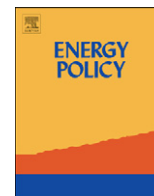




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# Kyoto Protocol implementation in Serbia as precognition of sustainable energetic and economic development

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## ABSTRACT

The paper gives reasons for low energy efficiency typical of the Serbian economy, which is based on outdated and dirty technologies. The comparison of selected economic indicators and indicators of energy efficiency in both Serbia and the European Union points out the benefits of the Kyoto Protocol implementation due to the growth of competitiveness in the global market. Serbia has no obligation to reduce GHG emissions, the authors point to the proposals whose implementation along with the mechanisms of the Protocol can enable Serbia the access to markets that trade GHG emissions and the access to dedicated funds, self-financing or attracting foreign investments to raise energy efficiency, which will be accompanied by adequate economic benefits. A similar principle can be applied in all countries that are not obliged to reduce GHG emissions. The application of different mechanisms aiming to increase energy efficiency in Serbia, could contribute to the increase of GDP annual growth rate from 5% to 7%, which cannot be achieved by any other economic instrument. Energy efficiency, which is actually a question of competitiveness of each economy, can finance itself through the mechanisms of the Kyoto Protocol by selling excess emissions resulting from improved energy efficiency.

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## 1. Introduction

Economic development is only part of the development of a country, for it is obvious that a more intensive economic growth is impossible without environmental protection and reproduction of the environment. Economic growth and development cannot be unlimited, because the production process cannot function independently of the ecological capacity of the living environment. Contemporary conditions of production in highly developed countries are characterized by a compromise (*trade off*) between the quality of the environment and the economic development of the country. The economic system that does not value natural resources, and stimulates the economic growth regardless of the consequences on the limited resources is not sustainable in the long run. Basically, the entire economic system is to act in accordance with the mature ecological system. Both systems are characterized by cyclicality. An optimal economic system needs to be more productive but also to remove unwanted residuals—waste materials and a surplus of used or emitted energy. As a matter of fact, the Kyoto Protocol mechanisms allow their control and gradual elimination.

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The Kyoto Protocol was adopted as a protocol along with the Convention on Climate Change (UNFCCC) in 1997. The main objective of the Convention is to achieve “the stabilization of the concentration of gases producing the greenhouse effect at a level that would not lead to dangerous anthropogenic impacts on the climate system” and thus raise the energy efficiency through international collaboration of developed and underdeveloped countries signatories to the Protocol. This would provide the technology transfer, increase of energy efficiency and flow of financial resources into developing countries (Kyoto protocol, 2005).

Energy efficiency involves rational and effective use of natural resources, replacement of imported fuel with domestic energy sources, use of renewable and alternative energy sources, and increase of energy efficiency in the production and final consumption of energy. The direct link between the implementation of the Protocol mechanisms and characteristics of high energy efficiency is evident. The relationship between the consumed energy and economic results is considered to be one of the main indicators of energy intensity of the economy. Under the energy intensity coefficient is meant the amount of energy used for the creation of a certain value of GDP, mostly 1000 USD, at constant prices in 1995 that is regarded as base year after the methodology used by the International Energy Agency (IEA). Energy efficiency is a value expressed in constant dollars and created by using the energy of 1 ton of oil equivalent (toe).

The year 1990 was selected as the basis for assessing and measuring the annual emissions of all countries but each country separately negotiates about its obligation to reduce GHG emissions. The percentage of reduction is at least 5% but the old EU member states committed themselves to reduce the emission by 8% and Japan by 6% in comparison to, while Russia and Ukraine pledged to maintain 1990 levels[1].

The EU had begun to implement measures to reduce GHG emissions even before the official entry into force of the Protocol, which gave very good results regarding the growth of energy efficiency. These positive effects are numerically expressed in the paper section related to the research of the EU energy efficiency indicators. Until now, 175 countries accepted it including the countries of Southeastern Europe.

The Republic of Serbia signed the Convention on Climate Change in June 2001. In September Serbia ratified the Kyoto Protocol and signed it in January 2008. The aspiration to join the EU and the stabilization and association processes impose an obligation to Serbia to apply European standards concerning the living environment. Even 30% of legislation that needs to be adapted to EU standards is related to environmental protection. The ratification and signing of this document do not oblige Serbia, but it provides the opportunity to contribute to the reduction of GHG emissions, increase energy efficiency, gradually implement the principles of sustainable economic development, and reduce the local pollution of the environment (Golusiin et al., 2009). In terms of collecting data on the situation in the field of energy, in 2001 was established the National Energy Efficiency Program. The *Energy Sector Development Strategy in Serbia until 2010*, which was formulated in the Economic Development Strategy of Serbia until 2010, set the goals that are the subject of the following discussion, but with a small probability of realization due to global economic disorders.

