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BUILDING A CIRCULAR ECONOMY WITH THE AIM OF SUSTAINABLE GROWTH- GREEN INFRASTRUCTURE AS A POTENTIAL FOR SUSTAINABLE DEVELOPMENT

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PREFACE

In the preparation of this post- doctoral dissertation, I have precisely demarcated all the important points and after one very powerful live AIU presentation for circular economy. I have made my best possible efforts to elaborate the part important for aeronautics. The transport economy successfully connects air traffic with other branches of traffic and modern technologies of transport on international corridors. The speed of inclusion in European and international flows depends on a compatible transport economy with that of the European Union.

To clarify this part of the post-doctoral dissertation, we will start with a mathematical representation of the title of the dissertation, which is transport economy in function of sustainable development. The mathematical function as one of the most important mathematical subdisciplines represents the mapping of members from one set - domain D (economics as an area of definition) to another - codomain K (sustainable development as an area of values) in some rule where f: D-K where XϵD in the presence of single term Y=f(x) (Economics= f (sustainable development)). In this essay, the given relationship: “Building a Circular Economy with the Aim of Sustainable Growth” will be discussed, which is the transport economy as a function of sustainable development for the later development goal in the post-doctoral studies.

For the construction and development of airports, air traffic control and aviation companies as a subject of consideration of the “Green infrastructure as a potential for sustainable development”, it is necessary to define the terms of sustainable development of air traffic in accordance with the ongoing development, which are elaborated in this essay:

1) the most important features of the “Building a Circular Economy with the Aim of Sustainable Growth” as the concept, importance and types, as well as the relationship between the transport economy and sustainable development, and

2) the basic features of “Green infrastructure as a potential for sustainable development” as the concept and importance, environmentally sustainable airport infrastructure in accordance with air traffic control and airline companies, as well as the fundamental features of the transport economy of sustainable development in national and international frameworks.

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ABSTRACT

Air traffic with a theoretical and practical perception of sight is in the phase of expansion with the need for reconstruction, reorganization and introduction of new modern technologies, is one of the basic factors for development in order to increase the potential and competitiveness of the state which depends on the transport economy and the overall sustainable development of air traffic. As an area of study of all segments of the economy, the meaning of its study is found, which is sustainability. The transport economy of air traffic at the state level with the positive effect of sustainable development, as well as in other countries in transition, lacks attention to all relevant factors that affect the development of air traffic and transport, and especially the airport infrastructure in need of research.

In this scientific research there are two primary objects of research: transport economics of air traffic and sustainable development with an emphasis on the state level in the Republic of Macedonia, so that the first object is placed in the function of sustainable development while the other object of research is the theory of equilibrium based on of the analysis of costs and benefits for an optimized solution.

The following fundamental scientific hypothesis is set: with the scientific factors for the transport economy of air traffic in function of sustainable development, for the assessment of the degree of development and success of aviation in the development of sports and school purposes in Macedonia, with the assessment of the degree of the relationship between the transport economy and sustainable development. The ultimate goal of this research is to contribute to the process of building and retrofitting all segments of aviation (airports, air traffic control and aviation companies) at the national and global level through the circular economy.

Why should you explore the circular economy?

- The overall strategy to achieve net zero emissions by 2050
- The crucial role of government and policy support
- Effective implementation of sustainability measures
- Financing the energy transition
- Measuring, tracking and reporting emissions
- Addressing non-CO2 emissions
- The significance of value chains

Who will you meet?

- Airlines
- Airports
- Solution providers
- Policy-makers
- Regulators
- Banking and financial institutions
- Researchers
- Thought-leaders

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There are the questions that this paper is going to find the answers.

1.0 INTRODUCTION

In recent decades, the world has been faced with ever greater and faster growth and expansion of cities. On the one hand, cities offer great opportunities to their population through access to diverse services and functions, but on the other hand, they increase the pressure on the environment, which leads to numerous problems, not only at the local, but also at the global level. Namely, while the areas covered by gray or classic infrastructure are increasing, green spaces are becoming endangered due to the reduction and fragmentation of their surfaces. At the same time, cities and their inhabitants they become more and more vulnerable. This problem is further accentuated by climate change, so cities around the world are becoming more susceptible to various disasters such as floods or droughts. This ultimately affects the damage to the urban infrastructure, but also the quality of life in general. In addition, the consequences of anthropogenic action include the formation of heat islands, i.e. higher air temperature in urban areas, problems with stormwater management, air pollution, smog and dust, and noise. All this threatens the health of the inhabitants and the ecosystem. To solve the mentioned problems, it is necessary to develop effective concepts and tools that could mitigate these negative effects of human activity. At the same time, the main motive for management cities in the future should be sustainable development. One of the concepts for achieving sustainable development is green infrastructure. Namely, its value is that it has the potential to create sustainable solutions based on nature that aim to improve resilience of urban environments and maintaining healthy ecosystems.

In this paper, by means of an analysis of the available literature and sources, the concept of green infrastructure will be presented through several examples and types and through its ecological, economic and social advantages over gray infrastructure. In addition, the operation of green infrastructure in in the context of achieving the goals of sustainable development, especially through its contribution to the fight against climate change and through its role in the strategies of the European Union. In addition, possible challenges when implementing this concept will be considered.

2.0 THE TERM AND THE ROLE OF THE CONCEPT

Green infrastructure (GI) as a concept was introduced within the framework of the sustainability and resilience approach, and as a response to natural disasters that affect urban as well as rural areas. This, and other closely related concepts, are mainly used in the USA and the European Union. There are several definitions, and green infrastructure is most often defined as a strategically planned network of natural and semi-natural areas with features designed to provide a wide range of ecosystem services (European Commission, n.d.). In general, ecosystem services can be provisioning (providing food, water, and other resources), supporting (enabling processes such as soil formation or nutrient cycling), regulatory (through regulation of climate, floods, disease, or water purification), and cultural (aesthetic, spiritual, symbolic, educational and recreational) services (Millennium Ecosystem Assessment, 2003, according to Pitman et al., 2015). These services in the case of green infrastructure include: purifying water, improving air quality, providing habitat and recreational space, adapting to

climate change, preventing floods, storing carbon, improving health (European Commission, n.d.) and many other benefits, both for people and for the entire ecosystem.

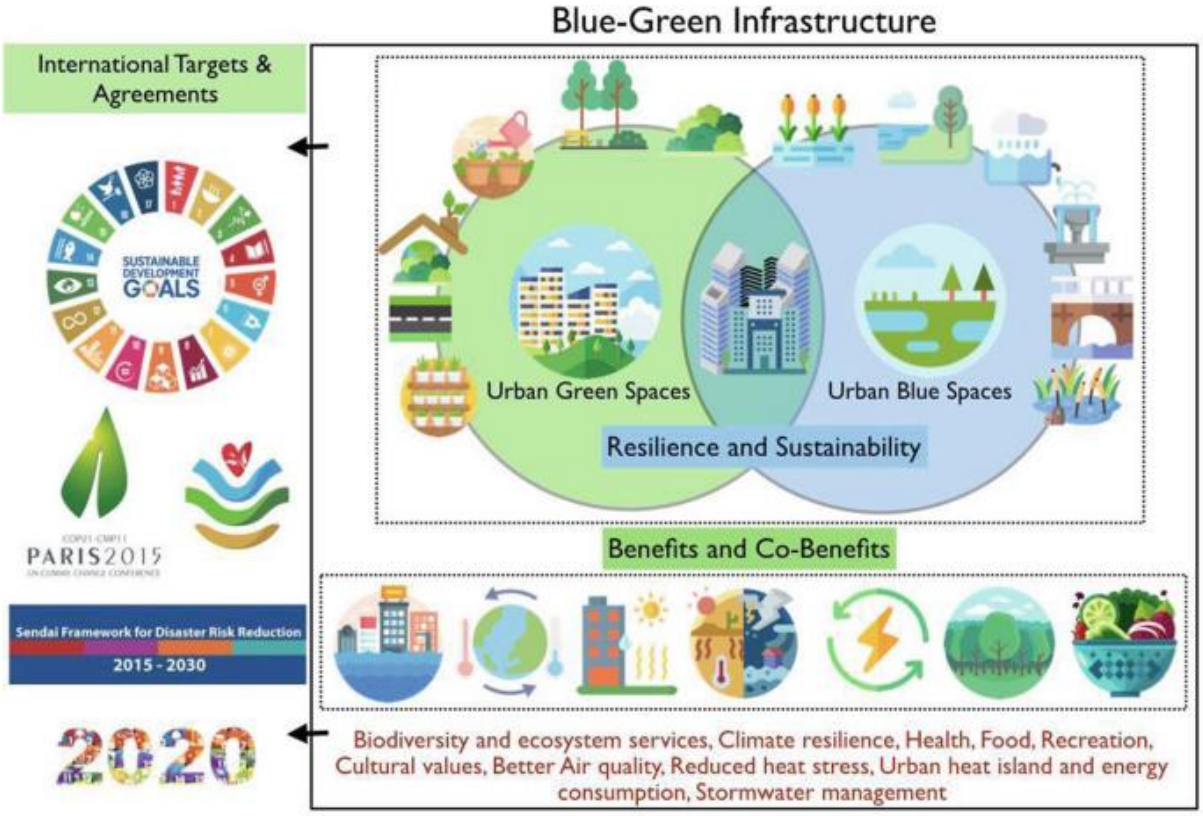

Figure 1, The connection between urban green infrastructure and quality of life[1]

Furthermore, green infrastructure includes natural areas rich in biological diversity such as forests, ponds or meadows, then semi-natural spaces such as parks or private gardens and those artificial, i.e. built areas intended to improve ecosystem services or encourage the movement of wild animals, such as green roofs or bridges (European Commission, n.d.). Green infrastructure maintains and restores ecosystems, ensures the continuous provision of their services, and provides the habitats and resources that species need to survive. It includes green spaces (or blue in the case of aquatic ecosystems) and other physical features in terrestrial (including coastal) and marine areas, while on land it is applicable in rural and urban areas. An important part of the green infrastructure network in Europe is the Natura 2000 network, which covers 18% of the land area of the European Union and 10% of its marine territory (BISE, n.d.).

Also, green infrastructure overlaps with concepts of nature-based solutions, water management measures, disaster risk reduction concepts, and climate adaptation and mitigation approaches. Although each of them emerged from different sectors of activity and different political needs, and although they differ in their specificities, they share the goal of using nature as a tool to solve social challenges in a cost-effective and sustainable way (BISE, n.d.).

[1] https://link.springer.com/chapter/10.1007/978-981-16-7128-9_23

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Contrary to traditional gray infrastructure, which usually has only one purpose, green spaces can perform several very useful functions, often simultaneously and at lower costs, which makes their multifunctionality one of the key advantages of green infrastructure (European Commission, n.d.). For example, green infrastructure can be used to reduce the amount of storm water entering sewer systems by using the natural property of vegetation and soil to absorb and retain water. In this case, not only one purpose is satisfied, but there are also advantages such as: contribution to better air quality, temperature regulation in urban areas and the creation of additional habitats for animal life or recreational areas for residents (European Environment Agency, 2015).

In addition, green areas give places an identity and contribute to the cultural and historical landscape. In addition, green infrastructure solutions are often cheaper than gray infrastructure and can ensure a contribution to the implementation of the goals prescribed by the European Union related to regional and rural development, disaster risk management, climate change, agriculture and forestry and the environment (European Environment Agency, 2015). Given that European ecosystems are degraded daily by land fragmentation, urban expansion and the construction of transport and energy infrastructure, green infrastructure planning can in many cases reduce dependence on gray infrastructure that can be harmful to the environment and biodiversity, and often more expensive to build. and maintenance. At the same time, degraded ecosystems have lower species richness and are not able to offer the same services as healthy ecosystems (European Commission, n.d.).

Thus, green infrastructure is a successful means of providing ecological, economic and social benefits through natural solutions. It requires careful planning and coordinated action in order to achieve a balanced system of protection, sustainable use and management at local, regional, national and supranational levels. With the proper application of green infrastructure solutions, urban development can be ensured that does not destroy the future potential of the place, and that establishes a balance between different needs in the environment (European Commission, n.d.).

3.0 EXAMPLES AND TYPES OF GREEN INFRASTRUCTURE

Green infrastructure consists of a wide range of different elements (tab. 1) that can operate at different scales - from local elements such as hedges or green roofs, to entire functional ecosystems such as intact floodplain forests or rivers. Each of these elements can contribute to green infrastructure in urban, suburban and rural areas, and inside and outside protected areas (European Commission, 2013). However, not all green areas are necessarily qualified as part of green infrastructure. Namely, in addition to having high quality, they must also form an integral part of an interconnected network of green infrastructure and be capable of providing multiple functions. This is why an individual tree can be an element of green infrastructure, but it will only be valuable if it forms part of a larger habitat or ecosystem that then provides a wider function. Another example is agricultural land with intensive management in rural areas. It would generally not be part of a green infrastructure network, unless specifically managed in a way that supports local biodiversity or encourages multifunctional land use that combines food production with other benefits, such as recreation or water treatment (European Commission, 2013).

