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## CLIMATE CHANGES - CHALLENGES AND POSSIBLE SOLUTIONS

*Abstract:* Climate changes are a topic which has been gaining attention of the global scientific and professional public increasingly for years. The question that has been on the agenda of conferences addressing this issue is how much time has left for us and whether a human can emerge as the winner in the struggle against climate changes bearing in mind that nature will always find a way to confront its uncontrolled destruction. With their activities, above all by uncontrolled technological progress (development), humans brought the Earth into the current state. A wish to earn as much profit as possible neglected the fact that economic interest and interest related to the environment can be balanced only by sustainable development. This is why this century will be to a great extent defined by a manner how we deal with climate changes. Since, “effort is pointless if nature confronts”, Lucius Annaeus Seneca.

*Key words:* climate change, sustainable development, Oslo Principles, UN Climate Change Conference in Katowice, UN Climate Change Conference in Madrid.

### 1. INTRODUCTION

As a conscious being, a human has always been looking for methods to adjust himself to nature in order to secure his survival. Via the transfer from manual production methods to mechanical, new chemical production, from wood and other bio-fuels to coal, in other words, to modern economic and technological development, apart from facing great benefits, a human also faced negative consequences of his own activities, such as industrial pollution of air and water, destruction of the ozone layer and global heating followed by climate changes as well as by the extinction of certain plant and animal species. Therefore, mutual effects of the human and of the environment represent the ground for contemporary environmental law which has an enormous importance in the prevention of these contradictions under the current circumstances (Lilić, Drenovak Ivanović 2014: 258).

Bearing in mind the above given, the pollution control-related regulations are extremely important. Out of the given set of regulations, one should mention the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Law on Ratification of Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters 2009) and the Kyoto Protocol (Law on Ratification of the Kyoto

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Protocol with the United Nations Framework Convention on Climate Change 2007) which was adopted in order to reduce the greenhouse gas effects and climate change risks and which provided for a classification of countries in line with the pollution degree and with the level of national product. According to the given regulations, countries with a high environment pollution share (these countries are very often those ones with a high national product) should be obliged to have higher rates of polluting matter reduction on their territory in comparison to countries with a lower share in pollution so as to have a more even pollution reduction on the global level.

One of the biggest sources of environment pollution caused by human activity is the process of fossil fuel combustion. With reference to this, the harmonisation of demand with economical supply of necessary energy quantities and keeping polluting matter emissions within limits is a specific challenge. It is possible to accomplish this by the implementation of an entire set of different measures, among other things, by switching to clearer energy sources as well as by adequate regulations.

When referring to the impact of energy consumption to environment, in terms of harmful gases emission from power production and consumption, the focus is on the switch to renewable energy sources. Within the struggle against global heating, states are stimulated to use all renewable energy sources to the maximum in different manners with simultaneous reduction of their dependence from fossil fuels. In this respect, in the end of 2015, 195 countries signed the Paris Agreement within the the United Nations Framework Convention on Climate Change which entered into force officially in the end of 2016. The countries which signed the Agreement committed to limit dangerous global heating to less than two degrees in comparison to the preindustrial period (Ministry for European Integration 2017: 49-50).

## 2. OSLO PRINCIPLES

Adjustment to climate changes has become the most important issue of our time. However, the awareness that mere adjustment to climate changes and the implementation of purely environment protection measures to the necessary extent is not always possible highlighted the need to establish the balance between the sustainable development, implementation of measures for social justice and maintaining the integrity of the environment (Eriksen et al. 2011).

It is a fact that we live in uncertain times which bring huge changes. Gradual glacier melting, changed ecosystems as well as extreme weather indicate that we are already facing the climate change effects largely, i.e. facing one of the biggest and the most inhumane challenges of the 21<sup>st</sup> century. Some authors agree that these changes represent a more serious threat than terrorism. This is why global collective actions are necessary in order to prevent potential dangers (Adger, et al. 2006).

