Create sustainable and smart mobility in the Western Balkans country

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Abstract

Climate change and environmental degradation are existential threats to Europe and the world. In paper we discussions on how to create a climate resilient, intelligent, and resource-efficient transport network in the Western Balkans. Making transport cleaner and sustainable is must be one of the key drivers of transport policy in Western Balkans. With the final aim of making transport greener, sustainable, and healthier for citizens of Western Balkans. In addition, the Western Balkans region is affected by climate change and has already experienced its severe consequences of climate change. In the coming period, the countries of the Western Balkans should develop and implement joint regional actions, that will contribute to the creation of sustainable and smart mobility. Joint regional measures of the country should be developed in more detail according to the organization of the country. The paper presents current situation, and the future main joint regional actions aimed at creating sustainable and smart mobility of the countries of the Western Balkans.

Keywords*: Regional actions, Sustainable, Smart, Mobility, Emissions, Create*

1 Introduction

The positive side of the transport sector is reflected in the movement of people and material goods, but at the same time it is a source of great pressure on the environment and climate, with the participation of about ¼ in the creation of all greenhouse gases, with a particularly pronounced impact of road traffic.

The future of Europe and the world depends on a healthy planet. Facing current challenges in the field of climate and environment requires an urgent and ambitious response. The EU has committed itself to achieving climate neutrality by 2050. To achieve this goal, a transformation of European society and economy is required, which must be cost-effective, fair and socially balanced.

The European Green Plan represents the EU's strategy for achieving the climate goal for 2050, it contains a package of initiatives in the area of policies aimed at ensuring the green transition of the EU, with the ultimate goal being to achieve climate neutrality by 2050.

It supports the transformation of the EU into a just and prosperous society with a modern and competitive economy. It emphasizes the need for a comprehensive and cross-sectoral approach in which all relevant policy areas contribute to the ultimate climate goal. The package includes initiatives in the fields of climate, environment, energy, transport, industry, agriculture and sustainable financing. The paper deals in detail with the area of transport, the importance of the implementation of the EU strategy for sustainable and smart mobility, as well as the future activities of the countries of the Western Balkans.

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The countries of the Western Balkans are greatly influenced by climate change. Namely, in the previous period they experienced the negative consequences of climate change, and as a region they are seen as one of the most affected by climate change in Europe. With regard to the impact of the transport sector of the countries of the Western Balkans on climate change, five subcategories stand out, namely: road, rail and air transport, as well as transport by sea and inland waterways. The paper will also present three scenarios regarding the generation of harmful substances, financial savings and energy consumption until 2050.

2 The impact of the EU transport sector on the climate and environment

From 1980 to 2020, more than 138,000 people lost their lives due to extreme weather conditions and phenomena related to climate change. The year 2020 was recorded as the hottest year in Europe, and in the last 5 years the average temperature was 2.2 0C higher than at the end of the 19th century. Financial losses as a result of climate change have cost Europe more than 487,000 billion euros in the last 40 years. Floods cost Europe more than 5 billion euros every year, and fires cost more than 2 billion.

In the EU, five sectors (transport, agriculture, construction, small industry and waste) account for 60% of total greenhouse gas emissions. Each country should contribute to the reduction of greenhouse gases in all sectors, adopting a series of regulations and establishing marginal annual pollution limits by sector. Figure 1. shows the projection of greenhouse gas emissions in EU member states until 2030.

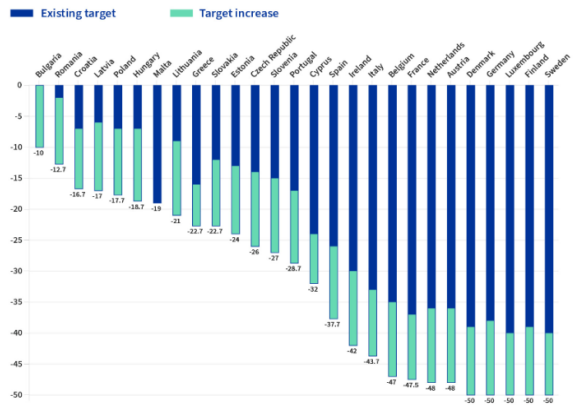

Fig. 1. Projection of greenhouse gases in EU member states until 2030. [1]

When it comes to the transport sector, it accounts for about 25% of greenhouse gas emissions in the EU. According to the European Green Plan, today about 75% of land cargo is transported by road, which in the future should be partly transported by rail and inland waterways. Urgent action is therefore needed as relatively little progress has been made so far: for example, the modal share of railways in land freight transport fell from 18.3% in 2011 to 17.9% in 2018. In the Fig. 2., the % presentation of the origin of emissions according to the type of traffic is given.

