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LEGISLATIVE FRAMEWORK OF CLIMATE CHANGE IN THE REPUBLIC OF SERBIA

Nadezda LJUBOJEV, Snezana FILIP*, Dragica IVIN, Mila Zakin, Jasmina PEKEZ

University of Novi Sad, Zrenjanin, Serbia

Abstract

The struggle against climate change is one of the priorities in the policy of the international community. In this paper the authors have analyzed legal framework relevant for the protection of climate change in the Republic of Serbia. In the Republic of Serbia, the energy sector is the largest source of greenhouse gasses, but it is also the sector with the greatest potential for the application of mitigation measures. The country has already established important components of the institutional and legal framework for the purposes of the struggle against climate change. At the same time, there remains a need for further harmonization of national legislation with international trends in the field of climate change, as well as with the obligations arising from ratified international documents and the process of European integration, as well as capacity and knowledge building within relevant and competent institutions both at national and local levels, but also at the level of general public. Within the Republic of Serbia the obligations towards the European Union in the field of climate change, further alignment with European Union policies, are necessary such as objectives 20-20-20 and requirements for monitoring and reporting.

***Keywords**: climate change, legal framework, European Union, Republic of Serbia.*

1. INTRODUCTION

In recent decades, the data on average annual temperatures have shown an alarming situation, as until 2012, the temperature rose by 0.8% compared to the pre-industrial period, but in the past thirty years there were recorded the highest temperatures in the last 1.400 years. The growth rate of average global temperature has increased to 0.1°C per decade and in the past 10 years up to 0.2 °C per decade [1]. Average annual temperatures at the European level in the past 50 years have grown faster than the global average. The measured medium increase in temperature annually is 1.4 °C. The projections for the end of the 21st century show an annual increase in temperature from 2.1°C to 4.4°C, while in the Southern Europe the temperature may locally rise up to 6°C [2].

Global climate changes are reflected in the climatic characteristics of the geographical area of the Republic of Serbia, so that, based on measuring of the Republican Hydro-Meteorological Service of Serbia (RHMS), there was observed a positive trend of temperature [3, 4, 5]. The increase amounts up to 0.04°C per year, while in some areas in the east and southeast Serbia a negative trend of -0.05°C was recorded. The highest temperature rise was recorded in autumn [6].

The state of the climate system that includes statistical description of its variations in period from few months to few millions of years is defined as **"Climate"** [7]. The term '**climate change'** refers to changes caused by the presence of greenhouse gasses (GHG) whose presence is solely linked to *human activities* (Intergovernmental Panel on Climate Change (IPCC).

According to the data of the IPCC, the most important source of GHG emissions is electricity and heat production with a share of 25% in total emissions of GHG, followed by agriculture, forestry and other land use (AFOLU) with 24%, industry 21%, transport 14%, buildings with 6.4%, and other energies which refers to all GHG emission sources in the energy sector other than electricity and heat production with 9.6% [8].

The world concentrations of the CO_2 in the atmosphere have been constantly increasing since the period of the industrial revolution. The data indicate that the CO_2 emission with 910 $GtCO_2$ for the period of 1750-1970 increased to 2000 $GtCO_2$ for the period of 1740-2010. A noticeable increase was recorded in the period from 2000-2001. In this period, GHG emissions rose by an average of $GtCO_2$ eq/year, while for the period from 1970-2000 the increase was 0.4 $GtCO_2$ eq/year [1].

In the Republic of Serbia the most common gas of GHG is carbon dioxide (CO_2) [9]. The main GHG 2014 was carbon dioxide (CO_2), accounting for 79.7% of total GHG emissions [10]. According to the International Energy Agency (IEA), the Republic of Serbia emits about 60 million tons of CO_2 per year. Out of this, production of electricity from the two largest lignite depots in Kolubara and Kostolac emit about 40 million tons of CO_2 [11].

In this paper legal frameworks relevant for the protection of the climate change within the Republic of Serbia borders are discussed.

2. BACKGROUND

In the recent decades, climate change, one of the greatest environmental, social and economic threats has taken great attention of the scientific and political public. Great efforts have been invested in the creation of policies that would affect the reduction and mitigation of climate change as climate change represents a global risk which requires a reaction on the global level.

The United Nations (UN) globally directs the activities in the field of climate change. United Nation Framework Convention on Climate Change (UNFCCC) was adopted in 1922 at the Earth Summit in Rio de Janeiro in Brazil, as the first step towards solving this problem [12]. The main objective of the UNFCCC is to stabilize concentrations of GHG at a level that would prevent negative anthropogenic interference with the climate system.