Table 1, Components of green infrastructure

ELEMENT	DESCRIPTION
NODES	AREAS OF HIGH VALUE AND BIOLOGICAL DIVERSITY, SUCH AS PROTECTED (NATURE 2000) AND UNPROTECTED AREAS WITH IMPORTANT, HEALTHY AND FUNCTIONAL ECOSYSTEMS
CORRIDORS	THEY INCLUDE NATURAL ELEMENTS SUCH AS SMALL STREAMS, PONDS, HEDGES OR WOODED AREAS
RESTORED HABITATS	THEY HAVE A ROLE TO RECONNECT OR IMPROVE EXSISTING NATURAL AREAS
BUFFER- TAMPON ZONE	THEY IMPROVE THE GENERAL ECOLOGICAL QUALITY AND BIOLOGICAL DIVERSITY OF THE LANDSCAPE
MULTIPURPOSE ZONES	THEY ARE USED IN A WAY TO SUPPORT MULTIPLE USES IN THE SAME SPACE

Source: EC, 2013, according to BISE, n.d.

Furthermore, the elements of urban green infrastructure can be divided into several categories according to their features, functions, ownership or affiliation. According to the character of green areas, we can distinguish between their conventional and unconventional elements. The most conventional elements of urban green infrastructure are public parks and gardens, green squares, street greenery, greenery that accompanies or complements roads and other green areas (Supuka et al., 2008, according to Tóth et al., 2015). On the other hand, unconventional components have appeared more often only in the last twenty years. These are, for example, gardens on roofs, i.e. green roofs, vertical greenery or green walls, brownfield areas converted into semi-natural green areas, and rain gardens. Also, private (family gardens or plots), semi-public and public (parks) green areas can be distinguished (Tóth et al., 2015).

Figure 2, Several types of green infrastructure at Airports[2]

[2]https://www.google.com/searchq=Several+types+of+green+infrastructureat+Airports&tbm=isch&ved=2ahUKEwiC_NTs8Z2BAxX8iv0HHVq3D4UQ2cCegQIABAA&oq=Several+types+of+green+infrastructureat+Airports&gs_lcp=CgNpbWcQAzoECCMQJzoHCCMQ6gIQJ1CCO1jUamCVemgBcAB4AoABsgGIAdwvkgEFNTMuMTWYAQCgAQGqAQtnd3Mtd2l6LWltZ7ABCsABAQ&sclient=img&ei=VJX8ZIKCEfyV9u8P2u6-qAg&bih=775&biw=1600&client=firefox-b-d

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Rain gardens are often mentioned as an example of green infrastructure. We can define them as depressions in the ground intended for receiving, storing and filtering rainwater from roofs and other surfaces. They are planted with selected plants that can adapt to dry and rainy conditions. Green roofs, which are covered with vegetation, are another innovative example. Compared to conventional roofs, green roofs slow down and reduce runoff volume. At the same time, they serve as insulation of the building from heating, and can also serve as habitats for some insects and birds. Permeable pavements and pavements are also an important element that enable rainwater infiltration and thus contribute to drainage in a natural way (Šperac and Obradović, 2019).

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Considering existing built spaces, hybrid planning approaches combining green, blue (water bodies) and gray infrastructure are often used to achieve greater community benefits and resilience (Zuniga-Teran et al., 2020). For example, in many urban areas, mainly in industrial cities, there are former industrial plants or other abandoned areas with no modern use. These areas represent potential green areas that could improve the resistance of urban environments to the negative impacts of climate change. Therefore, green infrastructure in urban areas can be seen as a combination of natural and artificial elements intended to achieve the goals for ensuring sustainability (Tóth et al., 2015).

4.0 ADVANTAGES

Green infrastructure brings multiple benefits arising from the area it occupies, because through the creation of a system of connected spaces and services, it simultaneously creates value for people and the local ecosystems it supports (Pitman et al., 2015). The following text lists the advantages of green infrastructure divided into environmental, economic and social benefits.

4.1 Environmental Benefits

The benefits of green infrastructure in an ecological sense are very valuable and diverse. First of all, vegetation provides a multitude of services: from providing shade, reducing noise, purifying and managing water, over wind protection, filtering air, stabilizing and suppressing soil erosion, and providing habitat for wildlife. Therefore, trees and other vegetation can help reduce the urban heat island effect through two main natural mechanisms. The first of them includes temperature reduction and protection from solar radiation by providing shade to urban areas, while the second includes evapotranspiration, which has the effect of cooling and moistening the air (Pitman et al., 2015). Namely, trees can intercept most of the Sun's energy, whereby part of the energy is reflected, and most of it is absorbed and used in photosynthesis. Also, providing tree shade to reduce surface temperature is considered much more effective than shading with non-natural materials (Georgi and Dimitriou, 2010, according to Pitman et al., 2015).

Furthermore, the increasing need for resilience to deal not only with higher temperatures, but also with more extreme weather events, such as storms and floods, calls into question traditional ways of planning and designing cities. This is because flooding has long been a problem faced by many cities around the world, especially low-lying coastal settlements that are also affected by rising sea levels. At the same time, better adaptation to storms and floods is facilitated by areas under vegetation and those with porous surfaces because they have the ability to capture, retain and reuse water (Pitman et al., 2015). Water is an integral element of green infrastructure, whether it is rainwater, groundwater, stormwater, recycled water, desalinated water or water in streams, rivers, wetlands, lakes and reservoirs. Effective green infrastructure is closely related to effective water management. Safe and accessible water supplies, healthy waterways, habitats for flora and fauna, and flood protection are just some of the ways in which green infrastructure, through effective water management, contributes to the sustainability of cities (Wong, 2011, according to Pitman, 2015).

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Figure 3, Examples of urban green infrastructure[3]

Another issue is the impact on air quality. Namely, with the growth of cities, an increased level of pollutants is expected, which will result in deterioration of air quality with harmful effects on human health. In this case, green infrastructure contributes to improving air quality through carbon sequestration, shading and temperature reduction, reduction of greenhouse gas emissions through energy conservation, particle capture through vegetation, improved water and ecosystem management, and wind protection (Pitman et al., 2015). Wind in urban areas is very complex and depends on many factors, such as street design or orientation, so tall buildings can create high wind speed paths. On the one hand, wind can benefit urban areas by transporting air pollutants away from the city or reducing temperatures, but it can also carry dust and smoke or threaten comfort and safety (Pitman et al., 2015). Vegetation can contribute to changes in wind blowing by obstructing, guiding, deflecting and allowing air movement (Miller, 2007, according to Pitman et al., 2015) which can have benefits for improving health, safety, mobility and creating a more comfortable living environment.

Another benefit and function of green infrastructure is certainly the preservation of biological diversity through the creation of effective networks of green and water areas. These areas then reduce habitat fragmentation and contribute to species diversity and ecosystem health by providing habitat, food and water for many species (Pitman et al., 2015). Among other benefits, Pitman et al. (2015) cite a reduction in noise, reduced temperature of vehicles and parking spaces, protection from UV radiation and related health problems, extended duration of various materials and surfaces, and, in the case of green roofs and walls, an advantage in reduced energy consumption for heating and cooling buildings through soil and plant insulation.

[3] https://zeleneiplavesesvete.com/2020/03/18/zeleni-plan-zelena-infrastruktura-i-kruzno-gospodarenje-prostorom-u-urbanim-uvjetima/

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4.2 Economic Advantages

In economic terms, the benefits of green infrastructure include the reduction of numerous costs that may include the costs of water treatment, sewerage, facility maintenance, air pollution removal, or healthcare costs. Also, the contribution to energy saving is important. In addition, the presence of green areas often increases the value of the property next to it and attracts investments, which ultimately affects improved economic growth and employment and the creation of conditions for the sustainable development of agriculture, tourism, recreation and other activities (Liu et al., 2020).

For example, green infrastructure can create spaces for healthy and sustainable tourism in urban and rural areas and thus create new opportunities for employment, for work on the protection of cultural and natural heritage, and for increasing income. Furthermore, green infrastructure, in addition to improving the resilience and functioning of the ecosystem, can reduce business and investment risk and improve the company's reputation, considering that sustainably produced products have an increasing demand in the market. Also, its benefits can be seen in sectors such as transport. This is because green infrastructure contributes to the growth of sustainable transport and mobility through its impact on reducing carbon emissions and mitigating the effects of habitat fragmentation caused by transport infrastructure (BISE, n.d.).

4.3 Social Advantages

In the social sense, the advantages of green infrastructure are most often related to the improvement of people's physical and mental health. This includes reducing psychological stress and related diseases, as well as diseases caused by air pollution. In general, a living environment with many green spaces is also associated with a longer life expectancy because it enables a healthier and more sustainable lifestyle (Liu et al., 2020).

Green infrastructure is important for community development through cohesion and reducing the crime rate, which is confirmed by the data according to which fewer violent incidents are reported in areas with more developed green infrastructure. In addition, its presence has a positive effect on the cultural aspect through educating the public about the value of green areas, through the positive emotions that such areas evoke, through greater public participation, and through encouraging art and the attractiveness of the space, as well as better social relations in the living and working environment (Liu et al., 2020).

5.0 ROLE IN ACHIEVING SUSTAINABLE DEVELOPMENT

The increase in the number of inhabitants is accompanied by the increasing struggle of cities to meet expectations about their sustainability. Given that they are at the intersection of technology, resources, population, culture and economy, cities are uniquely positioned to address sustainability issues. Also, it can be said that sustainability is both a process and a goal because the transition to sustainability requires both short-term and long-term action (Chini et al., 2017). Speaking about the concept of sustainability, it is important to mention the concepts of vulnerability and the ability to adapt. They indicate the ability of some systems to adapt and resist disturbances, i.e. potential damages, and how they will be able to take advantage of the opportunities and deal with the consequences (Manuel-Navarrete et al., 2007, according to Marot et al., 2015).

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In addition, sustainability programs in cities are often part of social and technical changes, so they require thorough consideration, where the shift towards sustainable development should be the main goal and driver of urban planning and policy. Namely, a transformation is needed from the traditional principles of planning and engineering used in the 20th century to a new, more sustainable aspect. However, in urban areas there are often already existing regimes, with their infrastructure, social practices and economic investments, which then present challenges to contemporary changes (Chini et al., 2017).

Some of these changes include the emergence of the concept of smart cities. These are cities that, in a narrower sense, provide communication technology services to residents, but in a broader sense, they also require efficient use of energy sources and innovative technology. In this way, they contribute to saving energy and costs and improving the quality of life. The concept represents a general guideline and strategy with an emphasis on the fact that a city is smart only when it enables all elements of development, including economy, environment, traffic and people (Marot et al., 2015).

That is why, in the management of cities, the goals of sustainable development play an increasingly important role, and green infrastructure, together with its combination of ecological, social and economic advantages, is a potential tool for achieving the set goals, as well as an important part of future smart cities. This is proven by the fact that as of 2020, almost 20% of more than 800 cities around the world have reported that they will plant trees and create green areas as part of a plan to adapt to climate hazards and build resilience to them (Fig. 4). Other actions included flood mapping (18%), involvement and education of the social community (15%), development of crisis management plans, i.e. warning and evacuation systems (14%) and design and construction of climate-resistant infrastructure (10%)) (Statistics, 2021a).

Figure 4, How to make infrastructure more resilient against climate change[4]

5.1 Contribution to the Fight Against Climate Change

It is believed that climate change will permanently affect people and the environment and will define future economic progress. Therefore, only those places that have a certain resistance will be able to ensure security and investments. Other influential climate changes include: an increase in the number of people affected by floods, loss of electricity supply due to damage caused by increasingly severe weather conditions, the consequences of extreme heat, which, in combination with air pollution, can cause health problems and restrictions on water supply in certain regions during droughts. it can affect the production, availability and prices of food (PERFECT, 2019).

As for the leading dangers for cities in the coming years (fig. 5), the first place are heat waves and storms, which will become more and more common. In the long term, more frequent events such as droughts or floods are expected (Statista, 2021b).

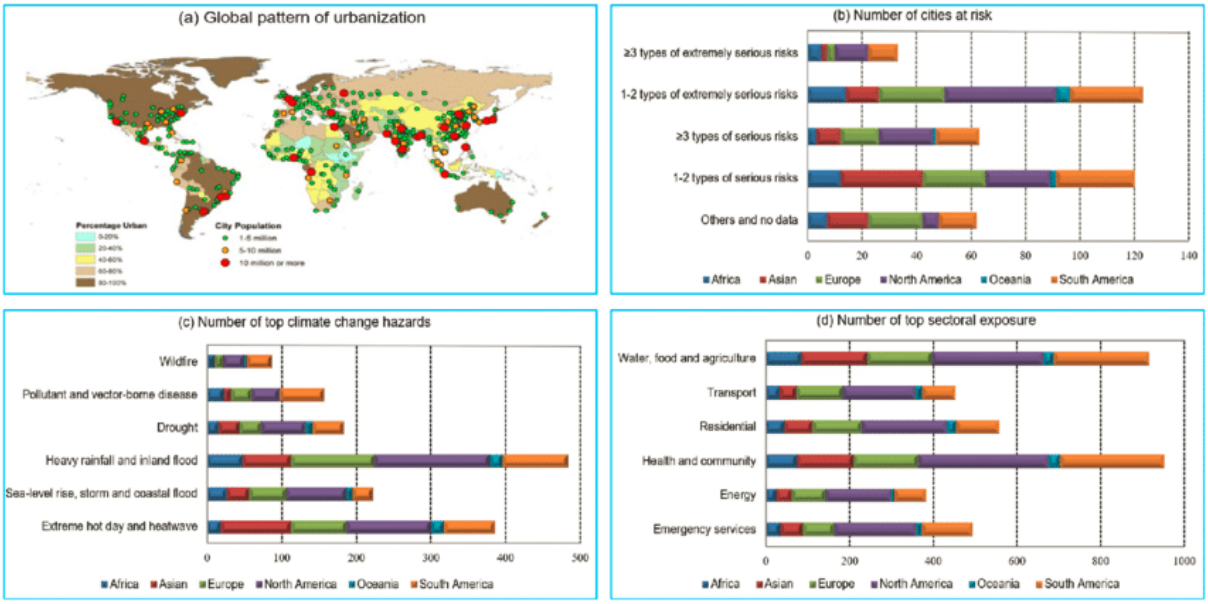

Figure 5, Climate change risks to cities. (a) Global pattern of urbanization[5]

Green infrastructure can help mitigate and adapt to climate change thanks to its adaptive solutions and pollution mitigation, so countries adopting its programs can improve their resilience. On the one hand, regarding the potential to mitigate climate change, green infrastructure provides opportunities for sustainable transport, reducing energy consumption,

[4] https://www.asce.org/publications-and-news/civil-engineering-source/civil-engineering-magazine/issues/magazine-issue/article/2022/01/how-to-make-infrastructure-more-resilient-against-climate-change

[5] https://www.researchgate.net/figure/Climate-change-risks-to-cities-a-Global-pattern-of-urbanization-extracted-from-the_fig1_348420630

developing renewable energy and encouraging carbon sequestration in soil and plants (PERFECT, 2019).