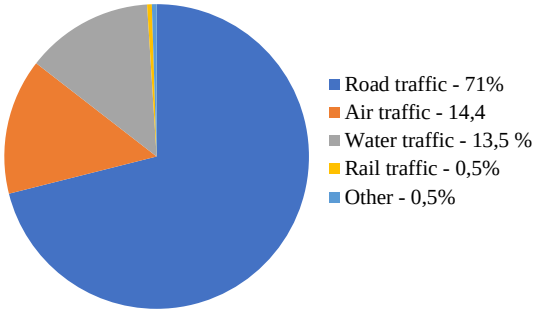

Fig. 2. Share of emissions by type of traffic [2]

When it comes to CO_2 emissions, cars and vans are responsible for about 15% of the total emissions in the EU, as shown in the Fig. 3.

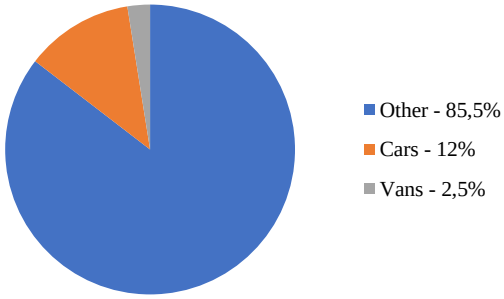

Fig. 3. Generation of CO_2 emissions from cars and van [3]

The greening of mobility must become a new basis for the growth of the transport sector. Mobility in Europe should be based on an efficient and interconnected multimodal passenger and freight transport system enhanced by an affordable high-speed rail network, widely available zero-emission vehicle charging infrastructure. In this sense, reducing the use of fossil fuels in transport is crucial for the EU to become climate neutral by 2050. In order to

achieve this goal, there must be enough charging stations for electric vehicles and alternative fuel stations for the cars, planes and ships that use them in the EU.

The regulation on infrastructure for alternative fuels, which is part of the package "Ready for 55%", sets concrete goals for the development of such infrastructure in the EU in the coming years.

From the mentioned approach, the expected benefits are reflected above all for citizens, consumers and the automotive industry, which is explained in more detail in the Fig. 4.

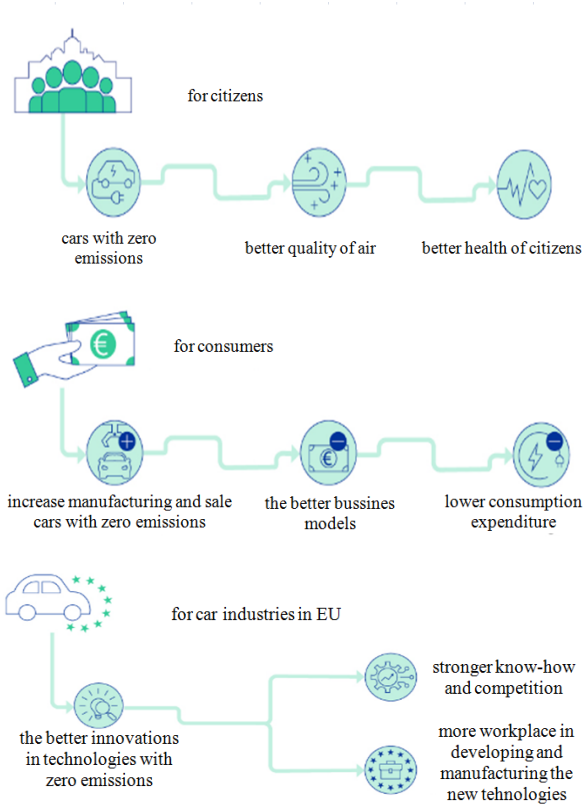

Fig. 4. Expected benefits for citizens, consumers and the automotive industry [3]

At the end of 2019, the European Commission announced a new growth strategy, called the European Green Plan. The strategy should enable sustainable and inclusive growth, the implementation of the United Nations program until 2030 and the goals of sustainable development, and the transition towards a just and prosperous society with a modern, resource-efficient and competitive economy in which there will be no greenhouse gas emissions in 2050. Policies for the implementation of the new general growth strategy, i.e. the European Green Plan, include:

- Climate policy,
- Energy policy (for the supply of clean energy throughout the economy),
- Industrial policy and circular economy,
- Construction,
- Environmental protection and biodiversity,
- Agriculture and tourism (for the implementation of "from field to table" initiatives),
- Mobility,
- Social policy,
- Research, development and innovation.

Adequate action in the field of sustainable and smart mobility requires a multidisciplinary approach at different levels, from the creation of strategic documents, planning and design to the use and application of specific technical solutions.