In addition to UNFCCC, in December 1997 in Kyoto, the Kyoto Protocol was adopted aiming to achieve better implementation of this Convention [13]. The Kyoto Protocol sets emissions targets for developed countries which are binding under international law. The main objective of the Kyoto Protocol is to reduce global anthropogenic GHG emissions by at least 5% compared to 1990 levels, in the first commitment period, 2008-2012. The peculiarity of the Kyoto Protocol is that it established three main mechanisms for realizing the stated objectives: *joint implementation* – JI (Art. 6), *clean development mechanisms* – CDM (Art. 12) and *emissions trading* – ET (Art. 17).

In addition to the Kyoto Protocol (and its amendment) and the Paris Agreement, parties to the Convention agreed to further commitments during UNFCCC Conferences of the Parties. The 21st regular annual session of the UNFCCC and the 11th meeting of the signatories of the Kyoto Protocol is the 21st Conference of Parties – COP21, held in Paris from 30 November to 20 December 2015. The Paris Agreement is a new global legally binding agreement on climate change for the period after 2020.

The Paris Agreement includes a plan for action in order to limit the global temperature increase at less than 2°C. While the long-term goal of the governments is the agreement to keep a level of global temperature at a level less than 2°C compared to the pre-industrial level and will make efforts to limit the increase to 1.5°C. In addition to reducing emissions (mitigation), the Paris Agreement also includes other key issues, or adaptation to changed climatic conditions (adaptation) and financing of mitigation and adaptation in the developing countries, as well as capacity building and development and transfer of technology. The Paris Agreement entered

into force on November 4, 2016, i.e. after its ratification by at least 55 member states of the Convention, which makes up at least 55% of global emissions of GHG.

The obligations of the Member States of the UNFCCC within the Paris Agreement are determined by the objectives of reducing GHG emissions the countries submitted as a preparation for the Conference (Intended nationally determined contributions-INDCs). The Republic of Serbia submitted its reduction target for 2030 in relation to 1990, which is 9.8% [14].

2.1. EU Political and Legislative Framework

Activities in the struggle against climate change and mitigating their effects have been identified as priorities in the EU [15]. Ever since 2007, the EU integrally regulates the fields of climate and energy through "EU climate and energy package" which includes a set of binding legal instruments in this field. The objectives of the "20-20-20" set three key objectives for the EU by 2020: reducing emissions of GHG by 20% compared to 1990 levels, increasing the share of energy consumption from renewable sources to 20% and increasing energy efficiency by 20%. These targets were set in 2007 in order to make Europe a highly energy-efficient economy with low carbon emissions, and they were adopted through climate-energy packet in 2009. After the Renewable Energy Directive, Member States have taken binding national targets for increasing the share of renewable sources in its energy consumption by 2020. National targets, which range from 10%-49% (10% in Malta to 49% in Sweden) will enable the EU as a whole to reach its goals for renewable energy sources by 2020. In addition to this, these objectives will contribute to reducing emissions of GHG and reduce the EU independence on imported energy. The element of the climate-energy package is a directive that creates a legal framework for the environmentally safe use of technology for capturing and storing carbon (CSC).

In October 2014, the EU leaders reached an agreement on a political framework for 2030 in the field of climate and energy which should make climate and energy system of the EU prepared for the future and keep Europe competitive and safer which will enable progress in achieving economic development with low carbon dioxide emissions. 2030 climate and energy framework sets three key targets for the year 2030. The first key objective of the framework is the obligation of reducing emissions of GHG at the EU level by 2030 for at least 40% below 1990 levels.

This objective should enable the EU to find itself on the profitable path to fulfilling the universal goal of reducing emissions by at least 80% by 2050. To achieve the target of 40%, the sectors that fall under the EU ETS system should reduce emissions by 43% compared to 2005. The emissions of the sectors not included in the EU ETS should reduce emissions by 30% compared to the 2005 level, which should be transferred to national objectives as well. The framework helps driving progress towards a low-carbon economy and builds an energy system that ensures affordable energy for all consumers, increases the security of the EU's energy supplies, reduces EU dependence on energy imports and creates new opportunities for growth and jobs. It also brings environmental and health benefits – e.g. through reduced air pollution. In addition to this, EU ETS will be reformed and improved.

The *EU Roadmap* [16] to 2050, towards an economy with *low emissions.* The European Commission is considering cost-effective ways to adapt the European economy to climate change [17].

