

GREEN TRANSITION IN SERBIA

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Abstract: *The main aim of this study is to highlight the main challenges of green transition in Serbia. The key challenges were achieving energy efficiency, and production of clean energy. Although, the majority of study in the field have been explored developed countries, there is growing interest of researchers in an issue of renewable energy in developing economies. Legal framework has been analyzed. The results showed the great potentials of Serbia in renewable energy resources, as well as pointed to significant challenges in wider exploration. Regional collaboration named WB6 can be framework for faster sustainable development of all Western Balkan countries.*

Key words: *green transition, renewable energy, scenario planning, Western Balkans, Serbia*

JEL classification: *Q01, Q20, Q47*

1. INTRODUCTION

In this paper, the authors will analyzed the challenges of green transition in Serbia. Serbia is chosen for three main reasons. First, Serbia has high energy intensities compared to European Union countries. Second, there are great renewable sources in Serbia. Third, the current state of the energy sector can be described as transitional in two ways. One way is change of economy, and the other is green transition i.e. the reduction of CO₂ emission.

However, the main goal is efficiency in energy sector in Serbia. In the process of the green transition, the main investors are: „Green for Growth Fund, Regional Energy Efficiency Programme, European Bank for Reconstruction and Development, European Investment Bank, and World Bank Group“. Along with the

important role of China, Turkey and Russia at the energy market.

To achieve sustainable development, the main goal will be rational consumption of primary energy sources i.e. energy saving. According to European Commission (2020), the greatest potential is wind. Moreover, it is necessary to invest in hydro power, as well. The production of renewable energy has numerous benefits for citizens, but some disadvantages is also present. In this study, the authors will pointed to both benefits and costs of green transition in Serbia.

The experiences of EU countries in domain of renewable sources showed the following main obstacles: lack of expert knowledge, planning process of exploitation would slow down that will result in high costs.

This paper is structured as follows. Next section is devoted to research context. Serbia is a case in point. Therefore, the section the analysis of renewable energy potentials, and Serbian strategies will be presented. To achieve vision “Serbia 2030”, two alternative scenario are possible. The final part is devoted to conclusions.

2. REVIEW OF PAST STUDIES

The Sustainable development is a vision for all European Union countries. This can be realized through reduction of CO₂ emission, and increase financing of the energy efficiency projects. The majority of citizens and companies have to change their ways in energy consumption and other life values. In this transition there are three main challenges such as financial and economic obstacles, knowledge and information obstacles, and institutional and organizational obstacles (Resch et al., 2017).

The aforementioned obstacles can be overcome by the community-based activities in which various

groups jointly act in production of renewable energy (Soeiro & Dias, 2020). In EU countries numerous studies have been focused this important subject (Walker & Devine-Wright, 2008; Yamamoto, 2016; Carlisle et al., 2009; Cejka et al., 2020; Denis & Parker, 2009; Kim et al., 2019; Carlisle et al., 2008; Young & Brans, 2017; McCabe et al., 2018; Bhattacharjee & Nandi, 2021). The aim main of these studies has been to identify main challenges in the particular countries, and to suggest the measures for policy-makers.

3. RESEARCH CONTEXT

Serbia is one of the Western Balkan countries. Sustainable strategy can be elaborated through two main perspectives. The first perspective includes legislative harmonization with the European Union laws. For instance, the goal is to increase renewable energy consumption. Joint strategy will be formalized by European Commission and Serbian Government.

The second way is regional cooperation of Western Balkan countries called Energy Community – Western Balkans 6 initiative also known as Berlin process. Since 2014, the annual meeting have been realized in European cities to implement the Green Agenda in Western Balkans. In 2019 “Statement on Clean Energy Transition in the Western Balkans” had been signed in Podgorica.

In 2020, the Green Agenda for Western Balkans had been signed. It comprised the main five pillars namely (European Commission, 2020):

1. „Climate, energy, mobility;
2. Circular economy;
3. De-pollution;
4. Sustainable agriculture and food production, and
5. Biodiversity“.

To foster sustainable development in Western Balkan countries, since 2020 annual plans had been developed. The main suggestions from World Bank (2021) were: new and different investments in infrastructure, green products, and the significant potentials for green opportunities.

4. RESEARCH RESULTS

The results will be present into four following subsections: Energy balance in Serbia, Key renewable resources, Scenario planning, and sustainable growth through regional cooperation.

4.1. ENERGY BALANCE IN SERBIA

The results of the OECD and International Energy Agency (2008) revealed the followed facts about the energy sector in Serbia:

- Lignite was the vital resource for energy production, as Serbia’s largest primary energy source,
- Followed by crude oil and oil products,
- Natural gas was third ranked energy resource,
- Electricity production was inefficient,
- State ownership and regulation of energy price -low prices,
- Lack of appropriate statistics,
- So called energy poverty, and
- Devastation of the forest along with the pollution.

