner of preparation of the programme for pollution reduction and ambient air quality improvement	Official Gazette of RM no. 108/09 of 31.08.2009.
MONITORING OF THE QUALITY OF AMBIENT AIR AND SOURCES OF EMISSIONS FROM INDIVIDUAL STATIONARY SOURCES	
Decree determining combustion plants that need to undertake measures for ambient air protection against pollution	Official Gazette of RM no. 112/11 of 24.08.2011.
INSPECTION SUPERVISION	
Rulebook on the format and the content of the invitation for education, manner of education performance, as well as the manner of keeping the central records for completed education	Official Gazette of RM no. 118/11 of 01.09.2011.
METHODOLOGY FOR ASSESSMENT	
Rulebook on criteria, methods and procedures for ambient air quality assessment	Official Gazette of RM no. 169/13 of 05.12.2013.
GENETICALLY MODIFIED ORGANISMS	
LAW ON GENETICALLY MODIFIED ORGANISMS	
Law on Genetically Modified Organisms	Official Gazette of RM no. 35/09 of 14.03.2008.
Law amending the Law on Genetically Modified Organisms	Official Gazette of RM no. 163/13 of 26.11.2013.
AREAS WHERE GENETICALLY MODIFIED ORGANISMS MAY NOT BE RELEASED	
Decree determining areas where genetically modified reproduction material may not be released into the environment	Official Gazette of RM no.112 /09 of 09.09.2009.
Annex to the Decree determining areas where genetically modified reproduction material may not be released into the environment	Official Gazette of RM no.113 /09 of 11.09.2009.
ADVISORY BODIES	
Decision to establish National Council for Waters	Official Gazette of RM no.149 /09 of 15.12.2009.
DELIBERATE RELEASE OF GMO	
Rulebook on the content of information for carrying out evaluation of the risk as a result of deliberate release of GMO	Official Gazette of RM no.148 /09 of 14.12.2009.
Rulebook on the content of the plan of emergency measures	Official Gazette of RM no.163 /09 of 31.12.2009.
Decree on the content, scope and methodology for environmental risk assessment appropriate to the nature of inlet genetically modified organism and environment	Official Gazette of RM no. 22/12 of 13.02.2012.
RESTRICTED USE OF GMO	
Rulebook on restricted use of genetically modified organisms	Official Gazette of RM no.08/11 of 24.01.2011.
PUBLIC CONSULTATIONS AND REPORTING	
Rulebook on the format and the content of the form of the announcement of the notification for issuance of permit for restricted use of GMO, notification for issuance of permit for deliberate release of GMO in the environment and notification for issuance of permit for GMO products release on the market	Official Gazette of RM no.150/12 of 29.11.2012.
RELEASE OF GMO PRODUCTS ON MARKET	
Rulebook on information that may be omitted from the notification for GMO product release on the market	Official Gazette of RM no.29/14 of 06.02.2014.