For the first time in history, on June 24, 2015, in the lawsuit initiated by the „Urgenda” Dutch foundation with a team of lawyers and nine hundred citizens against the Dutch government, the District Court in the Netherlands adopted a decision which obliged the government to act more promptly on citizens protection against climate change consequences. By the given decision which is based on legal positions from

different law areas, mainly from the human rights area, as well as on Oslo principles and scientific findings of the Intergovernmental Panel on Climate Change, the responsibility of the Dutch Government on their own territory for harmful gas emissions with greenhouse gas effect was established despite the rationale that the solution of the climate change problem does not depend on the efforts of one country only (Schweitzer, Ensia, 2015). By the given decision, the District Court in the Hague decided that the state has to strengthen projected measures for greenhouse gas emission reduction (of 17%) so as the emissions could be at least 25% lower in 2020 in comparison to 1990 in line with the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (The Intergovernmental Panel on Climate Change 2014). The given measures which range from 25% to 40% for industrialised countries are necessary so as the world does not extend the warming framework of 2°C and so as to prevent the worst climate change consequences. The verdict in the dispute „Urgenda“ versus the Dutch Government was the first court decision in the world which instructs a state to limit harmful greenhouse gases emission for the reasons which are not mandatory by the law. The verdict within the given dispute is very important for the citizens of the Netherlands bearing in mind that the territory of this country is greatly under the sea level as well as that the government of this country has a possibility to implement the instructed measures and thereby to adapt to climate change consequences. By the adoption of the given verdict, the court entered the sphere of politics by providing legal protection to the citizens against the government simultaneously taking into consideration a possibility of the government to create their own politics (Decision The Hague Court of Appeal, The State of the Netherlands v. Urgenda Foundation 2018). In addition, a message was sent by the given decision that they cannot remain passive but that they have to address the problems and protect their citizens. Otherwise, the courts will make them do it. This should encourage citizens and organisations from other countries, first of all from poor countries which contributed to climate changes least and which will probably bear the largest consequences to complain against human rights violation in terms of damage arising from climate change. With reference to this, a question arises whether the official verdict of the Dutch court represents a turning point for the whole humanity? This is due to the fact that the citizens tried to initiate legal actions even before the Urgenda file in order to make the actions of political leaders align with the promises which were given but unsuccessfully. One of the examples is the petition filed by an international non-governmental organization Inuit Circumpolarna Council to the American Human Rights Commission with headquarters in Washington claiming that global heating caused by harmful greenhouse gases emission in the USA violates the rights of the Inuit people to preserve their traditional way of life because of the destruction of the Arctic environment. However, the Commission refused to accept the given file due to the lack of evidence (ICC, Inuit Petition Inter-American Commission On Human Rights To Oppose Climate Change Caused By The United States of America 2005). Also, even before the verdict of the Dutch court, the citizens tried to harvest judicial protection but the court declined jurisdiction in the disputes related to the allowed level of harmful greenhouse gases emission directing file applicants to address the legislative and executive authorities. An example is the verdict of the American Appellate Court in a dispute initiated by the citizens of the village and city of Kivalina,

Alaska against twenty two big energy companies including oil giants such as ExxonMobil Corp., BP Plc, Chevron Corp, and Shell Oil Co, claiming that the global heating reduced the production of sea ice which protected the city from erosion and winter storms and forced them to move (Columbia Law School, 9th Circuit Affirms Dismissal in *Kivalina V. Exxonmobil* 2012).

In such a situation where citizens were left without adequate legal protection because governments avoided responsibility and courts declined jurisdiction, academia members and lawyers all around the world as well as some members of judicial authority felt a need to meet and establish whether climate changes are a real problem starting from the ruling laws on environment protection, international law, human rights and causing damage as obligation source. They concluded that the response is 'yes', i.e. during climate changes, human rights which also include the right to live in a healthy environment is endangered. The advices of the given group in the few-years period lead to the adoption of the Oslo principles on global obligations with an aim to reduce climate changes on 01/03/2015. These rules define the scope of legal obligations of states relevant for climate changes with the application of ruling laws and the establishment of the temperature ceiling of 1.5% in line with the Intergovernmental Panel on Climate Change (The IPCC and The Sixth Assessment Cycle, 2020), in order to implement them by the courts in energy-related disputes. On the same day, they were presented to the public on the School Law in London (The Dickson Poon School of Law, King's College London). The Oslo principles highlight moral and legal obligations of the states to take measures in order to prevent adverse effects of climate changes bearing in mind that states are obliged by ruling international regulations to assess the impact of their activities to environment and to take measures to prevent destructive effects of climate changes. The principles represent clear and law-based criteria, i.e. framework which could serve as the ground for judges' decisions. In addition, they stress the need to have the countries negotiate in good faith and to adopt good-quality national regulations with an aim to keep the global temperature below the critical level of 2°C, while developed countries are supposed to offer necessary financial and technical assistance to less developed countries (Columbia Law School, Dutch Court Orders National GHG Reductions 2015).