By 2050, the EU predicts to significantly reduce the majority of emissions of GHG. The *Roadmap* to 2050 is a set of planning policies which should enable sustainable use of resources at the EU level. Clean technologies play an important role.

The Roadmap indicates that by 2050, the EU at the national level should reduce emissions by 80% compared to 1990 levels. By the way, a greater use of clean technologies will drastically reduce air pollution in European cities.

3. DISCUSSION AND RESULTS

Cooperation with the UN aims at strengthening the institutional and human capacities in the Republic of Serbia in the area of climate change. The Republic of Serbia ratified UNFCCC in 2001 [18] and Kyoto Protocol in 2008 [19] and ever since it has established its legal, institutional and political framework aimed at fulfilling the obligations arising from the Convention and the Protocol.

As a non-Annex and Member State to the UNFCCC, the Republic of Serbia is under no obligation to reduce emissions of GHG, but it submits information on emissions and removals of GHG, as well as information on the activities undertaken in order to implement the Convention and activities aimed at integrating climate change issues into the broader planning of country's development.

The Republic of Serbia reports on their activities aimed at fighting climate change and changes and adjustments (adaptation) to changed climate conditions. Initial National Communication (INC) of the Republic of Serbia to the UNFCCC, as an important national strategic document was published in 2010. INC gives an overview of activities in the field of climate change, including information on current and expected levels of greenhouse gasses, the possibilities and ways to reduce it, on the monitoring, reporting, and verification, as well as about the flaws and needs. The INC contains concrete and adaptive measures for certain sectors, although it does not list institutions responsible for the proposed measures or stated deadlines for their implementation. The Second National Communication Report of the Republic of Serbia to the UNFCCC, include an inventory of GHG, as well as screenings and action plan to mitigate climate change by 2020.

Ministry of Agriculture and Environmental Protection (MAEP) published the First Biennial Updated Report (FBUR) of the Republic of Serbia to UNFCCC in February 2016 [20]. The FBUR provides the Republic of Serbia obligations towards UNFCCC, national characteristics of the Republic of Serbia, the inventory of GHG, emissions projections up to 2020, the activities for their reduction, monitoring, reporting, verification and gaps and priority needs. In the FBUR of the Republic of Serbia to UNFCCC, inventories of GHG have been revised and improved (including GHG inventory for 1990), and the GHG inventory for the period 2010-2013 was prepared. Also, there was published the FBUR with the results that the inventory of the GHG for the period of 2010-2013 is prepared as well as an action plan for mitigation by 2020, and promoted national system of monitoring, reporting, and verification.

Today, the Ministry of Environmental Protection (MEP) is responsible for climate change issues. The Republic of Serbia submitted the Second National Communication (SNC) under the UNFCCC on October the 23rd, 2017. The goal of the Second National Communication (SNC) of Republic of Serbia under the UNFCCC, is to prepare GHG inventories, to carry out the assessment of mitigation measures and the action plan of mitigation up to 2030 and 2050, to analyze the vulnerability of sectors and systems and adaptation to changed climate conditions, especially in the sectors of agriculture, forestry and water resources, to strengthen national capacities for the implementation of the Convention, and to involve the problem of climate change more effectively into all sector and national priorities. The data given in the SNC was used in the development of the Climate Change Strategy with the Action Plan [21]. The Program for the Implementation of the Energy Sector Development Strategy of the Republic of Serbia for the period by 2025 with projections by 2030, for the period 2017-2023, was adopted in October 2017. In the Republic of Serbia, the energy sector is the largest source of GHG, but it is also the sector with the greatest potential for the application of mitigation measures.

3.1 Projections of the Total GHG Emissions

Although adaptation to climate changes in the past few years has been the focus of scientists and politicians, because the IPCC reports have shown that climate change and their effects cannot be stopped in the short term. It is necessary to develop specific adaptation

systems, i.e. adaptation to emerging climate conditions [22]. Adaptation strategies are needed at all levels of administration, from the local to the international level.

The Serbian Agency for Environmental Protection developed the 2000-2014 national GHG inventory [23]. Based on the GHG inventory, in 2014 estimated total emissions in the Republic of Serbia without removals were 67,148.23 Gg CO_2eq. Since 2000, total GHG emissions without removals have increased by 7.8%. In 2014, the total GHG emissions with sinks were 49,299.24 Gg CO_2eq, which is a 2.4% increase compared to 2000. Emissions from the **energy sector** have the largest share (80.0%) in total emissions in 2014, which is a slight increase of 0.8 % compared to 2000. The second largest GHG emitting sector is the Agriculture, Forestry and Land Use (AFOLU) [10]. Due to lack of data for 2014 caused by disastrous floods, the data collection system has not been complete. Thus, the GHG inventory will have to be updated in the near future [**MEP]**.

