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ENERGY EFFICIENCY AND ENERGY SECURITY IN THE INTEGRATED NATIONAL ENERGY AND CLIMATE PLAN OF THE REPUBLIC OF SERBIA FOR THE PERIOD UNTIL 2030 WITH A VISION UNTIL 2050

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Abstract:

The Law on Energy Efficiency and Rational Use of Energy is harmonized with the regulations in the field of energy efficiency in the EU, which was adopted with the aim of improving certain provisions of the existing Law on Efficient Use of Energy, the aforementioned legal document today represents a key framework for the field of energy efficiency, which determines the precise conditions and methods for the efficient use of energy and energy sources, the policy of efficient use of energy, energy management systems, measures of energy efficiency policy, energy use in buildings, energy activities and end customers, for energy facilities and energy services, energy labeling and requirements in terms of eco-design, financing, incentives and other measures in this area. Due to the need to implement a global framework that would contribute to avoiding dangerous climate changes by limiting global warming to a level well below 2°C, a multilateral process for implementing climate change measures was initiated. At the United Nations Conference on Climate Change (COP21), the Paris Agreement was adopted as the first universal legally binding international agreement on climate change.

Keywords: Energy efficiency, energy security, energy and climate plan

Introduction

A national energy efficiency target for 2030 expressed as primary energy consumption and final energy consumption; Cumulative end-use energy savings to be achieved over the period 2025-2030 as defined under point (b) of Article 7(1) on the energy saving obligations pursuant to Directive 2012/27/EU as adapted and adopted by the Energy Community Ministerial Council Decisions 2015/08/MC-EnC and

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2022/02/MC-EnC. National objectives increasing the diversification of energy sources and supply from third countries, the purpose of which shall be to reduce energy import dependency, increasing the flexibility of the national energy system, and addressing constrained or interrupted supply of an energy source, for the purpose of improving the resilience of regional and national energy systems.

1. Energy efficiency

One of the additional energy saving goals is determined in accordance with the provisions of Article 7 of Directive 2012/27/EU. Specifically, 506 ktoe of cumulative final energy savings are foreseen, which should be achieved by implementing energy efficiency measures in the period 2024-2030. year. It is necessary to rehabilitate, adapt and reconstruct the existing construction fund, which is the undisputed primary goal, which leads not only to significant energy and cost savings, but also improves comfort, safety and health conditions, i.e. the new comfort of life in renovated buildings. The rates of rehabilitation, reconstruction and adaptation, estimated as part of the long-term strategy to encourage investments in the renovation of the national construction fund of the Republic of Serbia until 2050, in the case of residential and non-residential buildings, were taken into account within the INECP until 2030, in order to ensure their full compliance and facilitate sufficient renovation of the construction fund of the Republic of Serbia.

Implementing planned energy efficiency policies and measures for end users to improve energy efficiency requires designing efficient and applicable financing mechanisms in order to increase sources of own funds and attract foreign investments from the EBRD and the World Bank. The active participation of the financial sector and the promotion of innovative financing instruments, including the promotion of energy performance contracts and energy services, are key parameters for achieving this goal.

The Directorate for Energy Efficiency of the Ministry of Mining and Energy of the Government of the Republic of Serbia has a special role in the creation and implementation of financing mechanisms. The Directorate's capacities should be strengthened in the coming period, and its legal status should be further improved by adopting new legal solutions. This will enable the implementation of adequate financial mechanisms for the promotion of energy efficiency promotion measures

and plans. The Directorate is already implementing activities to finance the improvement of energy efficiency in households and public sector buildings at the local level.

2. Energy security

Diversification of energy sources and fuel supplier countries is the main goal of INECP for the concept of energy security. Policies and measures will be initiated to strengthen the diversification of energy supply sources in order to prevent dependence on only one type of fuel or only one country from which it is possible to import certain energy sources. The achieved diversification will increase the competitiveness between different types of fuel and suppliers from third countries, which will lead to the development of the market and the reduction of purchase prices of energy products and energy, the improvement of security of supply, and also the protection of energy supply in the event of an energy crisis at the regional and/or global level. Optimum use of domestic energy sources should be ensured in order to improve energy security in the Republic of Serbia. The identification of the existing potential for the economical and most profitable use of domestic energy sources is an essential goal within the INECP. Emphasis is placed on the use of energy sources and the use of RES potential, both for the production of electricity and for direct use by end consumers, which significantly contributes to the achievement of energy security conditions. Strengthening the economic and geopolitical role of the Republic of Serbia is another vital goal. Therefore, it is necessary to urgently complete existing interconnections to neighboring countries and design new international interconnections with pipelines and electrical networks from neighboring countries. These activities and actions will contribute to the diversification of energy sources and supply routes from third countries. Several cross-border/international natural gas transport projects (Balkan Stream, Turkish Stream, TAP and TANAP, etc.) will be promoted, which will improve the diversification of energy sources and, together with the promotion of natural gas storage projects, ensure uninterrupted supply in case of natural gas shortages, or local/global market disruptions. Stabilizing the rate of energy dependence is another important goal within the INECP. The current energy dependence is relatively low and it is necessary to limit it to similar levels due to the high penetration of oil derivatives and, to a