The effective response of society to negative phenomena in the transport sector, i.e. the creation of an effective system of protection, requires the creation of a deliberate, branched, planned, elaborated, synchronized system of diverse and interconnected organizational, social, educational, educational, technical, economic and other results based on science, measures and activities that will reduce the risk accompanying the development of a complex system of movement of people and goods to environmentally acceptable limits. In order to break the chain between the causes and the negative consequences of the transport sector, before the consequences occur, all factors that contribute to the negative impact of the transport sector on the climate and the environment must be respected, as well as their dynamic connection.

2.1 Sustainable and smart mobility of the countries of the Western Balkans

The countries of the Western Balkans in the previous period were greatly influenced by climate change, and as a region they are seen as one of the most affected by climate change in Europe. The estimated increase in temperature was from 1.7-4°C, with an estimate that it will be up to 5°C in the coming period, depending on the global effort to reduce greenhouse gas emissions.

The main source of greenhouse gases in the countries of the Western Balkans are the energy and transport sectors, which account for two thirds of the total share of greenhouse gases. The

transport sector accounted for about 12% of greenhouse gases in 1990, while its share increased to 16% by 2018. In the total share of emissions, road traffic is dominant with a share of more than 90%, which is especially pronounced in urban areas of the region, as well as areas with a large number of inhabitants.

Within the framework of the Permanent Secretariat of the Transport Community, in mid-2021, the Sustainable and Smart Mobility Strategy of the Western Balkan countries was adopted, which is based on the European Green Plan. In this sense, the strategy includes sustainable, smart and resilient mobility as key elements, as well as 10 initiatives. [5]

The strategy presents guidelines for the development of the region's transport sector with the aim of creating a greener, smarter and more resilient transport system, which will be integrated into the EU transport system according to the highest standards. It also represents the basis for the development of national mobility strategies, with the aim of achieving the set results by 2030 and 2050.

Through the defined action plan of the strategy, it is necessary to undertake activities on the improvement of the legislative framework, development of transport infrastructure and ITS, as well as institutional strengthening, within the suggested time frames.

2.1.1 The current situation in the countries of the Western Balkans

In all countries of the Western Balkans, the transport sector is based mainly on non-renewable energy sources for road, water and air transport, electricity and diesel for railway transport.

Road transport is the predominant mode of transport. The use of electric and hybrid road vehicles in the countries of the Western Balkans is low compared to the EU.

The implementation of energy efficiency measures in the transport sector is just at the beginning. The shortcoming is reflected in the absence of a unified approach to determining emission standards by the competent authorities, which ranges from Euro 3 as the lowest to Euro 6 as the highest Euro norm.[3]

Rail transport, zero-emission vehicles rely on electric traction because there is no infrastructure or means of transport that can use other types of alternative fuels. There are no means of transport with zero emissions in waterborne air transport.

There are two key parameters for reducing greenhouse gases, which are reflected in:

- the total energy consumed - which is based on the kilometers traveled and the type of means of transport, and
- to the greenhouse gas emission factor of energy consumed.

The key drivers that affect both the traffic model and then the energy/greenhouse model are reflected in:

- The population is growing,
- Growth of the gross domestic product,
- Total kilometers traveled,
- Composition of the fleet,
- Fuel economy,
- Emission factors, and
- The emission factor from the network.

In the absence of action, annual greenhouse gas emissions could be expected to more than double between 2019 and 2050. Total projected greenhouse gas emissions are expected to increase from 8.3 million tCO_2 in 2019 to 18.0 million tCO_2 in 2050. [5]

It can be noted that the main driver of the increase in greenhouse gas emissions in the region is fuel consumption in road transport, especially due to the increased use of passenger cars. Based on the estimated baseline scenario projections, it is evident that significant progress is necessary in the region for: policy intervention and investment in infrastructure, change of transport mode, change of fuel and renewal of the vehicle fleet.

We can observe the future activities of the countries of the Western Balkans through three scenarios:

1. Do Nothing scenario emissions describes the state of the system against which changes are measured: greenhouse gas emissions in the

[3] Import of M1 category, Euro V used and Euro VI new vehicles is allowed in Bosnia and Herzegovina.

transport sector are expected to almost double by 2050;

2. The "Do Something scenario emissions" scenario is an acceptable description of the future that describes how the (studied) system will respond to the implementation of certain policies and measures;

3. The decarbonization scenario "Decarbonization scenario emissions" implies full implementation measures.

In the following figure, according to three scenarios, the projection of tCO_2 generation by year until 2050 in the countries of the Western Balkans is given. [4-5]

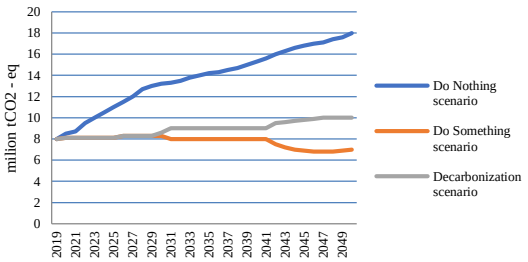

Fig. 5. Generation of tCO_2 by years in the countries of the WB according to scenarios

Table 1. shows the projection of energy consumption in the countries of the Western Balkans [6] according to three scenarios until 2050.