SPATIAL PLANNING	
SPATIAL PLANS	
Decision to adopt Spatial Development Plan for NP “Galichica”	Official Journal of SFRY no. 43/88 of 22.07.1988.
Decision to adopt Spatial Development Plan for NP “Pelister”	Official Journal of SFRY no. 43/88 of 22.07.1988.
Decision to adopt Spatial Development Plan for NP “Mavrovo”	Official Journal of SFRY no. 43/88 of 22.07.1988.
Programme for preparation and adoption of the Spatial Plan of the Republic of Macedonia	Official Gazette of RM no. 17/95 of 28.03.1995.
Programme amending the Programme for preparation and adoption of the Spatial Plan of the Republic of Macedonia	Official Gazette of RM no. 29/98 of 24.06.1998.
Decision to adopt Spatial Plan for the region of Kozjak accumulation	Official Gazette of RM no. 49/99 of 30.07.1999.
Spatial Plan for the region of Rasche springs protection zones	Official Gazette of RM no. 98/02 of 27.12.2002.
Spatial Plan of the Republic of Macedonia	Official Gazette of RM no. 39/04 of 18.06.2004.
Rulebook on procedure, manner of preparation, content of the reports on conditions and changes in space and deadlines for their submission	Official Gazette of RM no. 42/05 of 07.06.2005.
Rulebook amending the Rulebook on procedure, manner of preparation, content of the reports on conditions and changes in space and deadlines for their submission	Official Gazette of RM no. 111/06 of 27.10.2006.
Spatial Plan for the region of Treska River Basin	Official Gazette of RM no. 25/07 of 02.03.2007.
Spatial Plan for Ohrid-Prespa region 2005-2020	Official Gazette of RM no. 22/10 of 15.02.2010.
Annual Programme for development of spatial plans in the Republic of Macedonia for 2014	Official Gazette of RM no. 8/14 of 14.01.2014.
WATERS	
LAW ON WATERS	
Law on Waters	Official Gazette of RM no. 87/08 of 15.07.2008.
Law amending the Law on Waters	Official Gazette of RM no. 6/09 of 15.01.2009
Law amending the Law on Waters	Official Gazette of RM no. 161/09 of 30.12.2009
Law amending the Law on Waters	Official Gazette of RM no. 83/10 of 23.06.2010
Law amending the Law on Waters	Official Gazette of RM no. 51/11 of 13.04.2011.
Law amending the Law on Waters	Official Gazette of RM no. 44/12 of 30.03.2012.
Law amending the Law on Waters	Official Gazette of RM no. 23/13 of 14.02.2013.
Law amending the Law on Waters	Official Gazette of RM no. 163/13 of 26.11.2013.
WATER MANAGEMENT	
Decision to announce the draft amendment of the water management master plan of the Republic of Macedonia for public debate	Official Gazette of RM no. 123/13 of 06.09.2013
WATERS CLASSIFICATION AND CATEGORIZATION	
Decree on waters classification	Official Gazette of RM no. 18/99 of 31.09.1999.
Decree on the categorization of watercourses, lakes, accumulations and ground waters	Official Gazette of RM no. 18/99 of 31.09.1999.
RIVER BASINS	
Rulebook on the content and manner of preparation of river basin management plans	Official Gazette of RM no. 148/09 of 14.12.2009.
Rulebook on the methodology for river basins assessment	Official Gazette of RM no. 148/09 of 14.12.2009.

Decision determining the boundaries of river basin areas	Official Gazette of RM no. 107/12 of 27.08.2012.
Decree on the composition, manner of participation, as well as the manner of nomination of representatives in the councils for river basin areas management and council for management of part of the river basin area, as well as the manner of its work	Official Gazette of RM no. 106/13 of 29.07.2013
PROGRAMME OF MEASURES	
Rulebook on the content and the manner of programmes of measures preparation	Official Gazette of RM no. 148/09 of 14.12.2009.
MONITORING OF WATERS	
Rulebook on the content and manner of preparation of information on cartographic presentations of waters monitoring activities	Official Gazette of RM no. 148/09 of 14.12.2009.
ADVISORY BODIES	
Decision establishing national council for waters	Official Gazette of RM no. 149/09 of 15.12.2009.
BASIC PLANNING DOCUMENTS	
Rulebook on the methodology for the content, manner and procedure, review of Water Management Master Plan of the Republic of Macedonia	Official Gazette of RM no. 148/09 of 14.12.2009.
Rulebook on the format and the content of the application for non-taking decision accepting or rejecting the application for water management consent	„Службен весник на РМ“ бр. 129/11 од 23.09.2011 год.
Decision to announce the draft amendment of the water management master plan of the Republic of Macedonia for public debate	Official Gazette of RM no. 129/11 of 23.09.2011.
National Strategy for Waters (2012 – 2042)	Official Gazette of RM no. 70/12 of 07.06.2012.
URBAN WASTE WATERS	
Rulebook on the format and the content of the form of the application and of the permit for reuse of treated waste waters, as well as the manner of permit issuance	„Службен весник на РМ“ бр. 60, од 27.04.2011
Rulebook on the format and the content of the form of the application and of the permit for use of sludge, as well as the manner of issuance of the permit for sludge use	Official Gazette of RM no. 60, of 27.04.2011
Rulebook on the format, content and manner of data delivery and type of information on the use of sludge from urban waste water treatment in accordance with its intention, treatment, composition and place of its use	Official Gazette of RM no. 60, of 27.04.2011
Rulebook on the manner of sludge use, maximum values of the concentrations of heavy metals in the soil in which it is used, values of heavy metals concentration in sludge in line with its purpose and maximum annual quantities of heavy metals that can be inlet in the soil	Official Gazette of RM no. 60, of 27.04.2011
Rulebook on detailed conditions for collection, transportation and treatment, manner and conditions of designing, construction and operation of urban waste water treatment systems and plants, as well as technical standards, parameters, emission standards and norms for pre-treatment quality, waste waters removal and treatment, taking into account loading and method of treatment of urban waste waters discharged in areas sensitive to urban waste waters discharges	Official Gazette of RM no. 73/11 of 31.05.2011.