For example, creating a greener and more attractive environment can encourage a change in transport modes as it leads to an increase in walking and cycling which has the effect of reducing greenhouse gas emissions. In addition, installing green infrastructure on or near buildings can reduce the need for heating and air conditioning, which reduces the use of fossil fuels. Regarding the development of renewable energy, green spaces can serve as places for the production of renewable energy because they can accommodate wind farms and solar farms, while certain types of vegetation can themselves be a source of renewable energy (PERFECT, 2019).

On the other hand, adaptation to climate change, through green infrastructure, manifests itself in flood risk management, regulation of extreme temperatures and support of wild animal habitats. Namely, the contribution to flood risk management can be considered one of the most important roles of green infrastructure. At the same time, climate change has already reduced the availability of water and threatened the ability to supply water in water supply systems. Therefore, one of the prerequisites for sustainable development is the maintenance of water resources resistant to natural disasters, self-sustaining and useful for the community. Green infrastructure can also protect and improve the resilience of other infrastructure by reducing the risk of erosion thanks to plants whose roots stabilize the soil while they themselves help retain water. Also, green infrastructure plays a major role in reducing the impact of urban heat islands and extreme temperatures, as research shows that green spaces can cool the air by as much as 2 to 8°C (PERFECT, 2019).

5.2 Involvement in European Union Strategies

The European Union supports the implementation of green infrastructure by increasing access to finance, providing technical guidance and improving knowledge in the context of existing legislation and policy instruments. Also, numerous green infrastructure projects, although realized, were not necessarily named as such, but included areas for nature protection, land use planning or instruments for improving the connectivity of existing areas. In addition, the European Union promotes green infrastructure as a policy that can reduce biodiversity loss and contribute to climate change adaptation and mitigation. Various documents of the European Union have also emphasized the role of this concept in enabling the growth of companies and investments and the need to simultaneously strengthen biodiversity conservation and economic growth (EC, 2013, according to Salomaa et al., 2016). This chapter will outline some of the most important documents and strategies.

First of all, the European Commission Communication on Green Infrastructure from 2013 laid the foundation for green infrastructure as a tool that aims to provide environmental, economic and social benefits through natural solutions. This stimulated the investments needed to maintain and improve the above-mentioned benefits. Furthermore, apart from the aforementioned Communication, the preservation and development of green infrastructure are defined as priorities in the policies of the European Union, which cover a wide range of sectors. For example, the EU Biodiversity Strategy until 2020 defines goals for the maintenance and

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restoration of ecosystems and their services, the establishment of green infrastructure and the restoration of at least 15% of degraded ecosystems (Liquete et al., 2015).

Other strategies include documents on the efficient use of energy resources, proposals for the Cohesion Fund and the European Regional Development Fund, the Common Agricultural Policy, the Forest Strategy, the Communication on Land as a Resource (Liquete et al., 2015), the Water Directive, the Flood Directive or the Climate Change Adaptation Strategy (European Environment Agency, 2015). However, the most important document is the Strategy for Green Infrastructure adopted in 2013, which advocates its integration into European Union regulations, whereby green infrastructure would become a standard element of territorial development throughout the EU. Also, the Strategy places the use of green infrastructure in the context of the Strategy for Growth - Europe 2020 (European Environment Agency, 2015). Europe 2020 is a development strategy of the European Union issued by the European Commission in 2010. One of the priorities of the EU defined in this document is the achievement of smart and sustainable growth. The strategy defines green infrastructure as one of the tools to achieve main goals such as innovation, education, social inclusion and climate and energy issues. In addition, the Strategy represents an important step towards the protection of European natural wealth and towards sustainable regional development (European Commission, 2013, according to Tóth et al., 2015).

The network of green infrastructure in Europe (Fig. 6) was created based on the analysis of eight services essential for the management and maintenance of ecosystems (these are: air quality regulation, erosion protection, water flow regulation, coastal protection, pollination, maintenance of soil structure and quality, water purification and climate regulation) and based on the habitat of large mammals (Liquete et al., 2015).

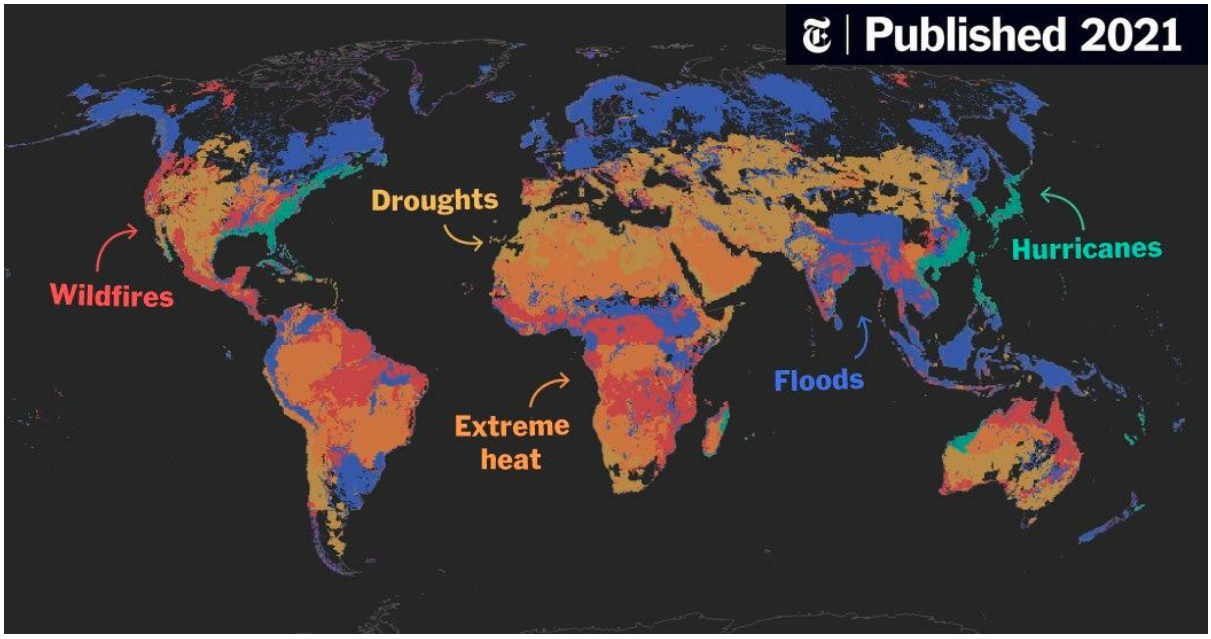

Figure 6, Every country has its own climate risk[6]

[6] https://www.nytimes.com/interactive/2021/01/28/opinion/climate-change-risks-by-country.html

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The network covers all EU member states, except for Croatia, for which sufficient data was not available. Therefore, 23% of the territory is made up of core areas, i.e. areas of the core of green infrastructure, while 16% is made up of auxiliary areas. Core areas are those that have the best state of the ecosystem and important processes within it. These areas are crucial for the maintenance of biological diversity and natural capital and should therefore be preserved. On the other hand, auxiliary areas need to be upgraded in order to increase their ecological and social resilience and therefore represent areas with potential for restoration (Liquete et al., 2015). In terms of shares among countries, Estonia, Slovenia and Latvia have the highest coverage of the green infrastructure network with shares of the core area between 56 and 63% of their territory. Conversely, Malta, Cyprus and Hungary show minimal coverage, less than 2%. As for auxiliary areas, Portugal and Greece have the highest coverage (38 and 34%, respectively). Ultimately, Cyprus has the sparsest network (6% of the territory) and Estonia the largest (73%) (Liquete et al., 2015).

6.0 CHALLENGES

There are also significant challenges in the implementation of sustainable development measures. First of all, issues of disaster resilience are generally not highlighted enough, and building disaster-resilient communities is often not a priority until disaster strikes. In addition, it is often difficult to encourage investors to adopt sustainable mitigation measures when money is already invested in current development (Tyler, 2016).

According to Zuniga-Teran et al. (2020), there are five most common challenges that are present during the implementation of green infrastructure in cities around the world and that can slow down its construction and use. These are: design standards or norms, regulations, socio-economic challenges, financing and innovation.

The fundamental factor that appears in all challenges is the role of political will as a fundamental factor for the successful implementation of the concept of green infrastructure. Political will is a prerequisite for facing all five challenges in a coherent way and is crucial for the establishment of new regulations and standards. Similarly, political commitment to invest in green infrastructure can be an opportunity (or an obstacle, in case of lack of commitment) to overcome the financial challenge and support innovation, as well as to distribute the socio-economic benefits of green infrastructure (Zuniga-Teran et al., 2020). Ultimately, although these are individual challenges, they should be viewed in an integrative way because the implementation of the concept of green infrastructure depends on the context. Namely, each city faces unique challenges in terms of its regulations, financial capacity, type of participants, level of development, availability of land, climate and land conditions, and its potential for innovation. Therefore, in cities around the world, with appropriate technologies, solutions specific to the space in which they are located will probably appear. At the same time, successful learning and overcoming challenges can be facilitated by data exchange and cooperation between cities (Zuniga-Teran et al., 2020). The following is a more detailed overview of each of the mentioned challenges.

6.1 Standards

The first challenge encompasses green infrastructure design standards and concerns the issues of how best to plan, design, implement and maintain green infrastructure.

Namely, during the design itself, there are technological obstacles that include the lack of data on the details of the project implementation and insufficient technical knowledge and experience (NRC, 2009, according to Zuniga-Teran et al., 2020). In doing so, it is necessary to define guidelines for design that will be adapted to local conditions in different cities and that will correspond to their specific needs, threats in the environment and availability of resources. All of them are crucial for the successful functioning of green infrastructure (Li et al., 2017, according to Zuniga-Teran et al., 2020) and, although it alone may not be able to fully restore the functioning of the ecosystem, it can certainly mitigate some negative effects.

Another design challenge involves unclear health benefits. This is because it is not exactly clear which elements in nature produce which health benefits, while some plant species can even have negative effects on health due to, for example, the creation of allergens (Shanahan dr., 2015, according to Zuniga-Teran et al., 2020). Also, the problem is that design norms are often universal, which does not correspond to the fact that green infrastructure and its advantages are specific to each location. Also, for design challenges, it is necessary to take into account the multifunctional aspect of this infrastructure, which includes possibilities for social and ecological use (Zuniga-Teran et al., 2020).

6.2 Regulations

Another challenge is related to the problem of finding an appropriate regulatory environment, because in many countries, numerous competent institutions do not have clear procedures for regulating green infrastructure and its benefits. Also, these institutions are relatively poorly integrated into a system that could fully utilize the already mentioned multifunctional aspect of green infrastructure. In addition, there is also the problem of integrating and coordinating different levels of government and jurisdictions that have different capacities and resources and that should oversee the green infrastructure network (Zuniga-Teran et al., 2020).

6.3 Socio-Economic Challenges

Under the third, i.e. socio-economic challenge, unequal access to green infrastructure among different groups of people is considered. So, it often happens in many cities that neighborhoods with low incomes also have less vegetation and less access to green space than wealthy neighborhoods. Despite the fact that the promotion of social equality is highly represented in initiatives for sustainable development, in practice it is a different story and in different places around the world marginality can manifest itself through a certain income, age, religion, caste or education, which usually means a lack of opportunity to take advantage green infrastructure (Zuniga-Teran et al., 2020).

In general, wealthier areas tend to be the first to benefit from green infrastructure, while poorer areas lag behind. This is because green infrastructure projects tend to start in areas that already have gray infrastructure and the capital to transition to green technologies, while poor neighborhoods still struggle to build gray infrastructure. When green infrastructure is finally developed, gentrification processes often perpetuate injustice by displacing poorer citizens from such improved neighborhoods (Gulsrud et al., 2018, according to Zuniga-Teran et al.,

2020) because after improvements in aesthetics and quality of life, real estate prices rise. On a global level, cities in the global south face the greatest challenges and pressures. These pressures include weak, inappropriate or absent planning, population growth and poverty, which put additional pressure on ecosystem services (Lindley et al., 2018, according to Zuniga-Teran et al., 2020).