lesser extent, natural gas. Energy dependence should not exceed the level of 41% in 2030. Another goal is to ensure the necessary adequacy of the power system in order to achieve the minimum level of reliability to cover the demand for electricity, in connection with the decision to reduce electricity production in lignite-fired thermal power plants in the Republic of Serbia. In order to achieve this goal, it will be necessary to adopt mechanisms to strengthen the flexibility of the system with additional capacities for the production of electricity from renewable energy sources.

Obviously, the optimal utilization of domestic energy sources should be ensured to enhance the energy security. The identification of the existing potential and the most cost-effective utilization of domestic energy sources is essential target within the framework of the INECP. Emphasis will be given on the utilization and use of RES potential, both for electricity production and for direct use in end-uses contributing substantially towards energy security.

Table 1: Annual trajectory of RES share [1]

	2025	2026	2027	2028	2029	2030
Share of RES in GFEC	29,8%	30,6%	31,2%	31,9%	32,6%	33,6%
RES in Electricity	34,7%	36,7%	38,0%	39,8%	41,5%	45,2%
RES in Heating and Cooling	41,1%	41,5%	41,2%	41,1%	41,0%	41,4%
RES in transportation	1,8%	2,1%	2,3%	2,6%	2,9%	3,2%
Contribution of biofuels in the RES in transportation share	1,3%	1,5%	1,6%	1,8%	2,0%	2,1%

3. Production and use of electricity

Electricity plays a key role in every technologically advanced society today. Technologies for generating electricity have changed over time. At the beginning, more than a century ago, electricity was produced only in hydroelectric plants. Nowadays, the production of electricity from fossil fuels dominates the modern world. The emission of CO_2 is one of the biggest problems related to the production of electricity from fossil fuels, for one kWh of electricity produced by burning coal, 1 kg of CO_2 is emitted into the atmosphere, the use of oil derivatives 0.65 kg and the use of natural gas 0.45 kg of CO_2 . Another problem is the low

efficiency of power plants. Since 2000, there have been novelties in global development in the field of energy: dynamic growth of renewable electricity, especially energy obtained from wind, photovoltaic energy, concentrated solar energy, as well as hydropower in regions where there is hydropower potential. The big advantage of these technologies: they have no raw material preparation costs, only capital costs. As soon as the plants are installed, they produce energy with minimal operating costs. Electricity production from biomass is growing all over the world and in our country. The great advantage of biomass is that it produces electricity with a high level of reliability, regardless of wind strength or solar radiation.

The modern concept for the use of electricity from biomass and biogas must take into account new trends in the production of sustainable electricity. Technologies for producing electricity from solid biomass or biogas have already been built. The cost of production is higher than the market price and sometimes higher than the cost of electricity obtained from wind or photovoltaic cells. The concept of incentive tariffs (feed in tariff) proved to be successful in overcoming this gap. In converting biomass/biogas into electricity, a share of 15-37% of the primary energy is transformed into electricity, depending on the applied technology, and the rest is thermal energy that needs to be used further. If the incentive tariffs are high enough, it pays for the companies to produce electricity and to lose thermal energy, i.e. to release it into the environment. Obviously, someone has to pay for these losses and for the gap between the incentive tariffs and the market price. Most often, these are consumers of electricity. Therefore, the concept of incentive tariffs has both a microeconomic and a macroeconomic dimension. High incentive tariffs without limits are an incentive to companies that produce electricity, but they can cause significant energy losses as well as a social problem if the financial burden for incentive tariffs constantly increases and is transferred to electricity consumers. This can be observed in many European countries, and should be considered in the Republic of Serbia and especially in AP Vojvodina. The conversion of solid biomass into electricity should be done only in projects where a large share of thermal energy can be used throughout the year. Incentive tariffs for projects with solid biomass are approved only if the conversion efficiency of biomass into final energy (heat and electricity) is above 65%. National regulations should be amended accordingly. The