Rulebook on detailed conditions, manner and maximum permissible values and concentrations of the parameters of treated waste waters for their reuse	Official Gazette of RM no. 73/11 of 31.05.2011.
Rulebook on conditions, manner and emission limit values for waste waters discharging upon their treatment, manner of their calculation, taking into account specific requirements for protected zones protection	Official Gazette of RM no. 73/11 of 31.05.2011.
Rulebook on methodology, reference measuring methods, manner and parameters of waste waters monitoring, including sludge from urban waste waters treatment	Official Gazette of RM no. 108/11 of 12.08.2011
Rulebook on criteria for identification of zones sensitive to urban waste waters discharging	Official Gazette of RM no. 130/11 of 26.09.2011.
WASTE WATERS DISCHARGING	
Rulebook on hazardous and harmful matters and substances and their emission standards that may be discharged in sewerage network or waste water removal system, surface or ground water bodies, as well as riparian lands and wetlands	Official Gazette of RM no. 108/11 of 12.08.2011.
Rulebook on conditions, manner and limit values of emission for waste water discharge upon their treatment , manner of their calculation, taking into account specific requirements for protected zones protection	Official Gazette of RM no. 47/11 of 08.04.2011.
INFORMATION DELIVERY	
Rulebook on the manner of delivering information from discharged waste waters monitoring, as well as the format and the content of the form for data delivery	Official Gazette of RM no. 108/11 of 12.08.2011.
MONITORING OF WASTE WATER DISCHARGES	
Rulebook on on the manner of delivering information from discharged waste waters monitoring, as well as the format and the content of the form for data delivery	Official Gazette of RM no. 108/11 of 12.08.2011.
INSPECTION SUPERVISION	
Rulebook on the format and the content of the invitation for education, manner of education performance, as well as the manner of keeping the central records for completed education	Official Gazette of RM no. 118/11 of 01.09.2011.
POLLUTING MATTERS AND SUBSTANCES	
List of polluting matters and substances	Official Gazette of RM no. 122/11 of 07.09.2011.
WATER RIGHT	
Rulebook on the format and the content of the application for failure to issue permit or failure to take decision rejecting the application for issuance of permit for use of water or permit for abstraction of sand, gravel and stone in riverbeds and shores of surface water bodies	Official Gazette of RM no. 129/11 of 23.09.2011.
Decision to initiate procedure for awarding concession for use of water for electricity production by hydro power plants on the river Crna Reka	Official Gazette of RM no. 144/13 of 22.10.2013
Decision to initiate procedure for awarding concession for use of water for electricity production by hydro power plants on the river Crna Reka and participation in public private partnership with AD ELEM	Official Gazette of RM no. 129/12 of 18.10.2012
Decision to initiate procedure for awarding concession for use of water for electricity production by hydro power plants on the river Crna Reka and participation in public private partnership with AD ELEM	Official Gazette of RM no. 138/12 of 06.11.2012

