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THE ENERGY TRANSITION IN THE WESTERN BALKANS COUNTRIES: A PATH TO SUSTAINABILITY

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Abstract

The aim of the paper is to review the achievements and possibilities of the energy transition in five countries of the Western Balkans (Albania, Bosnia and Herzegovina, Montenegro, North Macedonia and Serbia). According to macroeconomic indicators, the Western Balkans lag behind the members of the European Union. The transformation of the energy sector would accelerate the economic growth of the observed countries and provide the basis for achievement of Sustainable Development Goals. The greatest potential is present in renewable energy sources. In terms of the share of energy production from renewable sources, Albania and Montenegro are above the average values for the EU. According to the energy productivity indicator, all five observed countries are only at one third of the average values for the EU. Significantly worse achievements are an indicator of energy intensity, where the Western Balkans significantly lags behind the EU. There are also opportunities for significant improvements in energy efficiency. Initiatives such as the Energy Community and the Green Agenda for the Western Balkans provide opportunities for the development of the energy sector through regional cooperation and cooperation with the EU. The countries of the Western Balkans have also adopted national strategies for sustainable and clean energy.

Keywords

Energy Transition; Renewable energy sources; Sustainable Development Goals; Western Balkans; European Union.

1. Introduction

The Western Balkans, comprising Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, and Serbia, are at a critical juncture in their energy transition journey. Historically reliant on coal and other non-renewable energy sources, these countries face significant challenges in shifting towards sustainable and renewable energy systems. This transition is not only essential for environmental sustainability but also for economic and social stability in the region. The global push towards reducing carbon emissions and combating climate change has amplified the need for these nations to adopt cleaner energy practices. This process, however, is fraught with obstacles, including outdated infrastructure, financial constraints, and political complexities (Carnegie Europe, 2023). Despite these challenges, the Western Balkan countries have made notable strides, implementing policies and projects aimed at increasing energy efficiency, promoting renewable energy sources, and integrating into the broader European energy market (European Commission, 2020).

One of the key drivers for the energy transition in the Western Balkans is the European Union's Green Deal, which aims to make Europe the first climate-neutral continent by 2050. The Western Balkans, aspiring for EU membership, are aligning their energy policies with EU directives, which necessitates significant reforms and investments in the energy sector (European Commission, 2020). Renewable energy sources, such as hydropower, wind, and solar, are being increasingly harnessed to reduce dependence on fossil fuels and enhance energy security (World Bank, 2021).

The region's potential for renewable energy is substantial, with numerous projects already underway. For instance, North Macedonia's investment in solar power plants and Serbia's development of wind farms are notable examples of progress (World Bank, 2021). However, these initiatives require substantial financial investments and international cooperation to overcome technical and economic hurdles.

Energy efficiency is another critical aspect of the transition. Improving energy efficiency in industries, buildings, and transportation can significantly reduce energy consumption and greenhouse gas emissions. Countries like Albania and Montenegro are implementing measures to enhance energy efficiency through modernizing infrastructure and adopting new technologies (International Renewable Energy Agency, 2019). Jednak et al. (2020) demonstrate that energy efficiency is greater in the EU-27 compared to Serbia. Despite Serbia's advancements in energy efficiency from 1995 to 2018, it still falls short of the EU-27's standards. However, there is a positive correlation between energy efficiency, GDP, and GHG emissions in both the EU-27 and Serbia.

Moreover, the integration of the Western Balkans into the European energy market presents opportunities and challenges. Enhanced connectivity and market integration can provide energy security and economic benefits, but it also requires harmonization of regulations and substantial infrastructural upgrades (European Commission, 2020).

A pivotal element in this transition is the "Green Agenda for the Western Balkans" an initiative launched by the European Commission to support the region in addressing environmental challenges and aligning with EU climate policies. The Green Agenda focuses on five main pillars: decarbonization, circular economy, depollution of air, water, and soil, sustainable agriculture, and biodiversity protection. This agenda aims to facilitate the Western Balkans' transformation into a sustainable, climate-resilient economy. The EU's Green Agenda for the Western Balkans aims to address these issues by promoting renewable energy and improving energy efficiency, but financial and technical support from the EU is crucial. The introduction of the Carbon Border Adjustment Mechanism by the EU will also pressure the region to reduce emissions to remain competitive in the EU market (Fanku, 2023).