The socio-economic challenge includes public participation, which has been identified as an important aspect for project implementation. Therefore, people's needs and beliefs regarding the benefits of green infrastructure must be taken into account in order to achieve adaptation, behavioral change and public support. The problem arises when low-income residents may not have the free time to participate in community projects, or when some people have a negative view of trees and vegetation because of its association with the habitat of certain undesirable animals. This further hinders greening efforts, especially on private land (Zuniga-Teran et al., 2020).

6.4 Financing

The fourth financing challenge arises because the costs and benefits of green infrastructure technologies are not clearly and reliably estimated, and thus neither are the financing models. Although numerous studies have found that green infrastructure is actually cheaper than traditional, a number of factors can reduce this economic advantage, including: regulations, difficulties in measuring the value of ecosystem services, long-term savings challenges or additional maintenance costs (Zuniga-Teran et al., 2020). . Another challenge for financing lies in the lack of markets and the difficulty of valuing the multifunctionality of green infrastructure due to the wide range of ecosystem services it provides (McRae, 2016, according to Zuniga-Teran et al., 2020).

In addition, studies can be very expensive to conduct, and data collection and monitoring would require large investments. Another challenge is the question of who finances green infrastructure. Since it is more effective when it is widely applied, i.e. on public and private land, the willingness of people to accept and pay for such investments is crucial because the responsibility is transferred from the local government to property owners, which many people are not ready to accept (Parr et al. 2016, according to Zuniga-Teran et al., 2020). In addition, responsibility for maintenance costs further deters residents from investing.

6.5 Innovations

The last challenge is related to innovation. Since the concept of green infrastructure is relatively new, it is necessary to find innovative mechanisms that combine gray, blue and green infrastructure to provide residents with a wide range of ecosystem services. The successful implementation of the concept requires close cooperation between planners, workers, politicians and scientists (Zuniga-Teran et al., 2020). However, there is a gap between the potential and current implementation of existing instruments of nature conservation and land use planning. Part of the reason lies in the fact that different scientific fields understand green infrastructure differently, while its design requires a high level of expertise and overcoming challenges such as data harmonization (Salomaa et al., 2016).

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7.0 AIR TRAFFIC EMISSIONS AND THE GREEN AIRPORT CONCEPT UNTIL 2050 (GREEN AIRPORT 2050)

Emissions in air transport could be divided into two parts, those emitted and generated by aircraft engines, and emissions that occur as a result of servicing the aircraft and all other operations on the ground that are related to the reception and dispatch of the aircraft, its cargo and passengers.

7.1 Aircraft Emissions

Aircraft emissions are related to the mandatory use of kerosene, a type of aviation gasoline, with which aircraft engines can develop sufficient power for flight and transport of a large number of passengers and cargo. Considering the octane number, the following types of aviation gasoline are produced:

- AVGAS 80 stands for red bojot
- AVGAS 100 green
- AVGAS 100LL blue, with low lead concentration LL- low lead.
- Only AVGAS 100LL is delivered to airports in the Balkans.

The exhaust gases of jet engines, which are used by modern aircraft, consist of approximately 7% to 8% CO2 and H2O and 0.5% NOx, HC, CO, SOx and other chemical elements and soot particles. The remaining part (91.5% to 92.5%) consists of O2 and N2.

CO2 and H2O emissions are products of fuel combustion and are related to fuel consumption, which is a function of aircraft mass, aerodynamic design and aircraft engine performance. Emissions of NOx, smoke, CO, HC and SOx are mainly related to the method of fuel combustion in the engine and to some extent to the chemical reactions that follow after combustion.

These emissions are mainly related to the construction of the engine, so they can be reduced by more complete combustion of the fuel.

CO, HC, SOx, NOx and soot particles have the greatest impact on human health and the environment, reducing the ozone level, increasing the possibility of acid rain, reducing visibility and the like. Processes that greatly contribute to the reduction of local air quality are part of a set of atmospheric processes that can have regional and local consequences. The exposure of the atmosphere to ultraviolet UVB radiation, as well as the destruction of the envelope of the zones around the atmosphere, represent the clearest consequences, which people still feel today.

The difference between emissions on the surface of the earth, and those emitted by aircraft, is that these are different and physical conditions, for example the remains of aircraft tracks, or the so-called condensation path, and chemical effects as a byproduct of exhaust gases (destruction of ozone). Emissions that are important for atmospheric processes are not only CO2 emissions. The mixture of elements emitted by airplanes impairs the influence of radiation (radiative forcing) two to four times more than if it were only CO2 emitted. For comparison, the total impact of radiation as the sum of changes in the impact of radiation caused by human

activities is a factor 1.5 times greater than the impact of CO2 alone. Therefore, the consequences of burning fuel at flight altitude are twice as great as the consequences of burning fuel on the ground.

A turning point in limiting emissions and passing aviation regulations related to emissions reduction was initiated in the USA, when in 1970 the US Congress passed the Clean Air Act, which serves as the basis for controlling emissions from aircraft engines. Also, Congress established institutions that will enact and implement regulations. The International Air Transport Organization, in cooperation with the UN, held a conference in 1972, which adopted the ICAO Action Program Regarding the Environment program and a series of measures for environmental protection. As part of the action program, the so-called Study group - Study group that will define certain tasks related to aircraft engine emissions, i.e. exhaust gases. As a result of the work of this group, an ICAO circular entitled "Control of the aircraft Engine Emissions" was created and published in 1977.

The circular contains a "guide" in the form of prescribed procedures for controlling the content of the combustion products of turbo jet and turbofan engines (turbo jet and turbofan engines) intended for subsonic aircraft. The annex defines the composition of exhaust gases that are controlled when issuing an engine certificate: smoke, unburned hydrocarbons, carbon monoxide, nitrogen oxides.

The mass of the proportion of individual gases emitted during the measurement in the take-off and landing phase expressed in grams must also be expressed.

The transport sector around the world accounts for approximately one quarter of the total fuel consumption worldwide, so the growth of transport greatly affects the environment and its quality. Technological and innovative advances can help, but the increase in demand for transport is the main factor in the increase in the mass of emissions. In 1990, air transport had a share of 2.4% of the total consumption of fossil fuels. Compared to the early 1990s, fossil fuel consumption and overall CO2 emissions are projected to increase three to seven times by 2050, which corresponds to a roughly 2.4% growth.

7.2 Measures to Reduce Aircraft Exhaust Gas Pollution in the form of Technological Solutions

Small sports and business aircraft, which are used mainly for the purpose of general aviation, use a piston engine, mainly an Otto engine, and due to the reduced traffic volume of these types of aircraft, atmospheric pollution caused by the exhaust gases of aircraft piston engines is insignificant. They do not use catalysts, since they have no restrictions on the composition of exhaust gases, unlike jet engines. Combustion in jet engines is carried out in the so-called Combustion chambers. Three zones can be distinguished in the combustion chamber: primary, transitional and mixing zone.

On average, fuel combustion in jet engines takes place with high average values of λ (lean mixture), but the combustion process is carried out predominantly in the primary zone of the combustion chamber, where conditions may be significantly different from the average values.

- CO is a product of incomplete combustion, and it can be caused by:

- too rich mixture or too short combustion time in the primary zone of the combustion chamber,
- inadequate mixing of fuel and air, due to which zones of too rich mixture are formed,
- cooling of combustion products, especially in the primary zone by drawing in air for cooling.

Therefore, reducing the emission of harmful gases in the combustion chambers of jet engines is based on the organization of the combustion process so that the emission of harmful gases is as small as possible, and not later, on the subsequent processing of the exhaust gases. It is estimated that the modernization and technological achievements of the production of aircraft engines reduced the emission of exhaust gases, in a period of 40 years, by as much as 70%.

The retention time of exhaust gases of individual emissions in the air is not the same. For example, SO2 is retained for 1-6 days, H2o for 3-7 days, NOx for 1-3 days, while HC is retained for up to two days, while the average retention of CO2 molecules is estimated at 4 months. One fifth of these emissions is retained in the lower layers of the stratosphere, and the rest is emitted in the tropospheric layers.

In addition to technological solutions within the engine structures, a large part also refers to the modernization of the material used to make the aircraft itself. For example, in the case of the new model of one of the most prominent manufacturers of civil aircraft, the French Airbus, the A350XWB, approximately 70% of the structure is made up of a new composite material in combination with titanium and aluminum alloy.

This achieved a reduction of NOx emissions by 30% below the current limit. In addition, the weight of the aircraft has been reduced by 8 tons, which automatically results in lower fuel consumption.

In the scope of modernization and reduction of air transport emissions, the "Clean Sky" project was established, financed from the EU Horizon 2020 program, which is based on innovation and new solutions for the purpose of reducing CO2 emissions, gas emissions and noise levels produced by aircraft. Clean Sky contributes to the strengthening of cooperation between aviation industries and transport companies, as well as airport operators.

7.3 Measures to Reduce Pollution by Operators - "Green Airport 2050."

Unlike the aircraft manufacturers and air carriers themselves, the airport operators themselves, who receive and ship passengers and luggage, play a major role in reducing pollution and the impact on climate change.

Here we will look at the role played by the employer, who is granted a 30-day annual concession for operations and maintenance of the new terminal, built and put into operation.

According to a long-term plan, the operator is fully focused on reducing CO2 emissions and sustainable development. The objectives of the operator implemented in the "Integrated Management System" are:

- systematically include the environment in your activities

- prevent and be a responsible stakeholder in all activities concerning the environment.

In this plan, the operator managed to set standards for all airports in Europe, which resulted in the approval and obtaining of the ACI-Airport Council International certificate this year, which confirms the level of management and reduction of CO2 emissions in daily airport activities. They include the following:

Annually - reduction of electricity consumption: replacement of halogen lighting with LED lights, replacement of "approach" light 23, reconstruction of flashing lights on RWY:

- reduction of fossil fuel consumption, reconstruction of the old room with boilers and replacement of heaters, replacement of old refrigerators, replacement of old hot water pipes with insulated pipes, reduction of water consumption by replacement and installation of new pipes and valves, investment in better thermal insulation of the airport building itself (doors, windows, facade insulation - glass)
- installation of renewable energy sources: water heating with the help of collectors
- better control of electricity, water, fuel and gas consumption: improvement of the HVAC system with better monitoring and control, as well as modernization of the BMS system,
- implementation of the life cycle plan: gradual replacement of airport equipment and equipment (winter equipment for de-icing and management, buses and fire engines),
- education: education of the working staff in order to give importance to the efficient use of energy.

The goal has been achieved, and the "Green Airport-2050" project represents a commendable achievement and goal, taking into account the pandemic period, which most harmed the aviation industry and which feels the great burden of the current crisis.

8.0 ECONOMIC ASPECTS OF THE SUSTAINABLE DEVELOPMENT OF AIR TRAFFIC IN MACEDONIA

Economic aspects as part of the sustainable development of air traffic in Macedonia will be elaborated on the following seven questions: 1) economic theories in the focus of the sustainable development of air traffic; 2) financing for the sustainable development of air traffic; 3) financing for the sustainable development of the airport infrastructure; 4) economic and legal aspects of emissions trading in aviation; 5) rational management of sustainable development in air traffic; 6) compatibility and complementarity of the economy, the sustainable development of air traffic in Macedonia and the European Union; 7) compatibility and complementarity of the economy, the sustainable development of the airport infrastructure in Macedonia and the European Union.

8.1 Economic Theories Focusing on the Sustainable Development of Air Traffic

By determining the total value of the airport infrastructure on the environment, a fundamental basis is created for the percentage of ecological damage to the environment, economy and policy on each project or facility. In order to achieve sustainable development, it will be necessary to calculate the total value of the airport infrastructure in the surrounding area for the

implementation of the development project for the airport in the vicinity of the city of Gevgelija.

The value of the environment is immeasurable and its determination in the economic sense of the unit of measurement is illegal, because the usefulness or loss of the quality of life is of exceptional importance. Attempts to determine the units of measurement for assessing the value of the environment and ecological damage represent a frequent undertaking in reality with the exception of monetary assessment in ecological morality, i.e. love of nature.

Environmental damage is done in this group:

1. Objective damage is caused by pollution in the air and on the ground, the costs incurred by the removal of damage to aircraft and the reduction of the value of movable and immovable resources in aviation.
2. Subjective damage is an individual assessment that is not expressed in the immediate costs of rehabilitation.
3. Economic or monetary damage is a loss in the monetary unit for reduction or elimination, such as loss of working days at airlines, reduction of earnings of employees in the aviation sector, absence of expected income, costs for repairs to airport infrastructure, repairs to airport facilities infrastructure, etc.
4. Uneconomically damaging. Direct loss or unrealized benefits and gains, which result from psychological conditions, their dissatisfaction due to the impure air that is to the greatest extent in the aviation industry, the impossibility of realizing recreation on any action that produces pollution, etc.

The percentage of ecological damage caused by harmful gases in aviation, the meaning of the environment is related to the benefit of investing in means, techniques and methods in order for the obtained results to be more realistic.

The basic problems are considered in: the complexity of the pollution, in the mutual effect of the pollutants and in the dynamics and delayed phenomena of the environment. Different options are compared with costs and use cost-benefit analysis of the project and the total lost value of the environment. In such an analysis of primary, secondary and tertiary costs, problems related to: the place and method of pollution, quantification of pollution, the costs needed to neutralize or reduce the harmful consequences of pollution, the time intervals to which the cost analysis is applied, are used. and benefits, as well as the choice of discount rate.