WATERS PROTECTION	
Rulebook on technical and other conditions related to installation and operation of plants using dangerous matters and substances and manner of plants testing by experts prior to their putting into operation at regular intervals during operation	Official Gazette of RM no.123, of 12.09.2011
Rulebook on the format and the content of the application for failure to issue permit or failure to take decision rejecting the application for issuance of permit for discharge	Official Gazette of RM no. 129/11 of 23.09.2011.
Rulebook on setting the criteria for delineation of zones sensitive to nitrates	Official Gazette of RM no. 131/11 of 28.09.2011.
Decision delineating protection zones around the spring “Studenchica”	Official Gazette of RM no. 151, of 31.10.2011
Rulebook on the format and the content of the registry of protection zones of areas designated as protected natural heritage where maintenance and improvement of the status of waters is an important factor	Official Gazette of RM no. 25, of 19.02.2013
FUNDS FROM COMPENSATIONS FOR WATERS	
Programme for waters management for 2012	Official Gazette of RM no. 12/12 of 26.01.2012.
Programme amending the Programme for waters management for 2012	Official Gazette of RM no. 99/12 of 03.08.2012.
Programme for waters management for 2013	Official Gazette of RM no. 4/13 of 09.01.2013
Programme for waters management for 2014	Official Gazette of RM no. 8/14 of 14.01.2014
WORLD NATURAL AND CULTURAL HERITAGE	
LAW ON THE MANAGEMENT OF WORLD NATURAL AND CULTURAL HERITAGE IN OHRID REGION	
Law on the Management of World Natural and Cultural Heritage in Ohrid Region	Official Gazette of RM no. 75/10 of 07.06.2010.
EMISSIONS OF VOLATILE ORGANIC COMPOUNDS AT PETROL USE	
LAW ON THE CONTROL OF EMISSIONS OF VOLATILE ORGANIC COMPOUNDS AT PETROL USE	
Law on the Control of Emissions of Volatile Organic Compounds at Petrol Use	icial Gazette of RM no. 38/14 of 24.02.2014.

LIST OF ABBREVIATIONS

7EAP	7th Environmental Action Programme
ASCI	Areas of Special Conservation Interest
BA	Batteries and Accumulators
CDDA	Common Database on Designated Areas
CLRTAP	Convention for Lon Range Transboundary Air Pollution
CO	Carbon monoxide
EEA	European Environment Agency
EU-ETS	EU-Emission Trading Schemes
GLOBE	Global Learning and Observation to Benefit Environment
IBA	Important Bird Area
IPA	Important Plant Area
IUCN	International Union for Conservation of Nature
NAMAs	National Adequate Mitigation Actions for climate change
NH3	Ammonia
NMVOC	Non-methane Volatile Organic Compounds
NOx	Nitrogen oxides
PBA	Primary Butterfly Areas
PM_{10}	Particulate Matter sized up to 10 micrometers
$PM_{2.5}$	Particulate Matter sized less than or equal to 2.5 micrometers
POPs	Persistent Organic Pollutants
REACH	Registration, Evaluation, Authorization and Restriction of Chemicals
SAICM	Strategic Access in Chemicals Management
SNAP	Selective Nomenclature of Air Pollution
SO2	Sulfur dioxide
TSP	Total Particulate Matters
UNFCCC	United Nations Framework Convention on Climate Change
VOCs	Volatile Organic Compounds
GEF	Global Environmental Fund
GMO	Genetically Modified Organisms
SAAAQMS	State Automatic Ambient Air Quality Monitoring System
DDD	Name of measuring point of PHC Skopje
EMEP	Programme for air monitoring in Europe
EMERALD	Ecological network
EU	European Union
AMO	Alive Modified Organism
ZZZ	Name of measuring point of PHC Skopje
IPA	Instrument for Pre-accession Assistance
PHI	Public Health Institution
MASA	Macedonian Academy of Science and Arts
MEPP	Ministry of Environment and Physical Planning

MAFWE	Ministry of Agriculture, Forestry and Water Economy
MFA	Ministry of Foreign Affairs
NCCC	National Committee for Climate Change
NP	National Park
NCSD	National Council for Sustainable Development
NSSD	National Strategy for Sustainable Development in the Republic of Macedonia
O3	Ozone
WBA	Waste batteries and accumulators
UN	United Nations
SD	Sustainable development
PCB	Polychlorinated biphenyl
FRSD	Framework Report on Sustainable Development
RIMSYS	Automatic water quality monitoring system
USA	United States of America
WHO	World Health Organization
UNDP	United Nations Development Programme
UNEP/GEF	United Nations Environmental Programme/Global Environmental Facility
UNESCO	United Nations for Education, Science and Culture Organizations
HMA	Hydrometeorological Administration
HPP	Hydropower plant
HPS	Hydropower System
XE	Хидроелектрана
ХЕЦ	Хидроенергетски системи