burden on electricity consumers in terms of financing incentive tariffs must be limited. The range of restrictions is purely a political decision. The basis for such a decision is an analysis of the relationship between the production of renewable electricity and additional costs for consumers. These limitations may be surprising. Experience shows that in the long term biomass is well accepted only if it reduces costs for consumers or if it offers special advantages for the system, such as the reliability of electricity production that justifies high costs and thus significantly affects the energy efficiency and energy security of the electricity supply system. Wind, photovoltaic energy and to a lesser extent hydropower will play a dominant role in the future in the use of renewable energy at the local/global level.

4. Research, innovation and competitiveness

The promotion of higher education, science, research and innovation should be a priority through the support of innovative technologies, which will contribute to the fulfillment of goals in the field of energy and climate change. Annual expenditures for further support of research and technological development in the Republic of Serbia are expected to double by 2030 compared to 2020. Improving energy intensity and greenhouse gas emission intensity will succeed in increasing the competitiveness of the economy of the Republic of Serbia. The adoption of targeted energy efficiency policies and measures will contribute to reducing energy costs and increasing the competitiveness of various economic sectors related to these areas of the economy. Commitment of the Government of the Republic of Serbia to the objective of the Sofia Declaration, to develop the potential for carbon capture, storage and use (CCUS). The long-term effects of implementing this goal should be investigated in detail. The goal would be to capture the inevitable carbon dioxide emissions and their further use in industrial applications or storage. An analysis of the potential of CO₂ storage options in Serbia would be necessary and further research and demonstration activities would be carried out. It is expected that the adoption of Directive 2009/31/EC on the geological storage of carbon dioxide by the Ministerial Council of the Energy Community will lay the foundations for the future implementation of CCUS projects in the region, and especially in the Republic of Serbia. Reducing energy costs will make energy products more accessible to all consumers. The

development of the necessary policies and measures will take into account the purchasing power of consumers and their special groups, as well as all specificities related to local characteristics, such as those in rural areas. Maintaining the average price of energy products below the European average level of end users is set as a goal within the INECP of the Republic of Serbia. The domestic added value of the energy sector will be increased by identifying and promoting innovative applications and services in the energy sector with high domestic added value, which increases the gross domestic product and improves the sustainability of the energy sector. In addition, this goal also ensures an increase in the number of direct and indirect jobs due to activities in the energy sector. Policies and measures, which will be integrated into the Action Plan for a Just Transition, will be implemented in the areas that will be most affected by the transition to a low-carbon economy. The challenges faced by lignite-dependent areas during the transition to a low-carbon economy can be addressed by tailored solutions to support structural transformation and accelerate the process of economic diversification and technological transition. The goal is to develop a sustainable balanced regional development strategy, focusing on sectors with dynamic prospects in terms of production, employment and income indicators.

5. CONCLUSION

Strengthening the geopolitical role of the Republic of Serbia constitutes another vital objective. Therefore, it is urgent to complete the existing interconnections and to design new international interconnections with pipelines from neighboring countries. Furthermore, these actions will also contribute to the diversification of energy sources and supply routes from third countries. Several cross-border/international natural gas transportation projects will be promoted, enhancing the diversification of energy sources and, in conjunction with the promotion of natural gas storage projects, ensuring the adequacy in the case of a natural gas shortage. The fight against climate change requires changes in the behavior of all social actors, from decision-making at the highest level in the public and private sectors, to patterns of daily behavior/energy consumption. Change can best be managed through a multitude of incentives, which can be effectively implemented through education, new skills training and awareness raising. The

implementation of the measures included in the INECP of the Republic of Serbia and the achievement of general and specific goals will determine the reduction of activity in some sectors and the increase of activity in others. This means that sectors with decreasing activity will have a labor surplus, while sectors with increased activity could face a labor shortage. Here, special attention should be paid to the acquisition of skills relevant to sectors with increased activity and demand, which especially applies to employees in sectors where a labor surplus is expected. The implementation of this measure will contribute to the social equality of the transition to a low-carbon economy and will significantly affect the achievement of the goals within the INECP of the Republic of Serbia in terms of energy security and energy efficiency.

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