The Oslo principles are a result of large-scale research and discussions held in several years' period by legal experts who were concerned with global climate changes and their possible consequences. The product of their work represents a set of principles which define the obligations imposed to states and companies to prevent a critical level of global warming by their actions as well as the methods for their compliance (Oslo Principles on Global Climate Change Obligations 2015).

### 3. RESULTS OF THE UN CONFERENCE ON CLIMATE CHANGES IN KATOWICE

The United Nations Conference on Climate Changes which was held in December 2018 in Katowice represented a follow-up of negotiations on issues relevant for the implementation of the United Nations Framework Convention on Climate Change (Energy Portal, COP24 2018). The aim of the conference which was attended by

representatives of around 200 states was the finalisation of the process of adoption of Instructions for Implementation of the Paris Agreement so as to reduce greenhouse gas emissions bearing in mind that strong economies, including the USA and the EU do not keep their promises (Met Mekrat 2018).

One of the issues which blocked the progress of negotiations was the issue related to the market of the so-called carbon credits which some countries have as the acknowledgement of their efforts in harmful gases reduction. Via the introduction of carbon credits system, countries had their limits, i.e. boundaries set for the quantities of carbon-dioxide which can be emitted into the atmosphere annually and this means that countries and industries which exceed the allowed levels pay tax measured via carbon credits. Since the United Nations reduce the allowed limits of emitted carbon-dioxide every year, the carbon credit demand increases in such a manner and, thereby, their value increases as well (UN Conference on Climate Change in Katowice 2018).

Although the Conference had its positive results, it still did not offer a precise reply to the question how developed countries will secure financing for developing countries as well as the financing method after 2025 bearing in mind that developing countries cannot comply with the set goals without the transfer of financial means and technologies from developed countries (WWF, Neophodna veća posvećenost država u borbi protiv klimatskih promena 2018).

Having in mind that the world is on a completely wrong path at the moment and that it is heading towards warming level of three degrees, scientists who address climate changes concluded that the global average temperature increase should be under 1.5% since the aim of 2 degrees is not sufficient enough.

During the Intergovernmental Panel on Climate Changes, it was concluded that this goal can be reached if measures are taken aiming at the reduction of global emissions of carbon-dioxide from 2010 by 45% until 2030 and that by 2050 around 85% of global power from renewable energy sources are provided, the consumption of coal to be fully abandoned and residential facilities with the assistance of different systems for the use of renewable energy sources which do not pollute environment have a very low CO<sub>2</sub> emission into the atmosphere (Stajlano et al. 2018).

#### 4. UN CONFERENCE IN MADRID

The twenty fifth conference of the United Nations on Climate Change was held in Madrid in December 2019. During a two-week negotiations, representatives of around two hundred countries agreed that it is necessary to prepare better plans for the reduction of greenhouse gas emissions for the following conference which was supposed to be held in the end of 2020 in Glasgow (BBC News, Mekgret, 2019). However, due to the Covid-19 virus pandemia, the conference was postponed and held in early November 2021. Glasgow Conference (COP 26) with leaders of 197 countries of the world participating is considered to be the most important climate conference held during this century. This conference is a follow-up of the agreement reached in Paris in 2015 (COP 16) bearing in mind that national contributions defined within it aiming at carbon-dioxide emission reduction were neither adequate for developed countries nor for

the developing ones (Đorđević 2021). The given actions are necessary so as to prevent possible immense consequences.

Neither did the conference which was held in Madrid nor did the one held prior to this one yield expected results. An agreement on crucial issues such as the regulation of the global carbon credits market was not reached (UN Conference on Climate was finalised with 'minimum compromise' 2019).

The reason for the failure could be the unwillingness of developed nations (which are the biggest air polluters at the same time) to commit in the form of an international agreement. Namely, the USA withdrew from the Paris Agreement (the USA officially withdrew from the Paris Agreement, 2020); Brasil, Australia and Saudi Arabia opposed to a stronger battle for climate preservation while other big greenhouse gas emitters such as China and India required financial assistance from rich countries which was promised as a precondition for considering new goals for harmful emissions reduction (Steinhausen, Kreizer 2009). On the other hand, some European countries joined the list of climate change vulnerable countries such as small island, African and Latin American countries which advocate the introduction and implementation of more strict rules which will secure the integrity of the Paris Agreement.