## 2. Kyoto Protocol effect on economic growth and energy efficiency

International mechanisms allow a transfer of programs among the countries that are parties to the Protocol in the period 2008–2012. As limit costs of reducing pollution are in most cases much higher in industrialized countries than in developing countries, the Protocol provides a mechanism of international trade transferable licenses for glasshouse-effect gas emissions (“carbon market”). The market primarily deals with the trade carbon, although five other gases causing the greenhouse effect may be subject to sale. Financially speaking, it is more justified to reduce emissions in countries whose production processes are outdated and inefficient than in developed countries where the reduction of emissions would require more expensive and more advanced technologies than the ones already applied. Each of the three new mechanisms gives the opportunity for different types of exchange between groups of countries:

1. Joint Implementation (JI)—Countries from Annex B of the Protocol may transfer to or get from any other party “emission reduction units” that have emerged through the emission reduction during the investment in another industrialized country.
2. Clean Development Mechanism (CDM)—This mechanism allows emission reduction projects, supporting the sustainable development of developing countries, which is its important economic role. In this financially favorable way, host countries not only meet obligations regarding the Protocol but also the achieved results of emission reductions are calculated as verified emission

reductions (Emission Reduction Certified—CER) that have their value in the market.

3. International Emission Trading (IET) relates to the aforementioned flexible mechanism of “carbon market”. Member states listed in Annex B of the Protocol may trade “Assigned Amount Units” (AAUs) for the purpose of fulfilling their obligations.. Developed countries obliged to reduce GHG emissions can instead buy part of the emission of countries or companies from Annex I whose emissions are below the approved level. Another way to acquire “emission credits” is to invest in projects for GHG reduction, i.e. in projects to improve energy efficiency in developing countries. The allocation of projects is not easy because the United Nations conduct detailed analyses of specific projects and their impact on emissions before the projects are approved.

From the clean development mechanism and international emissions trading, it is clear that the Kyoto Protocol cannot be viewed only as an instrument for achieving environmental goals but also the economic ones. The raising of energy efficiency is a goal that cannot be achieved only by ecological measures and protective environmental measures, but also by economic measures since the increase of energy efficiency requires large financial resources. They can be accumulated through the emission trade in the “Carbon Market”, by investing in ventures that directly (“green technologies”) or indirectly raise energy efficiency. In any case, the international exchange of knowledge, technology and know-how, investments and all other forms of international assistance and joint projects are a condition without which it cannot be expected that the developed or undeveloped countries will increase energy efficiency or reduce GHG emissions. An environmental problem that occurs at the local level usually has wider geographical or even global consequences (Gingrich et al., in press).

Due to the lack of financial means the countries not listed in Annex I—developing countries *are not obliged to reduce their GHG emissions*, for it is usually the only way to continue their economic growth and development. This again stresses the connection between environmental and economic problems. Very often environmental problems, such as reducing emissions or increasing energy efficiency cannot be solved without additional investments. Therefore, the clean development mechanism includes the implementation of projects for current or future reductions of GHG emissions. In this way a support is provided for the sustainable economic and environmental development of developing countries on one hand, and on the other hand, developed countries are allowed to keep their emissions and economic growth on the prescribed level. Serbia is a country that has no obligation to reduce GHG emissions.

A direct correlation is observed between the GDP growth and greenhouse gas emissions, i.e. low energy efficiency. Relatively speaking, the gas emission increases in case of lower national income, and then grows slightly slower; while in the mature stages of development begins to decline. The fall of GHG emissions and increase of energy efficiency is a consequence of the intensified use of the pollution reduction system and of the use of economic instruments, for the realization of which is required not only *environmental* awareness but *higher income* as well (Golusiin and Munitlak Ivanović, 2009). The link between the pollution (environmental problem) and the social wealth (economic result) is reflected in the per capita income greater than 10 USD a day. Namely, an increase in daily income from less than 1 USD to 10 USD per capita also leads to growing of pollution levels, whereas by a further increase of the daily income from 10 USD to 100 USD per capita, the pollution is reduced. Fig. 1 shows the relationship

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