Value and damage to the environment can be determined by monetary (direct) or natural (indirect) method.91F[7]

The monetary method takes the direct environmental benefits or damages such as: better view, better air quality and directly evaluates the environmental damages for valuing the environment as a resource with the demand curve and charging for that resource to stimulate the market to be able to to value improvements in the quality of the environment.

[7] Črnjar, M.: Ekonomika i politika zaštite okoliša, op. cit. , str. 100.

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The natural (indirect) method of environmental valuation does not require direct observation of environmental resource propensity, but rather calculates or estimates a "dose recreation" relationship between harmful pollution and some harmful effect that presents a challenge to natural science scientists in the process of determining of quantitative relationships between pollutions, while economists use the method of monetary valuation of the environment and ecological damage to the environment.

The problems arise from the natural method, especially the collection of groups of different functions while ecologists have developed the environmental assessment method of valuation and takes the "characteristics of environmental qualities" that are measured and then included in the analysis. The diversity of airport infrastructure is useful in the comparison and planning of land use and ecosystems around airports. The utility can also be increased by determining the average standard norms for ecological quality, which can determine the ecological value without the availability of detailed information.

In this mode, in addition to acceptability, there is a problem in planning and decision-making for the processing of economic parameters, where the solution is provided by the multi-criteria analysis for environmental valuation by reducing to a common denominator for the systemic valuation of the alternatives of more criteria and more attributes.

The monetary valuation of the environment verifies the rationality of improving the quality of the environment during the construction of airport infrastructure. The basic idea boils down to the individual benefit that requires the possibility of choosing the most favorable location at the positive inclination in the willingness to pay the desired demands. Main interests include community demands, individual preferences, and overall willingness to pay for a particular environmental service or resource. The initiator is ready to compensate a higher amount than the requested amount, which in environmental economics is called consumer surplus.

Monetary valuation is expressed in determining the demand for ecological products:

1. methods that determine the "demand curve";
2. methods that do not determine the "demand curve".

Methods that use the consumption curve are:

a. Method for determining travel costs (travel cost method -TCM);
b. Hedonistic pricing method for determining the value of the environment (hedonistic pricing method – HPM);
c. Contingent valuation method (CVM).

The second group of methods includes:

1. Dose response method;
2. Replacement cost method;
3. Behavior mitigation method;

4. Possible cost method.92F[8]

Ecological assessment of the life cycle of economic resources takes place with the method of managing sustainable development, the ecological assessment of the life cycle (Environmental Life - Cycle Assessment -LCA)93F[9] which is the basis of the assessment of environmental impacts in the imperfection of the price system. Its purpose is: determining and quantifying all environmental damage, services and/or production processes with environmental cards (stamps), global thinking, and local action to influence habits and behaviors for relatively less environmental damage. The environmental consequences when choosing certain alternative possibilities is very complex, expensive in terms of time and money, which requires the organization and management of statistical-documentation and information systems. The increase in time and finances does not always give results proportional to the increase, because leaving the equilibrium system also means the need to increase other parameters, which in reality is not always the case. The most common evaluations related to infrastructure projects are often complex, which in practice may result in a change in costs in the cost-benefit analysis. Theoretical and practical attempts create enormous problems in direct and indirect sources. LCA in identifying the numerous links from sector to sector, activity to activity, as reasons for bypassing the project life cycle, leads to the limitations:

i. the impossibility of one "right" answer due to the many numerous alternatives; in the potential choice, they are not compared with other potential alternatives;
ii. because there is no single quantitative or qualitative indicator of real damages;
iii. As the precision of the LCA method increases, its complexity increases with a significant change in costs and benefits;
iv. LCA rather identifies environmental problems that are "related" to "caused" based on analysis that may be different from expectations;

Multiple methods such as the hedonic method and the method of possible valuation in the assessment of the air value can give significant deviations in the obtained results, which leads to the need to use or combine various methods for higher accuracy of the results. Establishing the value of the airport infrastructure is necessary to assess the total value of the project as a whole.

If environmental services were valued by their contribution to the world of aviation, the global pricing system would differ significantly from todays and the environmental system as part of the sustainable development would be monitored and included in the internal pricing of aviation products and services.94F[10]

8.2 Financing the Sustainable Development of Air Traffic

According to the Agenda 21 signed in Rio, the necessary funds coming from the public and private sectors are with large investments for sustainable development programs. LEDCs do

[8] Докторска дисертација, Ана Лазаровска

[9] Pašalić, Ž.: „Ekonomski aspekti upravljanja održivim razvitkom“, Zbornik radova I. Dio, VIII Međunarodno znanstveno stručno savjetovanje „Promet i održivi razvitak“, 27. - 28. travnja 2000. Opatija, Hrvatska, str. 15-19.

[10] Докторска дисертација, Ана Лазаровска

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not have the funds and technologies needed for basic development issues and international problems and therefore should stimulate economic growth and social development by providing the necessary funds which is of common interest.

Aviation as the most developed industry requires large expenditures to secure new and additional financial resources. For the realization of the goals of the United Nations, 0.7% of the annual gross national product is set aside for aid to developing countries, recognition and encouragement to continue.

The largest international financial organizations such as the International Development Association, regional development banks and the United Nations Global Environment Facility (GEF), for the realization of the goals, they show sufficient flexibility in helping developing countries, recognition and encouragement to continue in the acquisition of skills and expertise necessary for the implementation of sustainable development.95F[11]

The main goal is for low- and middle-income countries with external debts to increase funds for investment in sustainable forms of development as well as the transfer of clean and efficient technologies to national authorities through public contributions to non-governmental organizations. The achievement of economic growth will be made possible through the realization of programs for sustainable development, especially in air traffic and transport, which are among the major polluters of the environment. Airplanes pollute the air through exhaust gases, soil, underground and surface waters are polluted through atmospheric precipitation from polluted air, while noise negatively affects people living near airports. Due to the negative impacts on the development of aviation and airport infrastructure, they should be developed according to the principles of sustainable development and certain maintenance measures and actions should be taken.

The evaluation of the airport infrastructure of financing for sustainable development and the environment in Macedonia is very poorly evaluated, and especially for the financing of sustainable development in air traffic as a result of the rapid and unstable changes in the proposal for financing sustainable development in air traffic and the protection of life environment from negative impacts:

a. a certain percentage of the budget;
b. fund for sustainable development and protection;
c. compensation according to the "polluter pays" and "user pays" principles;
d. fines;
e. motivating economic-environmental instruments;
f. funds from the state, enterprises and local self-government;
g. funds from the party.

The application of various measures that contribute to the financing of sustainable development in air traffic are:

1. on the price of fuel for the purposes of sustainable development;
2. compensations for maintenance of aviation infrastructure;

[11] Докторска дисертација, Ана Лазаровска

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3. aircraft maintenance for sustainable development, etc.

The transport economy directs the goals towards the realization of constant and reliable financing of the sustainable development in air traffic, which would satisfy the principles to get closer to the air traffic system of the developed countries of the European Union.

8.3 Financing the Sustainable Development of the Airport Infrastructure

The economy of sustainable development takes place over long periods of time and requires high monetary units with sufficient, permanent and stable sources of monetary units as performance indicators. The costs related to sustainable development at the state level represent public expenditures for the protection and improvement of quality with an objective view of the importance of monetary units that:

1. Each country has its own unique problems with the structure, the industry, the amount of measures they take, etc.
2. the standard of living,
3. the diversity of technology with the different influence of the environment.

The BDP for sustainable development differs between EMDC and ELDC, but it is different for different forms of pollution due to geographical, climatic and development conditions. According to data from 2019, Skopje is the most polluted city in Europe, and therefore in Macedonia the most importance should be given to the air. Aviation requires costs for the prevention, control and protection of the environment in the area of sustainable development, which refer to:

- preventing;
- control and monitoring;
- implementation;
- management of sustainable development.

In general, financing of sustainable development is provided by:

- state funds;
- general or special funds;
- funds from the economy;
- combined sources.

Funds for sustainable development are especially important for the decentralization of state functions and build a new system of sustainable development. State budgets are underfunded with various reform costs adding considerable importance.

The main objective of the introduction of economic instruments for "incentives to reduce emissions" is the collection of revenues for environmental protection, and in OECD countries there are four main common institutions:

- Community Action for the Environment - CAE;

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- European Regional Development Fund – ERDF;
- Community structural funds;
- European Investment Bank – EIB.96F[12]

The benefits of investing in environmental protection in OECD countries are in:

- reduction of environmental damage;
- improving competitiveness;
- reduction of pollution.

Within the Ministry of Environment and Spatial Planning there is a fund for sustainable development with financial means for implementing the goals where:

i. profitability without harming future generations;
ii. ii. percentage rate growth;
iii. tax on products and services;
iv. enforcement of "polluter pays" and "user pays";
v. removal of polluting industries;
vi. use of collectors to reduce the negative impact;
vii. harmful emissions to be regulated with special environmental permits;
viii. creating a "culture" for sustainable development.

We cannot precisely determine the percentage of NBP for environmental protection, due to the emergence of the COVID pandemic and the special measures and restrictions for air traffic. According to the data available to the Ministry of Environment and Spatial Planning (Ministry of Environment and Spatial Planning), the percentage of NBP for environmental protection is approximately 0.25%97F[13] and is too small to solve problems and prevent new ones.

8.4 Economic and Legal Aspects in Aviation Emissions Trading

Emissions trading with environmental permits is a market instrument for sustainable development and protection for the control and preservation of natural resources, i.e. "market environmental permits for emissions" (Emission trading). The basic idea is "determining acceptable levels of pollution" which is expressed by the allowed concentration of some substances defined by the number of the allowed emission.

There are various retrospective ways of determining initial issuance based on "past emission levels", although today's permitting practice indicates that it is necessary to find an acceptable formula. Initial release is reduced by pollution or overuse of resources if:

- the initial granting of permits is a reduction of existing pollution, or
- the original issuance of permits is reduced.

[12] Докторска дисертација, Ана Лазаровска
[13] https://uslugi.gov.mk/#

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Any polluter who achieves a lower level of pollution in relation to the number of permits he owns, receives credit for a cheaper solution than the price he receives for sale.

Permit trading as the main factor at the core of the entire permit system is freely conducted with the main essence in determining the simplicity in reducing the level of pollution. Both polluters gain an incentive to trade permits when the seller of permits with a higher price than the cost of abatement and the polluter with a high cost of abatement earns by buying the permit at a lower price so that the total standard is preserved without changing the the total number of permits, that is, with the level of pollution.

For operation with environmental permits and the market price of the permits, the Environmental Protection Administration defines the conditions for application:98F[14]

1. the areas of importance;
2. the quality standards of the area;
3. type of pollution based on environmental permits;
4. expiration date;
5. procedure after the termination of validity;
6. method of sale;
7. method of control and penalties for exceeding the allowed pollution.

The state agency with clear operating rules monitors whether polluters comply with the total number of permits and the number of permits for each polluter and the amount of emissions they produce. Emissions trading is applied while maintaining the quality of environmental standards with lower costs of protection compared to "specify and control" legislation.

8.5 Rational Management of Sustainable Development in Air Traffic

Regarding the management of sustainable development in R. S. In Macedonia, there are a small number of municipalities that have an environmental monitoring service with a large number of responsibilities regulated by LGUs, waste management and the issuance of B integrated environmental permits and inspection supervision. With the Law on Environment, municipal environmental inspectors are appointed with responsibilities. The capacities of local self-government for environmental management are provided by the CARDS 2004 program and compliance permits.

The Constitution of R. S. Macedonia ("Official Gazette of the Republic of Macedonia" No. 52/91 and Amendments to the Constitution of the Republic of Macedonia "No. 52/91, 1/92, 31/98, 91/01, 84/03) contain provisions for environmental protection without does not directly use the term "sustainable development", but contains articles that refer to the fundamental principles. In the General Provisions of the Constitution in Article 8, paragraph 1, paragraph 10, one of the basic principles is the arrangement and humanization of space and the protection of the environment.

The right to a healthy environment is prescribed in the Constitution of the Republic of Macedonia as a social right with an obligation to promote and protect the environment, and

[14] Črnjar, M.: Ekonimika i politika zaštite okoliša, op.cit. str. 246

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Macedonia is obliged to implement it according to Article 43. According to the Constitution, the preservation of the environment can limit the freedom of the market of the fundamental values of the Constitution of the Republic of Moldova in Article 55. Natural resources, flora and fauna, resources, objects and facilities of cultural and historical importance are protected by a law of general interest.

International agreements, ratified in accordance with the Constitution, are part of the internal legal order established by law according to Article 118. Courts are held on the basis of the Constitution, laws and international agreements in accordance with the Constitution (Article 98, paragraph 2). Amendment 17 of the Constitution states that "in local self-government units, citizens participate directly or through representatives in the decision-making process on issues of local importance in the area of public services, urban and rural planning, environmental protection".

Amendment 4 of the Constitution of the Republic of Macedonia contains the key principles of sustainable development "Citizens of the Republic of Macedonia". S. Macedonia, "... taking responsibility for the present and future of their homeland, ... and are responsible to future generations for the preservation and development of everything that is valuable...". The preamble contains the three pillars on which sustainable development is based, namely: economic development, social justice and environmental protection, i.e. "Citizens of R. S. Macedonia ... decided to constitute R. S. Macedonia as an independent, sovereign state, with the intention to.... guarantee human rights and civil liberties, to ensure....social justice, economic well-being and progress in personal and community life...".