In metodology, estimations of the total GHG emissions and GHG emissions for sectors were made through three scenarios: a baseline scenario, scenario "with measures" and scenario "with additional measures". The estimations were made by 2030, with a cross-section in 2015, 2020 and 2025. The year 2010 was chosen as a starting point. The LEAP (Long range Energy Alternatives Planning System) model was used for developing all projections.

The basic scenario implies implementation of policies and measures that were in force in 2010, until 2030. The scenario "with measures" entails improving the implementation of the existing policies and measures to be in accordance with the commitments under the EU accession process. The scenario "with additional measures" implies a further reduction in final energy consumption.

In order to achieve consistency and compliance of projections for 2020 and 2030, in preparation of the three scenarios (for total emissions and emissions per sector) the same assumptions were taken into account as those used for drafting of the FBUR of the Republic of Serbia to the UNFCCC. Some of the reporting priorities to the UNFCCC include: projection improvements, the definition of specific activities for reduction of GHG emissions, reducing emissions estimates by gases and the monitoring of the GHG emission reduction potential.

Levels of total GHG emissions in 2030, including 2015, 2020 and 2025, determined on the basis of three scenarios (baseline scenario, the scenario 'with measures" and scenario "with additional measure"), are summarized in Table 1.

Table 1. Levels of total GHG emissions in 2030, including 2015, 2020 and 2025, for three scenarios, Gg CO_2eq [10]

Total emissions (Gg CO_2 eq)	**2015**	**2020**	**2025**	**2030**
Basic scenario	70,783.23	79,442.37	80,661.99	87,099.71
Scenario "with measures"	68,410.42	70,966.54	70,749.05	75,293.72
Scenario „with additional measures"	66,015.15	65,164.09	63,475.53	67,613.66

Trends of total GHG emissions in the period 2010-2030 developed from the three scenarios are presented in Figure 1.

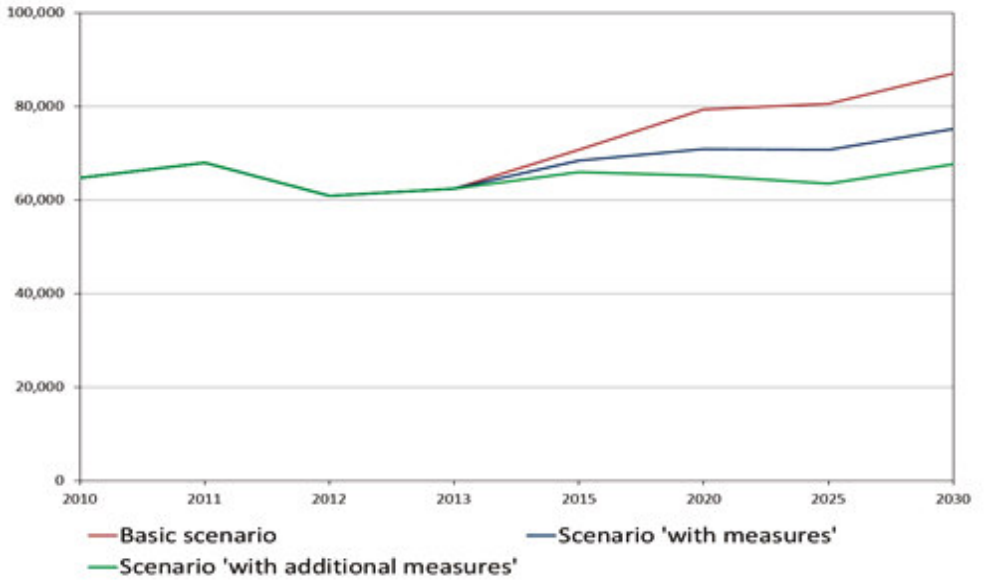

Figure 1. GHG emission trend in the period 2010-2030 for three scenarios, Gg CO2eq [10].

According to SNC data, in 2030, if applying the scenario "with measures" GHG emission will decrease by 14.37% compared to the basic scenario, and by 23.50% under the scenario "with additional measures".