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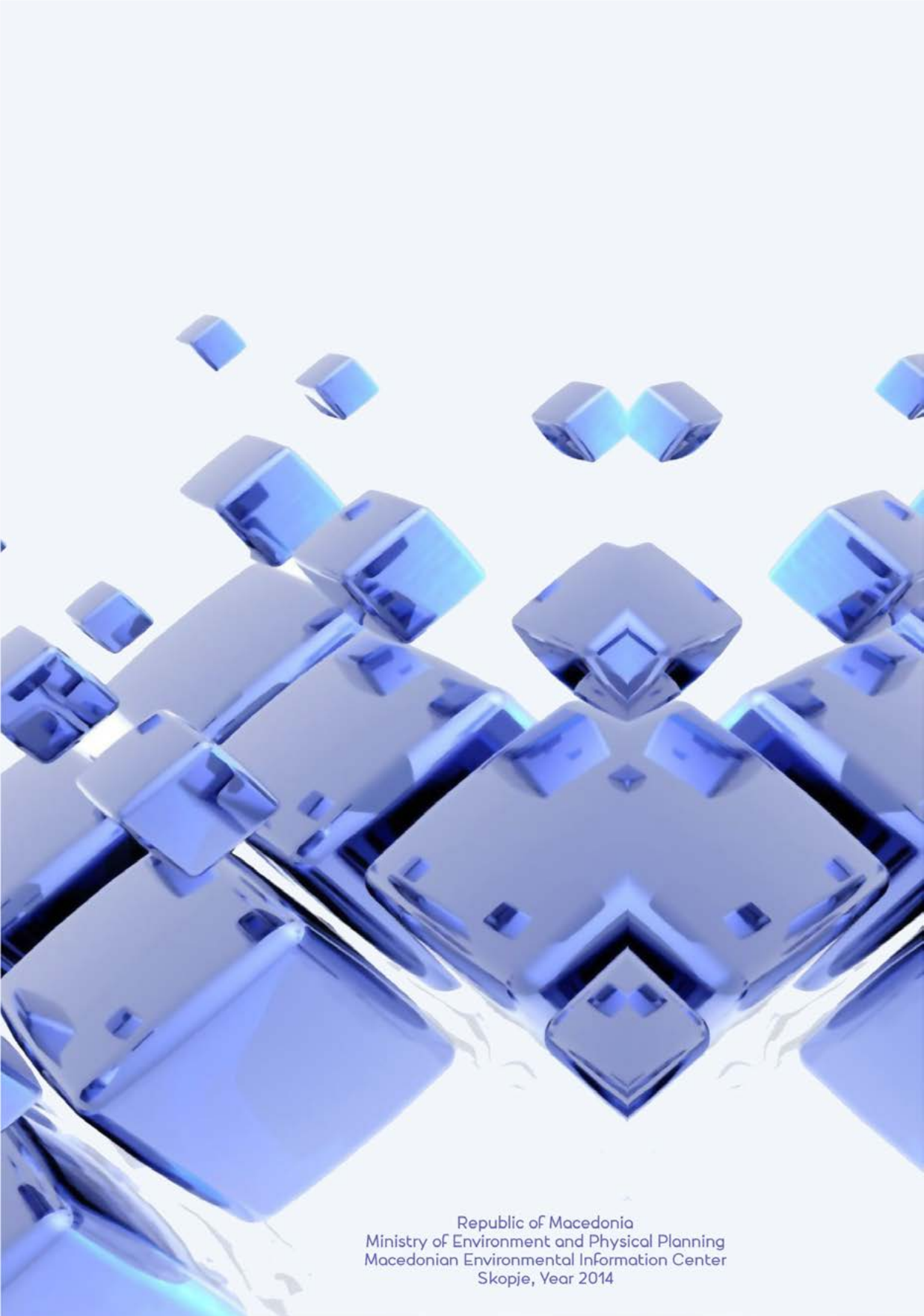

Republic of Macedonia
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