In order to harvest expected, or, rather, required results, it is necessary to have the states with the biggest greenhouse gas emission actively involved in the struggle against climate changes, i.e. China and the United States of America which jointly emit more than 40% of the total global gas emission according to the data from two registries - European Commission's Joint Research Centre and PBL Netherlands Environmental Assessment Agency. Otherwise, i.e. if the objectives set for the reduction of greenhouse gas emission stay unchanged, average global temperature could be increased by 3 to 4° C until 2100 which would represent the overstepping of the limited increase of up to 2° C which was established by the Paris Agreement and this could bring more significant and dangerous changes on our planet (Allen et al. 2018).

## 5. POSSIBLE METHODS FOR SETTLING CLIMATE CHANGES

Findings indicating that global warming consequences such as natural disasters (storms, floods, drought), extinction of animal and plant species, decrease of agricultural production and thereby food shortages may cause conflicts, migrations and big shakes lead to the situation where methods for ever urgent reduction of emission of greenhouse gases which mainly origin from prevailing fossil fuels production and consumption are being found as well as lead to the conclusion of climate agreements. A need for urgent address of climate changes, with joint but differentiated methods, with respect to national circumstances (developed – undeveloped countries) was stressed in the preamble of the Paris Agreement bearing in mind the demand for financing and technology transfer, poverty eradication, biodiversity protection, sustainable development (United Nations, Framework Convention on Climate Change 2015).

Having in mind that climate changes are one of the most serious global threats which may cause unrepairable damage for environment with big economic and social consequences, new technologies and new behaviour patterns should be implemented.

In concrete terms, it is necessary to strive to ever larger use of renewable energy sources (wind, water, sun, biomass) which with great energy capacity and renewable characteristics pollute the environment less. In such a way, the concept of a society which is in harmony with nature is implemented since natural resources are used in a sustainable manner.

New challenges arose due to climate changes. With reference to this, economic growth and development have to be harmonized with environment requirements via the stimulation of higher efficiency and use of natural resources, waste reduction, prevention of pollution and risks of accidents via the implementation of green technologies (OECD Green Growth Strategy 2011). This is why the issue of ecological boundaries is ever more discussed and these borders should be a subject of international and regional negotiations and agreements, national and local regulations in order to prevent the situation where global economy could get to a dangerous point with a risk of sudden, non-linear and irrecoverable changes which could be devastating for human civilization. From the above given reasons, climate changes, damage of the ozone layer, of soil, water and biodiversity are mentioned as the most significant planetary boundaries (Christof, Eckersley 2013: 197). Nowadays, ever higher number of countries including the Republic of Serbia take activities in order to accelerate transition towards green economy and development of strategies and activities in this direction. Models for the establishment of a strategic framework are different: either within existing sustainable development strategies with green economy elements or within a completely new approach.

A high number of scientists, reserachers and engineers was engaged to find a method for climate change prevention. Solutions are not always simple and do not always bring positive results exclusively. One could say that each solution has both advantages and disadvantages and the latter should be mitigated as much as possible. One of the latest challenges is the energy storage via lithium-ion batteries. However, the exploitation of litium which is necessary for the production of these batteries could have negative effects to environment (Simonović 2020). This is why we are on a path of further development of new know-how and technologies and of upgrade of existing ones.

If the climate change problem is not settled in time, adjustments will be necessary in order to secure survival. The fact that climate changes are rarely the only and primary motivator stimulating people to adjust is a matter of concern. Extreme events which may burden a certain area, wider region with a tendency to expand globally represent a more important stimulus (Berrang, Ford at al. 2011: 25-33).

Changed climate due to climate changes, floods and droughts may have a negative effect to the population welfare and reaching sustainable development in the future. Therefore, adjustments to climate changes becomes the primary issue especially for developing cities due to demand for prompt urbanisation on one hand and institutional and legislative limitations on the other hand. This is why healthy environment becomes an imperative in terms of spatial planning which is why analyses of possible scenarios are the forecast tools in order to have more efficient response to future dynamics and changes in cities so as to reduce the impact of climate changes on environment and human welfare (Ceren, Tezer 2015: 267-278).