In 2012, the Republic of Serbia identified NAMAs and submitted to the NAMA Registry projects that were taken into consideration during the development of scenarios "with measures" and "with additional measures (Figure 1)

Estimated reduction in total GHG emissions by 2050, like in the case of projections made by 2030, relied on three scenarios: a basic scenario, a scenario "with measures" and a scenario "with additional measures" (Figure 2). The year 2010 was chosen as a starting point for projections, and was used LEAP model.

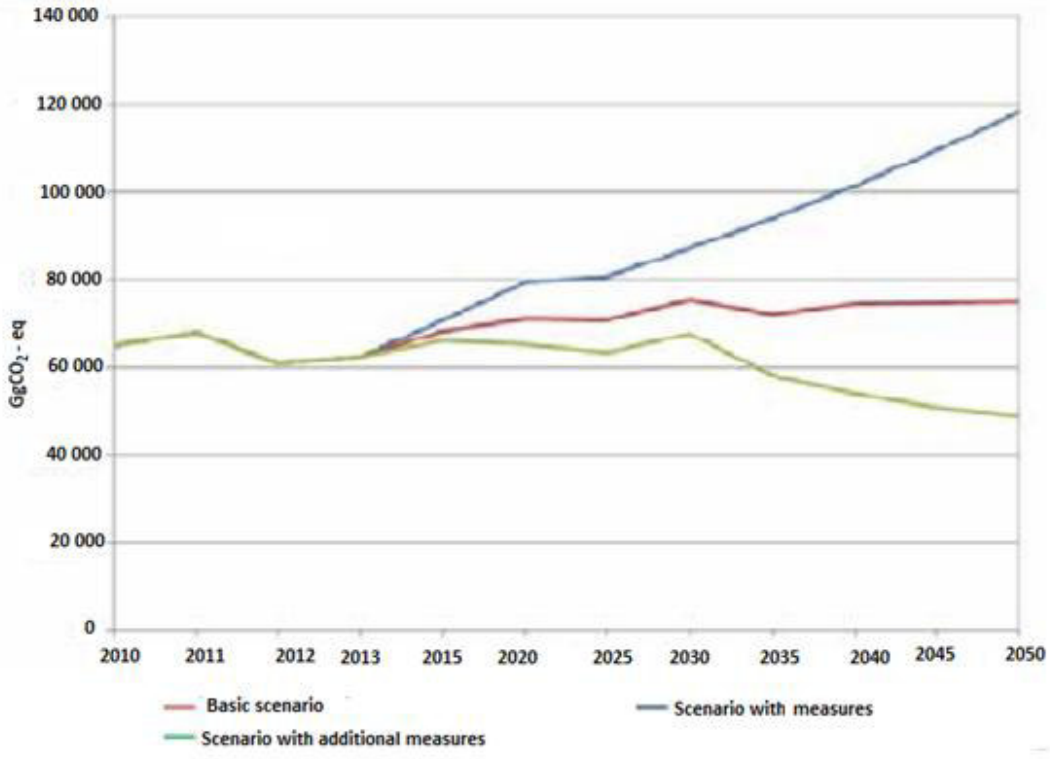

Figure 2. Emission projections of greenhouse gases in the Republic of Serbia by 2050 [10].

The first estimates have shown a reduction in GHG emissions by 35% if applying the scenario "with measures' compared to the basic scenario and by 49% under the scenario "with additional measures". According to the scenario "with additional measures", emissions in 2050 will be 42% lower than 1990 emission levels and 22% lower than 2013 emissions [10].

3.2 Activities in the field of Climate Change

Specific activities that will ensure the reduction of GHG emissions were identified through the Nationally Appropriate Mitigation Actions (NAMA) projects.

In addition, there was established a Central Registry of Energy Passports (CREP). The HMSS, where the center is located, has significantly improved its capacities so that today it is one of the key institutions for the monitoring of climate change, as well as for planning adaptation. However, the level of knowledge and quality of data on climate change has significantly promoted the formation of the South East European Virtual Climate Change Center-SEEVCCC within the Republic Hydro Meteorological Service of Serbia was established (2008).

Activities in the field of climate change, especially adaptations have not been developed on the local level so far so that the availability of information on locally specific consequences of climate change is very limited.

As a non-Annex and Member State of the Convention, the Republic of Serbia has access to the Clean Development Mechanism (CDM). In accordance with the obligations, there was established a National Authority for the implementation of the CDM of the Kyoto Protocol (DNA). So far, there have been registered seven CDM projects in Republic of Serbia.