The basic freedoms and human rights established in the Constitution of the Republic of Moldova are parallel to the three pillars of sustainable development:

- the right to work, free choice of employment. . .(Article 32)
- the right to social security and social insurance. . (Article 34)
- the right to a healthy environment ... (Article 43).

The rights and obligations arising from the legal provisions on sustainable development apply equally to all, prior to rational management of sustainable development, while monitoring should be performed by specially trained and authorized persons, at the local and state level, with the following basic principles:

- management and planning lead to adequate use of resources;
- sustainable development is not an "anti-development" concept;
- bill for equality and justice between generations;
- entities from the environment should be consulted, involved in decision-making and informed about the problems of sustainable development;
- a realistic assessment of the possibility of applying sustainable development and the possible scope in the future period;
- taking advantage of market advantages by applying sustainable development;
- for misunderstandings about the use of resources, concessions and compromises are necessary;

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- the benefits and costs of sustainable development require the opinion of individuals on whom meaningful development has an impact.

Reforms in the three pillars of sustainable development are of inevitable importance and need to be supplemented and perfected in our country. The Law on the Protection and Promotion of the Environment and Nature ("Official Gazette of the Republic of Moldova" No. 13/03) of a public character introduced the basic instruments for protection and management with several laws, defines the rights and duties of legal and natural persons, the preparation of planning documents, such as the National Environmental Action Plan (NEAP) and Local Environmental Action Plans (LEAPs), environmental monitoring as an integrated system with the information system. The State Inspectorate is a law enforcement instrument and the Environmental Fund as an economic instrument aims to directly support the protection and improvement of the environment with a major contribution to raising public awareness of the environment with the relevant EU directives.

The Ministry of Environment and Spatial Planning works on the preparation of environmental laws, including the Environmental Law as a framework law Aquis Communitaire known as horizontal legislation.

The framework law contains the basic principles on which the procedures in managing the arrangement of separate areas, access to information, public participation in decision-making, environmental impact assessment, industrial accident control plans and environmental inspectors are regulated. Integrated environmental permits with compliance with the required standards for integrated control, pollution prevention and with operational plans are a condition for the continuation of existing installations in the country, which derive from the international instruments ratified/signed by R. S. Macedonia.

The program for approximation of the national legislation to the EU legislation in accordance with the Action Plan for European Partnership in the country leads to the need to pass laws in the area of noise, chemicals and genetically modified organisms. The CARDS 2005 environmental program programs activities for the development of a National strategy for the approximation of legislation in the area of the environment, which aims at investments related to the acquis and the time frame of the EU legal instruments.

The Law on the Environment is a basic law on global environmental issues and for the adoption of by-laws, through the adoption of special laws: Законот за управување со отпад,

- Nature Protection Law,
- The law on ambient air quality, and
- Proposal for the Law on Water,99F[15].

The new legislation for the protection and promotion of the environment incorporates the principles of the EU for the environment with a national, regional and local sign with the basic principles on which they are based.

[15] Верица, Данчевска, дисертација

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The National Environmental Action Plan (NEAP) processes the state's strategic determinations for the protection and improvement of the environment, financed by the World Bank, and the second NEAP (2004/2005) financed by the CARDS 2001 program of the European Union is in progress. The spatial plan with a strategic-developmental connotation of the basic goals and directions for the development for organization, arrangement and protection, with qualitative and quantitative structural changes for spatial-planning solutions determines the goals and planning determinations as part of the total activities within 20 years. A large number of sectoral strategic documents of action plans for the implementation of the determined actions influence the other sectors on the protection of the environment. Within the framework of the national strategy for sustainable development with an Action Plan, the following documents have been prepared:

- "A conceptual approach in creating and revitalizing the National Strategy for Sustainable Development of R. S. Macedonia", 2000;
- "National assessment for sustainable development of R. S. Macedonia", 2002;
- "Research concept for providing analytical and prognostic data in the function of preparation of the National Strategy for Sustainable Development", 2003.100F[16]

The Ministry of Environment and Spatial Planning is the coordinator of activities for the development of the National Strategy for Sustainable Development/NSOR as a strategy for integration into the European Union. "Decision of the Council on the principles, priorities and conditions contained in the European Partnership with R. S. Macedonia", in the short term states the need to "develop a National Strategy for Sustainable Development" in accordance with the United Nations World Summit on Sustainable Development01F[17] The Ministry of Environment and Spatial Planning finances the Local Agenda Guide to local strategies and action plans for sustainable development.

8.6 Compatibility and Complementary Economics of The Sustainable Development of Air Traffic in Macedonia and The European Union

The economics of sustainable development is an interdisciplinary scientific discipline of economic activities in the research of the aviation sector of economic theory and practice with scientific knowledge from the natural sciences, that is, with a political, economic and environmental character. The economics of sustainable development for the construction of airport infrastructure uses the cost method and uses the cost-benefit analysis and analyzes the effectiveness of the "command and control" method with the help of the optimization model. Compatibility and complementarity in the field of air traffic and transport in the interest of national interests are based on EU programs:

The Transportation Infrastructure Regional Study (TIRS)

- The Regional Infrastructure Study in the Balkans (REBIS - Transport).
- ICAO - International Civil Aviation Organization
- IATA - International Air Transport Association

[16] Ибидем

[17] Ибидем

The Memorandum of Understanding of the Main Regional Transport Network of Southeast Europe refers to stabilization and association for cooperation in the development of infrastructure and all signatory countries are obliged for the execution and financing of further infrastructure development and/or operational studies to prepare and implement annual and multi-annual action plan. The senior group in the General Directorate for Transport and Energy, the selected projects respect the international criteria according to the methodology.

At the fourth high-level meeting (High Level Meeting) with the implementation of the SEETO (South-East Europe Transport Observatory) project to support the CARDS countries, technical groups and activities for monitoring the projects of the regional transport network (Core network) are formed. The main task of SEETO is to provide support in the full operation, i.e. the collection and development of data, preparation of indicative plans for a longer period of time, coordination with working bodies or technical groups in the transport corridors with representatives from the European Commission and International Financial Institutions. When SEETO officially starts the activities for the projects in the field of transport (TPPF), financed by the European Commission, with the necessary input they will enable an effective start that will ensure the preparation of feasibility studies and other types of studies with other countries and with international financial institutions.102F[18]

8.7 Compatibility and Complementarity of the Economy of the Sustainable Development of the Airport Infrastructure of Macedonia and the European Union

The economy with sustainable development shows the importance of resources and prices of services for the development of legal, economic aspects and provides an overview of the existing status, institutions, mechanisms and planned activities of the national environmental legislation with a document from the Government of R. S. Macedonia:

Program for approximation of the national legislation to the legislation of the European Union (NPPZ), which is the basis of a control mechanism for monitoring the legislation. The provisions of the Stabilization and Association Agreement (SAA), on national legislation, implementation, competent authority, EU legislation, as well as review of existing national legislation and planned legal acts are regulated by the Ministry of Environment and Spatial Planning.

- Procedural manual of the EU legislation regulates the procedure of harmonization of the legislation, with a clear task of the competent authorities, for the way of handling, organization, coordination, reporting and control, with steps and activities for the ministries, through the formation of working groups and subgroups and etc.

According to Articles 103 and 68 of the Stabilization and Association Agreement (SAA), the harmonization of environmental legislation is the responsibility of the Ministry of Environment and Spatial Planning (MSESP). The internal institutional structure for harmonizing the national legislation with the EU legislation is in charge of two sectors: the Sector for European Integration with the EU and the Sector for Regulation and Standardization and is managed by RG 22 - environment from NPPZ. According to the deadlines established in the NPPZ, a

[18] Докторска дисертација, Ана Лазаровска

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program of work and activities is prepared every year, in accordance with the regulations relating to the environment of the EU through:

- Formation of inter-ministerial working groups, as the main driving force for the activities with the preparation of the legal texts and represented a platform for the development of the new legislation according to the EU. Participants in WGs are selected in a way with an optimal balance based on ministries, government institutions, local self-government, higher education institutions, NGOs, the business sector and the Chamber of Commerce of Macedonia and others.

- For the needs of the ministry, an Action Plan was prepared for the harmonization of legislation in the area of the environment, for the analysis and drafting of laws with a core group that "leads" the activities at regular meetings, at longer intervals. The core groups are composed of international and local, senior and junior, technical and legal experts, where a large number of institutions participate in the drafting of legal texts.

- Corresponding tables of the status of transposition and degree of compliance and the draft national legislation are prepared for each directive.

- In order to acquaint the public with the content and obligations of the new legislation, public debates and workshops are organized at all stages.

- The statement of compliance of the regulation with the EU legislation, before submission of the legal regulation, contains the basic data about the directives that are transposed by the proposed legal act and the relevant provisions of the Stabilization and Association Agreement (SAA). The main problem is the lack of knowledge about the requirements of the directives of other sectors by organizing workshops, where the objectives of each directive or other EU act were presented. Resistance has been created in the competences of the state administration bodies due to the need to redefine the competences of individual bodies and an additional problem due to the lack of human resources in the state bodies.

In R. S. Macedonia does not have a single plan for investing in the environment of the Acquis communitaire according to the priorities defined in separate national plans, programs and laws. The obligations arising from the SAA are a criterion in the EU directives. In the NEAP, priorities were identified for implementation and which direct financial resources from the Environmental Fund.

Within the framework of PHARE SOP 99 as an indicative framework for cost planning, an initial analysis of the necessary economic, financial and administrative conditions for approximation to the EU in the area of the environment was made, with a preliminary assessment of the costs needed for larger investments. Through the "Regional Environmental Reconstruction Program for South Eastern Europe" as a regulatory body of the European Commission, a Program for Priorities for Investments in the Environment for South Eastern Europe and R. S. Macedonia with a list of priority investments.103F[19]

[19] Ибидем

8.8 Institutional Management in The Field of Air Traffic Planning from The Local Community to The State Level

As a result of insufficient regulation at the national level, institutions and organizations that intend to improve the planning of the development of air traffic in their territories must first define the basic principles of sustainable development of the airport infrastructure, the goals of strategic planning of a sustainable transport system and the need for a comprehensive strategic framework according to the Municipal Support Program, defined by the European Union.

The aim is to define the concept of a sustainable transport system and the provisions of the legal, institutional and strategic framework at the local level and the definition and application of the local strategy for sustainable development, as well as the methodology in the development of local sector plans, including the description of the process of strategic planning and the scope of these plans. The steps in the analysis of air traffic conditions at the local level of practical advice related to traffic planning at the level of cities and municipalities imply that local governments have the authority to adopt programs for the development of traffic, bearing in mind that transport is understood as one of the important factors which enable and monitor local economic development. For properly structured spatial planning, it is necessary to carry out both vertical and horizontal coordination, all new planning should be independent, but in accordance with the state framework and carried out through cooperation, coordination and consensus.

However, in R. S. In the current conditions of such planning, Macedonia encounters great difficulties that include a new territorial structure and division of responsibilities in the field of spatial planning. There is a lack of correlation between the needs and capacities of the various stakeholders. Many of these newly delegated powers are not adequately funded because local governments have been unable to finance their own ongoing needs. Financing development plans, spatial plans or development projects of individual sectors for many newly formed small municipalities is a difficult task. The lack of competence on these issues at the state level leads to the absence of a strategy for spatial planning, and therefore planning for the development of the transport system.

In the past years, GAP2 has been working to improve the organizational, technical and managerial capacities of local governments and continues with spatial planning reforms through: business improvements in accordance with modern principles; information technology (IT) applications; more efficient exchange of information with citizens; development of more flexible planning technology; directing administrative procedures to potential investors; and professional development of operational (technical and managerial) staff, etc.104F[20]

8.9 Principles of Sustainable Development of the Transportation System

The principles of sustainable development can be seen as: the general principles of sustainability and the principles of sustainable infrastructure development. The general principles of sustainability include: the degree of utilization of non-renewable resources should

[20] Mustafa Mehanović, Institucionalno upravljanje u oblasti planiranja saobraćaja u BiH- od lokalne zaednice do državnog nivoa

not exceed the degree of development of its renewable substitutes; the degree of utilization of renewable resources does not exceed the degree of development of its renewable substitutes; the degree of utilization of renewable resources does not exceed the degree of their regeneration; the level of pollutant emissions does not exceed the carrying capacity of the ecosystem. The principle of sustainable development of the infrastructure implies the definition of such a policy in spatial development which through the preparation of appropriate planning and technical documentation with conditions for the construction and use of infrastructure systems in accordance with the general principles of sustainability. The application encourages balanced spatial development by creating conditions for connecting undeveloped and isolated areas with larger settlements and enabling their access to the main infrastructure systems.

The approach to sustainable planning of infrastructure systems is defined in the Guiding Principles for Sustainable Spatial Development on the European Continent through two principles:

- The principle of promoting balanced accessibility implies good accessibility to all parts of Europe through the construction and use of a pan-European transport network. In order to achieve regional balanced development, improving connections between small and medium-sized cities, as well as rural areas with trans-European networks and transport centers (airports, highways, railways) and actions to increase regional accessibility through missing internal regional connections. Priority is given to those types of transport that have less negative impact on the environment, primarily airports, railways, highways, as well as reducing the need for physical communication through proper urban planning.
- The principle of developing access to information and knowledge implies the implementation of activities for the construction of telecommunication networks and the removal of physical and other restrictions, in order to ensure equal access to information for all regions by renewing and expanding telecommunication networks throughout the area.