Table 1. Energy consumption by year and scenario

Depending on the applied scenario [6], the projection of financial savings in the following period is given in table 2.

Table 2. Projection of financial savings according to scenarios expressed in billions of euros

	2030	2040	2050
Do Nothing scenario	0.0	0.0	0.0
Do Something scenario	8.2	34.5	75.0
Decarbonization scenario	8.8	40.8	99.6

2.2 Sustainable and smart mobility of Bosnia and Herzegovina

Bosnia and Herzegovina has adopted the Framework Transport Policy for the period 2015-2030. year, which is a framework and basic document, on the basis of which the development strategy, regulations, programs, plans and other acts were adopted in the process of progress and development of the transport sector, and to decide on development directions, action plans and priorities at the level of Bosnia and Herzegovina, its entities and Brčko District of Bosnia and Herzegovina, and in accordance with the Constitution of Bosnia and Herzegovina.

As a follow-up to the stated policy, the Framework Traffic Strategy of Bosnia and Herzegovina for the period 2016-2030 was adopted, which describes in detail the implementation of the Transport Policy until 2030. The framework transport strategy determines the procedures and programs to be undertaken (administrative reforms, regulatory harmonization, capacity building and investment programs), as well as the corresponding distribution of responsibilities, time frame and key performance indicators. [7-9]

The European Commission in Bosnia and Herzegovina selected consultants in order to further update the Framework Traffic Strategy of Bosnia and Herzegovina, which resulted in a final document at the end of 2022, which was submitted to the Ministry of Communications and Transport of Bosnia and Herzegovina for further processing. [7-9]

Further activities aimed at the adoption of the aforementioned document require consideration by the competent bodies in Bosnia and Herzegovina and adoption by the Council of Ministers of Bosnia and Herzegovina. The above should ultimately ensure the further integration of the BiH transport sector into the EU transport sector, according to the highest standards and legal norms.

		2030	2040	2050
Energy consumption per RP (MWh/ year)	Albania	4,207,119	3,786,886	2,617,169
	Bosnia and Herzegovina	5,053,133	3,991,572	2,577,427
	Kosovo	3,100,050	2,869,005	2,052,239
	Montenegro	1,129,182	864,076	602,603
	North Macedonia	4,887,384	4,750,646	2,908,254
	Serbia	12,722,336	10,465,760	4,849,448
Decarbonisation scenario energy consumption (WB6 total)		31,099,204	26,727,945	15,607,140
Do Something scenario energy consumption (WB6 total)		32,029,462	31,937,095	31,141,451
Do Nothing scenario energy consumption (WB6 total)		41,993,735	54,821,886	60,920,665

3 Conclusion

The recovery from the crisis caused by the COVID-19 disease pandemic should be used to accelerate the decarbonization and modernization of the entire transport and mobility system, limiting its negative impact on the environment

and improving the safety and health of citizens. The parallel green and digital transition should reshape the transport sector, redefine connectivity and revive the economic sector. The transformation, which must be fair, will not be easy and will have to be fully committed to and supported by all participants in the transport sector, and investments from the public and private sectors that stimulate growth will have to be significantly increased.

The sustainable European transport system that the EU strives for must be smart, flexible and adaptable to changing traffic patterns and needs, and be based on the most modern technological achievements in order to ensure smooth, safe and protected connectivity for all citizens. Transport should be an indicator of European ingenuity and craftsmanship, a driver of research, innovation and entrepreneurship, and a driving force of the double transition. For the countries of the Western Balkans, a comprehensive set of measures is proposed towards the creation of a sustainable, smart and resilient mobility system of the future and the introduction of fundamental changes necessary to achieve the goals of the European Green Plan. Also, further synchronized elaboration at the national levels of the measures proposed in the Strategy for Sustainable and Smart Mobility of the Western Balkan countries is needed. Given the importance of joint actions, the achievement of a common goal can only succeed with sufficient commitment from all interested parties, specifically the institutions of the Western Balkan countries and their bodies at all levels of government, participants, companies and citizens.

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