Following new features to combat climate change under the auspices of UNFCCC, the RS has developed (NAMA). The Republic of Serbia supported Copenhagen Accords and in 2012 identified 12 NAMA actions, seeking support for their implementation. The concept of nationally adjusted mitigation actions is one of the key components of climate change mitigation at the international level and it involves policies and actions to reduce emissions of GHG, in accordance with their capacities and different responsibilities.

In the context of the EU accession, and in order to implement Directive 2009/29/EC on the system of emission trading, there was established a system for monitoring, reporting, and verification (MRV) indispensable for the successful implementation of the EU ETS [24]. This requires implementation of the legislative and institutional framework for the implementation of the Directive. So far, there were prepared a preliminary list of installations falling under the EU ETS, preparation of relevant laws and regulations necessary for full implementation of this system; there was also made an estimate of possibility of transitional measures to comply with the system, cost analysis for the energy sector and the implementation plan for stationary equipment and airline operators for the period prior to EU accession. The law on the system of monitoring, reporting, and verification needed for EU ETS, which should introduce the obligation of monitoring, reporting, and verification of data on GHG emissions from industrial and power plants, has not been adopted. The transposition of the Directive on Emissions Trading in our legislation and transposition of the Directive 2009/31/EZ on the Geological Storage of Carbon Dioxide have not started yet.

The Republic of Serbia has enacted laws and by-laws that are important to mitigate climate change, arising from obligations in the process of EU integration. Within the Republic of Serbia obligations towards the EU in the field of climate change, further alignment with EU policies is necessary, such as objectives 20-20-20 as well as requirements for monitoring and reporting.

Conclusion

Despite the activities and efforts to establish a systematic, permanent and functional system required for efficient UNFCCC reporting, capacity building and financial resources, as well as bilateral and multilateral cooperation and assistance will be necessary. Since it belongs

to the developing countries (non-Annex I countries), the Republic of Serbia is not obliged to reduce GHG emissions, nor it is obliged to submit regular reports to the Conference of the Parties to the Convention, which includes the assessment of the sector and the system to changed climate conditions, calculations of GHG emissions, proposed measures of mitigation, as well as including the problem of climate change into sector and national development strategy.

In its NSC of the Republic of Serbia to UNFCCC, as an important national strategic document, among other things it was noted that the **energy sector** is the largest source of GHG, but it is also the sector with the greatest potential for the application of mitigation measures.

The introduction of reporting after the UNFCCC has significant implications for strengthening of technical and institutional national capacities in the field of climate change. However, although it is strongly committed to the implementation of the Convention, the Republic of Serbia is faced with many restrictions such as lack of capacity and lack of complete operational system for monitoring, reporting, and verification (MRV) activities in the field of climate change. However, as a non-Annex I Member State of the UNFCCC, the Republic of Serbia has access to CDM and so far, there have been CDM projects in the Republic of Serbia through which industrialized countries (Annex I countries) invest in projects that contribute to sustainable development and the reduction of GHG emissions in the developing countries (non-Annex I countries).

In addition, the Republic of Serbia has developed NAMA projects. But there is comprehensive strategic document dealing with climate change in the Republic of Serbia. Activities in the field of climate change, in particular, adaptation have not been developed at the local level in the Republic of Serbia yet so that access to information on locally specific consequences of climate change is very limited.

Significant progress in the struggle against climate change began with the process of the Republic of Serbia integration in the EU and harmonization of its national legislation with the EU laws, especially bearing in mind that the basic principles of the EU legislation are based on the struggle against climate change. Preparations for harmonization of legislation in the field of trade with emissions show progress with the support of Instruments for Pre-accession Assistance (IPA).

Since it is necessary to assign priority to the establishment of a system for monitoring, reporting, and verification (MRV) of GHG emissions, the Republic of Serbia has initiated and implemented IPA projects and activities. Another important initiative relevant for the establishment of MRV is the establishment of the monitoring, reporting and verification system required for successful implementation of the European Union Emission Trading System (EUETS). This System will secure collection of data on GHG emissions at the level of industrial and power plants. The establishment of a complete MRV system is expected in 2019.

In the end, we can conclude that the Republic of Serbia has established some important components of the institutional and legal framework for the purposes of the fight against climate change. At the same time, there remains a need for their improvement, as well as capacity and knowledge building within relevant and competent institutions both at national and local levels, but also at the level of general public.

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Corresponding Author
Snezana Filip
University of Novi Sad
Technical Faculty"Mihajlo Pupin"
Djure Djakovica bb
23 000 Zrenjanin
Phone: +381 638571488
E-mail: filipsnezana@gmail.com