Moreover, the following actions have been proposed to Serbian Government in domain of sustainable development (OECD/IEA, 2008):

- Creation a strategy of renewable energy production;
- Identification of place where this energy can be used;
- Financial support to plants that produce equipment;
- National plan for sanation of devastated areas;
- Penalty for illegal logging and
- Harmonization of statistical methodology with EU regulative.

It is important to note that statistics of renewables and waste, according to International Energy Agency (2021) composes of the followed categories: „electricity generation from biofuels, heat generation from renewable, hydroelectric, renewable share in final energy consumption, solar electricity generation, and wind electricity generation“.

4.2. KEY RENEWABLE RESOURCES

The latest data of renewables in Serbia is presented (IRENA, 2023). Renewable share in Total energy supply was 13% in 2015, raised on 17% in 2020. The structure of renewables in Serbia in 2022 was as followed (IRENA, 2023):

- 1% Bioenergy,
- 81% Hydroenergy,
- 13% Wind,
- 4% Solar energy, and
- 0% Geothermal energy.

This structure has been significantly different in 2020 when the main renewable was bioenergy (IRENA, 2023).

In 2022 net capacity change in MW was:

+472 Non-renewable

+85 Solar

+12 Hydro, and

0% Bioenergy/Wind/Geothermal energy.

Serbia has great potentials for renewable generation, especially solar and wind potentials. According to IRENA (2020) forecasts, economic potential in 2030 of wind is 1,796 MW, and technical potential is 29,670 MW.

4.3. SCENARIO PLANNING

If meta-data from relevant sources such as EUROSTAT, International Energy Agency, and International Renewable Energy Agency combined with scenario planning the results will be interesting (See Table 1). One of the proposition is that renewable energy share is 27%.

Table 1. Forecasting Serbian sustainable development

Indicators	Scenario 1	Scenario 2
%renewable energy	36.8	39
GDP growth in %	3.5	/
Flat rate component	2.3	12
Potential component	2.0	/
Inter-connector	2.1	/

Source: Eurostat (2021), IEA (2021), IRENA (2020)

Regional cooperation can facilitate the green transition in Serbia.

4.4. SUSTAINABLE GROWTH THOUGHT REGIONAL COOPERATION

In the past 17 years, researchers devoted significant focus on sustainable development of Western Balkan countries (Dunjic et al., 2016; Schneider et al., 2007; Lalic et al., 2011; Topalovic et al., 2021; Ralchev, 2012; Pavicevic et al., 2020; Karakosta et al., 2012; Golusin et al., 2013; Papapostolou et al., 2017).

Since 2014, when initiative idea to foster sustainable growth thought regional cooperation, formalized in „Contract entitled Western Balkan 6 Initiative“. The main goal of European Commission was to help and assist Western Balkans Governments in creation of regional energy market. Since 2015, the progress has been annually monitored.

Until 2030 the main objectives are (Resch et al., 2019):

- To improve methodology and statistics in Western Balkans;
- The raise of renewable energy source in energy balance in whole region;
- To reduce CO2 emission in Western Balkans countries.

The newest data about energy mix in the Western Balkan countries are presented in Table 2.

Table 2. Energy consumption by source in Western Balkan countries

Country	Coal	Oil and oil products	Natural gas	Renewable energy	Other
Albania	259 8.40 7	134 19.9 53	404.93	11858.1 42	
B&H	491 95.8 03	196 68.8 86	2315.0 07	20399.2 95	
Montenegro	419 2.99 3	453 3.52 3	0	4008.58 9	
North Macedonia	974 3.03	115 55.9	2428.7 43	4262.80 7	
Serbia	877 94.0 86	443 81.5 89	24793. 795	23490.9 23	

Source: Eurostat (2021)

All Western Balkans are similar regarding cost of renewable production. But, they are differences in renewables by each country in the region. However, significant differences have been in resource availability at country level. Regional integration of renewable energy market will facilitate sustainable development. The main obstacles can be identified as followed (Resch et al., 2017):

- Political barriers that are manifested in political mission regarding sustainable development and energy efficiency,
- Legal barriers that comprised lack of laws, institutional obstacles, contacts,
- Economic barriers high investment risk, small market, unpredictable condition and unexpected changes.

CONCLUSION

Green transition is a pathway for Serbia in achieving sustainable development. Decarbonization and clean energy production can foster an economic development.

Results of this study revealed two possible strategies in green transition process. The first is legislative harmonization with the European Union laws. The second is regional cooperation

and creation of one energy market for all Western Balkan countries.

This study contributes to existing literature by exploring green transition in one emerging market such as Serbia.

In this paper, the authors have been analyzed numerous meta-data from relevant sources and combined with scenario planning. The aim was to forecast renewable potentials and production until 2030. The main renewables in Serbia are wind power and solar energy.

There are limitations of this study. The first one is specific research context i.e. Serbia. Another limitation is qualitative method of research. Third limitation is available data for renewables in Serbian environment according to EU methodology.

Future study will include one or more countries from Western Balkans. This will enable usage of the comparative method. If we include all Western Balkan countries the future study can be used to test proposed measures in domain energy efficiency and green transition.

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