The creation of the global world or, in brief, globalization affects environment and sustainable development in different manners and it brings big benefits potentially but risks as well. It is a challenge to manage the globalization process in a manner that promotes sustainability of environment and fair human development (Panayotou 2000).

Fears from globalization which necessarily harms environment may not always be justified and the economic interests and interests related to environment protection may not necessarily be in collision. Namely, as real revenues grow, the tendency for healthy and good-quality environment which is protected on the national level primarily by the implementation of local legislation also grows. However, since ecological problems do not recognize borders, it is necessary to adopt international regulations and regulate environment protection issues on the international level as well (Frankel 2003).

Organisations dealing with environment protection also contribute to the battle against climate changes via their activities. Their actions are directed towards activities aimed at drafting scientific and expert analyses on the environment situation, submission of proposals, drafts, amendments or proposals for annulment of relevant state legal acts based on self-initiative. Their share is also visible in the work of international conferences and in the adoption of international documents. For example, the World Conservation Union indicated numerous international problems. In addition, the activities of the World Fund for Nature with a mission to stop environment degradation on our planet and create the future where people will live in harmony with nature are also important. The work of these organisations raised indicated concern for ever growing global ecological threats.

The current crises such as the energy crisis, water and food shortage impose a necessity to make changes aimed at ever greater use of renewable energy sources, opening new “green” jobs in the field of environment and turning to general “green” economic growth (Lilić, Drenovak Ivanović 2014: 252-257).

## 6. CONCLUSION

Climate changes have a negative effect on nature: rivers, lakes, land, air, forests, i.e. on natural habitats of all living beings. Forest fires caused by high temperatures during summer months, dry pastures and meadows as well as the shortage of clean drinking water hinder life quality.

This recognition lead to human awareness on the necessity to preserve environment in order to secure survival. This is why we have to think well in advance about to which extent we preserved the environment that we leave to the generations to come. Education could be one of the measures to mitigate climate change consequences.

The Republic of Serbia is characterized by natural resources wealth. With reference to ores exploitation, it is necessary to implement the Law on Mining and Geological Exploration as the legal ground for geological exploration of mineral resources and other geological resources so as to use natural resources in a manner acceptable both for the population and for the environment and for mining companies. This is why the project promoter has to obtain an approval of the study on assessment of impact on environment of the project they plan to realize in a certain area. For sure, these projects have to be in line with relevant strategic documents.



The projects realized in the field of forestry, agriculture, water industry, mining, industry, energy, transport, waste management and utility activities may have a significant impact on environment. Therefore, relevant prescribed measures have to be taken in order to preserve healthy air, water and all natural resources necessary for the health and life of humans and all living beings on the Planet.

In particular, we must be aware that we are not more powerful and stronger than nature which will for sure find a way to confront its excessive and uncontrolled destruction.

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Law on Ratification of Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, „Official Gazette of RS – International Treaties“, No. 38/09.

Law on Ratification of Paris Agreement, „Official Gazette of RS – International Treaties“, No. 4/17.

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## КЛИМАТСКЕ ПРОМЕНЕ – ИЗАЗОВИ И МОГУЋА РЕШЕЊА

### РЕЗИМЕ

Климатске промене су тема која годинама уназад све више заокупља пажњу светске научне и стручне јавности. Питање које се поставља на конференцијама које се баве овим проблемом јесте колико нам је још времена остало и да ли човек може изаћи као победник у борби против климатских промена, имајући у виду да ће природа увек пронаћи начин да се супротстави њеном неконтролисаном уништавању. Човек је својом активношћу, пре свега неконтролисаним технолошким напретком довео планету Земљу у стање у којем се тренутно налази. Жеља за што већим профитом занемарила је чињеницу да се једино путем одрживог развоја економски интерес и интерес заштите животне средине могу довести у равнотежу. Стога ће век у коме живимо у великој мери бити дефинисан начином на који се суочавамо са климатским променама. Јер „труд је узалудан ако се природа противи“, Луције Анеј Сенека.

*Кључне речи:* климатске промене, Осло принципи, Конференција УН о климатским променама у Катовицама, Конференција УН о климатским променама у Мадриду.