Based on the above, three basic goals for sustainable infrastructure development at the local level are defined: integration of infrastructure systems in the environment, development of accessibility, development of alternative ways by reducing motor vehicle traffic.105F[21]

8.10 Strategic Planning of a Sustainable Transport System

One of the key goals of sustainable urban development is the construction and development of the city transport system, which will enable sustainable mobility of the population, support the accelerated development of the city and its competitiveness in the region and beyond, and assumes:

1. Careful development of surface uses to reduce journey lengths without affecting mobility;
2. Replacement of movement with passenger cars, bicycles or the introduction of electric vehicles or combinations with the system for public mass transportation of passengers;

[21] Mustafa Mehanović, Institucionalno upravljanje u oblasti planiranja saobraćaja u BiH- od lokalne zaednice do državnog nivoa

3. Modern transport imposes the need for sustainability in the economic, social and ecological population.

The three prerequisites for sustainability in terms of transport are:

- efficiency - represents the search for traffic solutions in accordance with the needs and possibilities with the available resources, and achieving the maximum possible quality;
- equity - giving priority to interventions that promote accessibility for all users of the transport system;
- sustainability - taking into account the strong interaction with other policies and seeking a maximum compromise between the social and economic domains of the environment.

Defining a comprehensive strategic framework is necessary given the complexity of transport, the causal links between economic development and transport and the environment. Comprehensiveness includes all users, all types of movements, all participants in the implementation of the accepted action plans. The strategic framework proposes answers to the challenges of economic development, answers to the problems related to the financing of infrastructure development and sets the framework for stimulating economic development.106F[22]

8.11 Institutional Frameworks at State Level

The jurisdiction of regulatory capacities in the field of transport at the state level is in one ministry, the Ministry of Communications and Transport, which is responsible for: policy and regulation of common and international communication devices; international and inter-entity transport and infrastructure; drafting contracts, agreements and other acts in the field of international and inter-subject communications and transport; relations with international organizations in the field of international and inter-entity communications and transport; preparation and drafting of strategic and planning documents in the field of international and inter-entity communications, transport, infrastructure and information technologies; control of continuous transport in international transport; civil aviation and air traffic control. This ministry includes the administrative organization of the Civil Aviation Directorate of R. S. Macedonia, whose rights and duties are determined by a special law. At the entity level, the responsibilities are in the ministries: Ministry of Transport and Communications, Ministry of Interior, Ministry of Spatial Planning and Ministry of Environment and Tourism, Ministry of Transport and Communications. The Federal Ministry of Transport and Communications performs administrative, professional and other tasks established by law in relation to the exercise of competences in the field of transport and communications, namely: road traffic and public roads, rail, air, river and lake transport, air traffic control, communication devices, inspection supervision and performs other tasks established by law. The Ministry of Transport and Communications performs administrative and other professional work related to: road, railway, aviation, telecommunication, telecommunication infrastructure, coordination policy management and other matters under its competence.

[22] Mustafa Mehanović, Institucionalno upravljanje u oblasti planiranja saobraćaja u BiH- od lokalne zaednice do državnog nivoa

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The institutional capacities within the ministry are not sufficient to manage traffic safety in accordance with the standards that apply in EU countries and derive from EU regulations. At the local level in the capital, there are services that solve problems related to the traffic system depending on the size and development, and various public enterprises deal with traffic management. In developed cities, traffic management can be divided into several different public companies and agencies: Directorate of Urbanism, Directorate of Construction, construction company, parking service, traffic agency, city carriers and so on.

At the local level, the institutional framework for managing traffic development is organized in different ways depending on the size of the local government in the development of the transport network. In developed cities with higher requirements in terms of traffic management, the network of organizations and institutions, or departments in whose jurisdiction traffic management is located, can be very developed and branched. Smaller municipalities do not have separate departments that deal with these issues for the development of cooperation within the Department of Economy and Local Economic Development or within the Department of Communal Affairs. In some cities there are special secretariats for traffic, and in other special departments for traffic that carry out work in the field of cooperation in an administrative sense, adopt administrative acts, and will propose possible solutions and corrections in order to improve traffic services and increase traffic safety in the city.

The spatial planning system in R. S. Macedonia should contain harmonized plans of the state, subjects, regions, cities and municipalities and is responsible for the strategic spatial framework and the application of elements of national interest: transport corridors, oil pipelines, gas pipelines, electricity supply, ports, airports, national parks , natural parks, large rivers and others with special purposes. At the level of entities and regions, spatial planning plans of interest to smaller geographical areas and communities should be developed, such as the designation of transport corridors, infrastructure, protected natural areas, urban networks, tourism or rivers, while at the local level, the spatial planning must determine the purpose of the space.

Spatial planning and arrangement in R. S. Macedonia are regulated by the law on spatial planning and land use, which are implemented in parallel with municipal decisions on spatial planning at a higher level and specify some rules regarding municipal land. Entity laws refer to the field of spatial planning, management of spatial development from entity to municipal level, as well as the construction of facilities on the territory, regardless of ownership. Rulebook on the content and control of technical documentation describes the activities for the preparation of spatial planning and technical documentation.

In addition to the basic regulatory framework of the entire territory of R. S. Macedonia, each municipality makes a decision on construction that determines all the conditions that maintain the specificity of the territory of the municipality and that are in accordance with the Law of R. S. Macedonia.

There is a Unified Methodology for the preparation of plans which defines the content and methodology of the planning documentation and according to which R. S. Macedonia received

the Spatial Planning Plan, and the Ministry started coordination with the Ministry of Local Self-Government as a serious problem.107F[23]

8.12 Standards of the European Union and Spatial Policy of R. S. Macedonia

Liability of Rs. S. Macedonia is to harmonize its spatial policy with the Directives of the European Union regarding spatial planning and legal regulation of the EU in order to acquire the conditions for membership. The European Union has several programs that cover and go beyond the geographical area of the EU, as the enlargement of the EU poses new organizational challenges for participation in such programs and initiatives.

All factors relevant to spatial development should respect the basic objectives and principles of EU spatial development rooted in balanced and sustainable development by strengthening economic and social and spatial cohesion. Harmonization of the spatial development policy of the Republic of Moldova with the European processes requires a new state strategy for spatial planning and decision-makers at all existing levels of government to be involved in its implementation.

Considering the issue of spatial planning, several systematic problems are observed that prevent the proper implementation of spatial planning and arrangement. The most serious problems are related to legal and financial restrictions, organization, standardization and availability of human resources.108F[24]

8.13 Plan Documentation of Strategic Planning of Air Traffic Development at the Local Level

Study documentation that directly or indirectly deals with issues of air traffic development can be of different levels, names and contents, such as: spatial plan, general urban plan, traffic study of the city, settlements, traffic improvement study, a master plan for the city's transport, a strategy for sustainable traffic development, etc.

The Spatial Plan and the General Urban Plan are legally defined for the traffic studies of a city or settlement that are an integral part of the previous development of large infrastructure projects. The study to improve the air traffic with the intervention plan is based on certain researches, smaller in scope than the traffic studies, but offers solutions in a period of 3-5 years.

The city transport master plan is the basis for long-term development of the system and serves as the basis for evaluating solutions, testing variant solutions, generating large and new solutions and is the most detailed basis for all long-term and medium-term planning.

In relation to the above documentation, the position of the Strategy for sustainable development of transport, that is, the sectoral plan for the development of traffic with the strategies for sustainable development, is the "initial document". The strategies are based on the principles

[23] Mustafa Mehanović, Institucionalno upravljanje u oblasti planiranja saobraćaja u BiH- od lokalne zaednice do državnog nivoa

[24] Mustafa Mehanović, Institucionalno upravljanje u oblasti planiranja saobraćaja u BiH- od lokalne zaednice do državnog nivoa

of determining the necessary priorities and, through the plan, open up the possibility of quickly starting the development of projects in the field of air transport that will quickly produce the initial effects.109F[25]

8.14 Air Traffic Development Strategy

The local strategy for sustainable development is a general strategic plan of the city that defines the directions and key activities for future development in accordance with national and regional plans and strategies. Basic principles of methodology in the process of making plans are the local self-government unit manages the process and a participatory approach with broad participation of all stakeholders.

The process is organized in five stages in ten-year cycles:

1. Preparation phase
2. Sectoral analysis
3. Strategic framework
4. Action plan
5. Preparation for implementation

The document presenting the Local Government Transport Development Strategy is organized in different ways with the following document chapters:

1. Introduction
2. General information about the city
3. Analysis of traffic conditions
4. Strategic framework
5. Action plan
6. Monitoring and evaluation.

The basic steps in conducting a situation analysis are:

1. Defining the time range and space under consideration
2. Getting to know and reviewing the existing documentation.

Based on the performed analysis, an assessment of the current situation is given, namely: in relation to the established indicators and in relation to the established facts resulting from the analysis. A general assessment of the state of the observed area and an assessment of the existing critical parts of the network or parts that will become critical during the observed period are given.

Indicators for analysis and monitoring are: traffic efficiency, traffic safety, economy, accessibility, comfort and environmental protection, which can only be reached by researching the opinions of users or the views of citizens with an appropriate survey.110F[26]

[25] Ибидем

[26] Mustafa Mehanović, Institucionalno upravljanje u oblasti planiranja saobraćaja u BiH- od lokalne zaednice do državnog nivoa

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8.15 Measures for Improving Spatial Planning in R. S. Macedonia

To improve spatial planning in R. S. Macedonia needs the following measures in the aviation sector:

1. Creation and strengthening of the capacities and institutions for spatial planning and regulation at the state level,
2. If it is necessary to amend the legal regulation in order to ensure more regular and timely production of spatial planning documentation at all levels,
3. Simplifying the criteria for urban institutions that unjustifiably limit the availability of organizations qualified to develop and update spatial planning documentation,
4. Introducing professional measures for licensing in order to improve the quality of spatial and urban planning;
5. Establishment or better definition of existing standards through regulations and legislation for: implementation of zone planning, measures to support European principles for spatial development, establishment of spatial databases, exchange and distribution of spatial data, reorganization of the way of work of services and institutions in charge of spatial planning at all levels,
6. Strengthening of institutional capacities by supporting the introduction of spatial information systems and digitization of spatial planning data for monitoring the use of space with spatial planning plans;
7. Introducing control mechanisms for implementing the set goals of spatial development.

The planning of the traffic system in R. S. Macedonia is not at a satisfactory level for current problems in the field of spatial planning to take measures and activities that will be strategically treated at the local level to solve priority issues of the cooperation system at the local level in the Republic of Macedonia. S. Macedonia.

From the analysis of the situation in R. S. Macedonia, the experiences of the surrounding countries and the EU, there is a need to define a process of strategic planning for the development of cooperation at the local level, such as the planned airport near the city of Gevgelija, which will be followed by local governments and agencies, national institutions and bodies and international organizations and donor programs active in the field of transport and communications.

Strategic documents related to air traffic development planning at the international level emphasize integration with spatial planning and economic development policy, meaning that objectives are aligned on a practical basis, with guidelines for no additional need. Investments in the development of cooperation must coincide with investments in the development of the economy and normal functioning of the population. Policies related to local development are consistent with the principles of sustainable development. The participatory nature of strategic documents provides a panel for the exchange of opinions and information needed to draft all strategic documents.111F[27]

[27] Mustafa Mehanović, Institucionalno upravljanje u oblasti planiranja saobraćaja u BiH- od lokalne zaednice do državnog nivoa

8.16 Documents on Compatibility and Complementarity of Sustainable Development in Macedonia and the European Union

R. S. Macedonia has ratified many documents in the field of sustainable development and environmental protection, which are listed below 112F[28].

Ratified:

- Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, February 1991); 113F[29]
- Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters. 114F[30]
- Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects. 115F[31]

Signed:

- Protocol on Strategic Environmental Assessment. 116F[32]
- Protocol on Pollutant Release and Transfer Registers. 117F[33]

Signed:

- Cartagena Protocol on Biosafety to the Convention on Biological Diversity. 118F[34]
- Memorandum of Undarstanding on the Conservation and Management of the Middle-European Population of the Great Bustard (Otis tarda). 119F[35]

Atmosphere:

- (Vienna, March 1985) / Vienna Convention for the Protection of the Ozone Layer120F[36]
- (Montreal, September 1987) / Montreal Protocol on Substances that Deplete the Ozone Layer. 121F[37]

[28] http://www.sei.gov.mk/prasalnik/ стр. 31. (18. 03. 2005).
[29] Конвенцијата е ратификувана со Закон за ратификација ("Службен весник на РМ" бр. 44/99).
[30] Конвенцијата е ратификувана со Закон за ратификација ("Службен весник на РМ" бр. 40/99).
[31] Протоколот е ратификуван со Закон за ратификација на финалниот документ на Европската Конференција за Енергетска Повелба ("Службен весник на РМ" бр.16/98).
[32] Протоколот е донесен врз основа на Архуската Конвенција. Р. С. Македонија го потпиша во мај 2003 година, во Киев, Украина, на 5-та Министерска Конференција "Животна средина за Европа".
[33] Р. С. Македонија го потпиша Протоколот на 26 јули 2000 година. Постапката за ратификација на Протоколот е во процедура.
[34] Р. С. Македонија го потпиша Меморандумот на 07.10. 2000 година во Аман, Јордан.
[35] Конвенцијата е ратификувана со Закон за ратификација ("Службен лист на СФРЈ" бр. 1/90). Конвенцијата е прифатена од страна на Р. С. Македонија по пат на сукцесија на 10.03.1994 година.
[36] Протколот е ратификуван со Закон за ратификација ("Службен лист на СФРЈ" бр. 16/90). Протоколот е прифатен од страна на Р. С. Македонија по пат на сукцесија на 10.03.1994 година.
[37] Протоколот е ратификуван со Закон за ратификација ("Службен весник на РМ" бр. 25/98).

- The Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer London. 122F[38]
- The Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer Copenhagen. 123F[39]
- The Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer Montreal. 124F[40]
- The Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer Beijing. 125F[41]
- United Nations Framework Convention on Climate Change.126F[42]
- Kyoto Protocol to the United Nations Framework Convention on Climate Change. 127F[43]
- Convention on Long-Range Transboundary Air Pollution. 128F[44]
- Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Long-Term Financing of the Co-operative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe (EMEP). 129F[45]
- Stockholm Convention on Persistent Organic Pollutants. 130F[46]

Signed:

- Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Persistent Organic Pollutants (POPs). 131F[47]
- Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on Heavy Metals. 132F[48]

Waste

Ratified:

- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal 133F[49]

[38] Протоколот е ратификуван со Закон за ратификација (”Службен весник на РМ” бр. 25/98).
[39] Протоколот е ратификуван со Закон за ратификација (”Службен весник на РМ” бр. 51/99).
[40] Протоколот е ратификуван со Закон за ратификација (”Службен весник на РМ” бр. 13/02).
[41] Конвенцијата е ратификувана со Закон за ратификација (”Службен весник на РМ” бр. 61/97), а стапи на сила за Р. С. Македонија на 28.04.1998 година.
[42] Конвенцијата е ратификувана со Закон за ратификација (”Службен весник на РМ” бр. 61/97), а стапи на сила за Р. С. Македонија на 28.04.1998 година.
[43] Протоколот е ратификуван со Закон за ратификација (”Службен весник на РМ” бр. 49/04).
[44] Конвенцијата е ратификувана со Закон за ратификација (”Службен лист на СФРЈ” бр. 11/86). Конвенцијата е превземена од страна на Р. С. Македонија по пат на сукцесија на 17.11.1991 година
[45] Протоколот е ратификуван од СФРЈ ("Службен лист на СФРЈ" 2/87), а Р. С. Македонија го има превземено по пат на сукцесија.
[46] Р. С. Македонија ја потпиша Конвенцијата во Стокхолм, Шведска на 22.05.2001 година. Конвенцијата е ратификувана со Закон за ратификација ("Службен весник на РМ" бр. 17/04)
[47] Кон овој Протокол Р. С. Македонија пристапи со изјава, но го нема ратификувано (Архус, јуни 1998).
[48] Кон овој Протокол Р. С. Македонија пристапи со изјава, но го нема ратификувано (Архус, јуни 1998).
[49] Конвенцијата е ратификувана со Закон за ратификација (”Службен весник на РМ” 49/97).

- Amendment to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, Amendment to Annex I, Annex VIII and Annex IX134F[50]

Soil

Ratified:

- United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, particularly in Africa. 135F[51]

BILATERAL AGREEMENTS

Ratified:

- 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 Protection. 136F[52]
- Agreement on Cooperation in the Field of Environmental and Nature Protection between the Government of the Republic of Macedonia and the Government of the Russian Federation.137F[53]

9.0 CONCLUSION

9.1 Overview of The Elaboration

The concept of sustainable development is an important item in today's global society and economy, and without its wide application at the micro level, results cannot be achieved at the global level. The well-being of this and future generations of the European Union and the world economy in general depends on progress achieved in inclusive and green economic development, with full respect for democracy, the rule of law and fundamental rights. With the goal of sustainable development and the Paris Agreement on climate change, the European Commission has launched an open discussion on a long-term vision for a sustainable Europe that ensures a good life and well-being for all. This vision should guide actions in every area, whether it is about growth strategies, social priorities, energy and climate goals, or research and innovation programs. Identifying the most important sustainability issues and monitoring progress are the first steps towards a sustainable Europe and a sustainable world. In this sense, Eurostat's reports on the monitoring of sustainable development goals provide important evidence on what it is necessary to focus efforts on in order to achieve the established goals. The goals of sustainable development are defined in the Sustainable Development Program until 2030, which has been accepted by all UN member countries, including EU countries. The

[50] Амандманите се ратификувани со Закон за ратификација (”Службен весник на РМ” бр. 49/04).

[51] Конвенцијата е ратификувана со Закон за ратификација (”Службен весник на РМ” бр. 13/02), а стапи на сила за Р. С. Македонија на 06.06.2002 година.

[52] Договорот е потпишан на 01.03.2002 година во Загреб, Р. Хрватска. Договорот е ратификуван со Закон за ратификација ("Службен весник на РМ" бр. 13/03).

[53] Спогодбата е потпишана на 27.01.1998 година во Москва, Руска Федерација. Спогодбата е ратификувана со Закон за ратификација ("Службен весник на РМ" бр. 16/98).

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program consists of a total of 17 goals, and the EU has made progress towards almost all of them. Progress in some objectives was faster than in others, but in some areas a negative deviation from the objective was recorded. The best results were achieved in terms of health and well-being, quality education and affordable and clean energy. The EU has also progressed in terms of sustainable cities and communities, responsible consumption and production, gender equality, decent work and economic growth, partnerships for goals and poverty reduction. The area in which the EU deviates from the goal and shows negative trends is the reduction of inequality. This is the result of income inequality in member countries.

9.2 Sustainable Development at National and Global Level

With the ever-increasing pressure that people exert on the environment, ever-increasing problems arise, both locally and globally. The problem is further accentuated by climate change, which ultimately negatively affects the health of residents and the ecosystem. Therefore, it is necessary to develop effective methods for mitigating the negative effects of anthropogenic activity. In accordance with this, green infrastructure appears as a potential for creating sustainable solutions based on nature, where the main goal is to increase the resilience of urban environments and maintain healthy ecosystems. One of its key advantages is multifunctionality, thanks to which green infrastructure can provide a wide range of ecosystem services in both rural and urban environments. Also, it is often cheaper than existing infrastructure and contributes to the implementation of goals prescribed by the European Union.

Green infrastructure stands out thanks to its ecological, economic and social benefits, which are based on natural solutions. Among the ecological benefits, contributions to temperature reduction and sustainable water management stand out as key measures for mitigating and adapting to climate change. Furthermore, economic benefits most often include cost reduction and energy savings, while social benefits are most often the improvement of the physical and mental health of the population. Also, rain gardens, green roofs and permeable pavements and roads are often mentioned as examples of urban green infrastructure, while hybrid approaches combining green, blue and gray infrastructure are often used in planning.

In general, it can be concluded that a transformation from traditional principles to newer and more sustainable ones is needed. The European Union also contributes to this, supporting the implementation of green infrastructure through its inclusion in various strategies. However, there are big differences in the coverage of green infrastructure between countries. In addition, in the implementation of measures there are also significant challenges that can slow down its construction, and the most common are: standards, regulations, socio-economic challenges, financing and innovations. At the same time, it is important to mention that political will is the main factor in all the mentioned challenges. But green infrastructure is supported by a convincing body of evidence that, when effectively planned, it can provide significant support and contribute to the creation of healthier, more biologically diverse and sustainable cities around the world, which should be the main motivation for its adoption.

From year to year, air transport is a rapidly growing industry, to which they are attached many other branches in the world, and as such, represents a great challenge in the future, looking on the current topic of climate change. With the advancement of technology, in the last decades a

great contribution has been achieved in reducing aircraft emissions, reducing the impact of noise on local communities, as well as workers and passengers, and treatment of de-icing fluids that affect water quality. With innovations in aircraft engine production and regulations, it has been greatly reduced emission of pollutants, but an almost equal, if not greater, role in ecological evolution and Airports also have to adapt to changes. By modernizing equipment, vehicles, as well as as much as possible reducing energy consumption, for heating and cooling, equipment operation, and switching to renewable energy sources, local operators already now. The education of airline employees already plays a big role airport staff, whose behavior can also contribute to reduced emissions. However, the biggest role and revolutionary step will truly play one day, as well as in the road sector transport, represent a transition to the use of alternative energy sources, instead of until now of classic fuel derivatives, but this still represents perhaps too big a bite for the industry, which in can transport up to 400 passengers to the other side of the world in one flight. Qatar Airways is one of the carrier who managed to, with the addition of gas to the already existing fuel mixture, make it big a step in that direction, but with the research of liquid hydrogen and nuclear energy it would still happen a milestone that would mark the aviation branch as a truly green branch of transportation.

9.3 Environmental Challenges of Sustainable Development at the Global Level

Globalization as a process that encompasses the economy, society, politics and culture greatly affects the transformation of living conditions and connects modern parts of the world, and when we combine ecology with that, we come to the conclusion that we are also dependent on nature. The increase in the world's population has brought about various changes in the economy and the environment. The current state of economic and economic development is the main obstacle in achieving the concept of sustainable development. We conclude that developed countries are ready to adapt to the concept of sustainable development, but resistance is still felt. The results of the Millennium Declaration showed that there are advances, but not nearly as big as those that could stop the ecological disaster. The 2030 Agenda should be a top priority for all countries on a global level that will benefit the entire population. Each country should take control and implement the concept of sustainable development in economic sectors and in the social system.

Sustainable development is a challenge for all of us. It includes three basic dimensions - economic, ecological and social, which we should understand as a whole and implement as a whole. Ever since the beginning of the 20th century, with the UN conference, we have been trying to understand and solve the problem that the whole world is facing

findings. Now in the 21st century, we are still dealing with the problem of the environment and the problem of the survival of our species. Fulfilling today's needs without jeopardizing tomorrow's needs is the main goal of sustainable development. It is visible how we fulfill all our needs to some extent and achieve economic growth, but we do not think about the future and future generations.

Every day we are witnessing climatic events, droughts are increasing, oceans are becoming acidified and acidified, the ice sheets in Antarctica and Greenland are melting, which is raising the sea level, and some coastal countries are flooding. We conclude that the public reacts actively to all the mentioned environmental disasters and problems, but is passive in stopping

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the spread of pollutants that continuously harm the environment. The solution is no longer up to individuals to replace light bulbs, install solar panels or buy and drive a hybrid car. Governments and industries must deal with this disaster. It is necessary to constantly improve methods for maintaining ecological standards, and the application of economic instruments would be necessary. In addition to all that, we have the problem of sea and ocean pollution, which we also have to face. Everything we produce creates waste. And the biggest problem today is plastic. Eliminating plastic from the sea and ocean is not easy, because it breaks down into small pieces and that's how we have it microplastic, which is even more unfavorable and threatening for the marine ecosystem and for us. The biggest plastic pollution in the ocean is the so-called Great Pacific Plastic Pool. It is difficult to change the behavior of individuals, they will continue to buy plastic products if they are available to them. We conclude that education is necessary for individuals to apply the principles of sustainable development. Changes must also come in the production sector in order to protect against plastic pollution. We conclude that the problem is also improper disposal of waste, which leads to unfavorable living conditions and terrorizing the environment. It needs to be increased capital investments and investments in technological development, and also to adopt an interdisciplinary approach that will include everyone to work towards a common goal - sustainable development.

Natural capital is the foundation of every country and all living things depend on it. Through his actions, man has directly influenced the degradation and overexploitation of natural capital. Air, soil, water and ecosystems are under pressure and under the influence of climate change, which cannot be avoided, but must be adapted to and mitigated. Renewable natural capital such as forests and fish stocks are exploited beyond the limit of natural renewal, and supplies of non-renewable natural capital such as fossil fuels are increasingly depleted. Effective management of natural capital can reduce pressure on the environment, vulnerability to climate change and possible disasters and conflicts. In the context of the capitalist system, it is necessary to precisely calculate how much natural capital, its services and goods are worth in market terms in order to be included in national accounts and to be able to monitor its condition. Systematic monitoring of natural capital is a major challenge due to the large amount and variety of flows and services. By introducing natural capital accounting, an insight into the total value of natural capital would be provided, thus achieving a balance between the use, protection and restoration of natural capital. Knowing the total value of natural capital can help governments research, decide and moderate policies. Numerous initiatives and agencies in the European Union contribute to the development of natural capital accounting. Accounting for natural capital is key to achieving the goals of sustainable development.

In the UN Program for Sustainable Development until 2030, the goals of sustainable development are defined, which have been accepted by all the UN countries, and thus also the EU countries. By analyzing the 7 sustainable development goals related to natural capital, it can be concluded that the European Union has made progress in all goals. The best results were achieved in terms of affordable and clean energy. The EU has also progressed in terms of ecological production, water quality in the form of a reduction of phosphate in rivers, an increase in resource productivity and a circular rate of material use, a reduction in greenhouse gas emissions, an increase in the area of marine areas under the Natura 2000 network, an increase in bathing areas with excellent water quality, and an increase in forest areas.

In achieving sustainable development, it is not enough to act at the national and regional level, but also at the global level. The European Union has an economic influence that can promote the goals of sustainable development in other regions as well. The implementation of the Sustainable Development Goals is important for achieving the long-term vision of the EU until 2050, "A clean planet for all."

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