Following the introduction, the first section provides a comprehensive review of the relevant literature. The subsequent section examines the indicators of economic growth in the Western Balkans. The fourth section discusses the fundamental energy indicators that serve as the basis for tracking the progress of the energy transition. The final section evaluates regional cooperation efforts in the implementation of the energy transition.

2. Theoretical background

Streimikiene (2024) evaluates the achievements of Western Balkan countries in their green transition efforts. The study highlights significant progress in policy implementation but also identifies persistent challenges such as economic constraints and the need for improved infrastructure. Notable advancements are seen in Albania, Montenegro, and North Macedonia, while Bosnia and Herzegovina and Serbia face more substantial hurdles. Young and Macura (2023) review local energy transition strategies in the Western Balkans, focusing on the carbon-intensive nature of the region. The article emphasizes the importance of localized initiatives and community involvement in achieving sustainable outcomes. Successful case studies from Albania, North Macedonia, Montenegro, and Serbia are presented, showcasing the potential for scalable solutions.

Durašković, et al. (2021) discuss the current policies, developments, and future perspectives for renewable energy in the Western Balkans. They highlight both achievements and gaps in policy implementation across the region. Significant strides in renewable energy adoption are noted in Albania, Montenegro, and North Macedonia, while Bosnia and Herzegovina, and Serbia lag behind. Lucic (2018) explores how EU accession impacts renewable energy investments, using Bulgaria and Serbia as case studies. The thesis argues that EU membership provides a framework that can attract investment and support energy transitions. Serbia could benefit from potential EU accession by aligning its policies with EU standards, enhancing investment opportunities.

Ignjatović, et al. (2024) examine the obstacles to green transition in the Western Balkans, focusing on the economic and political recovery post-transition. They identify critical areas needing attention to ensure sustainable development. Albania and Montenegro are highlighted for their proactive measures, while Serbia and Bosnia and Herzegovina require more substantial reforms.

Aleksić and Batas-Bjelić (2021) critique Serbia's current renewable energy policies and suggest that more ambitious goals and comprehensive governance structures are needed to accelerate the energy transition. Comparative analysis shows that Montenegro and Albania are further ahead in meeting renewable energy targets. Jusić and Obradović (2019) review the interplay between EU enlargement policies and social changes in the Western Balkans, focusing on how these policies influence energy transitions. The study shows that EU policies have had a positive impact on Albania, Montenegro, North Macedonia, and Serbia, but further support is needed for continued progress. Batas-Bjelic and Rajakovic (2021) analyze the national energy and climate planning strategies of Western Balkan countries, highlighting the influence of the EU Green Agenda. Serbia, Montenegro, and Albania have begun aligning their policies with the EU Green Agenda, showing varying degrees of progress.

Zvezdanović Lobanova (2024) examines the green transition and energy security, emphasizing the difficulty of balancing environmental goals with energy needs due to the region's coal dependency. Neskovic and Bylo (2023) explore the role of the Energy Community in stabilizing the energy market and its geopolitical implications. Islamov (2023) investigates the influence of the EU and Turkey on the region's energy policies, particularly through

significant gas projects. Mitrescu (2023) discusses energy diplomacy in the context of the EU integration process, highlighting the need for an energy revolution in the Western Balkans.

The energy landscape in the Western Balkans is undergoing significant transformations aimed at achieving sustainability and security amidst various challenges. Brkljača et al. (2020) discuss the ambitious goal of achieving zero emissions by 2050 in the Western Balkans, emphasizing the need for high investments in renewable energy sources such as wind, solar, and biomass. Vuchkova (2020) analyzes the readiness of the Western Balkans for a sustainable energy transition, noting the political and economic complexities that hinder swift progress. The large inflow of foreign direct investments in the Western Balkans is significant for the financing of the energy transition, but care should be taken that foreign direct investments go to those sectors that do not threaten the environment (Bonomi and Uvalic, 2019; Jednak et al., 2021). Vasquez et al. (2018) provide a comprehensive overview of the energy sector in the Western Balkans, identifying key constraints and opportunities for securing a sustainable energy supply.

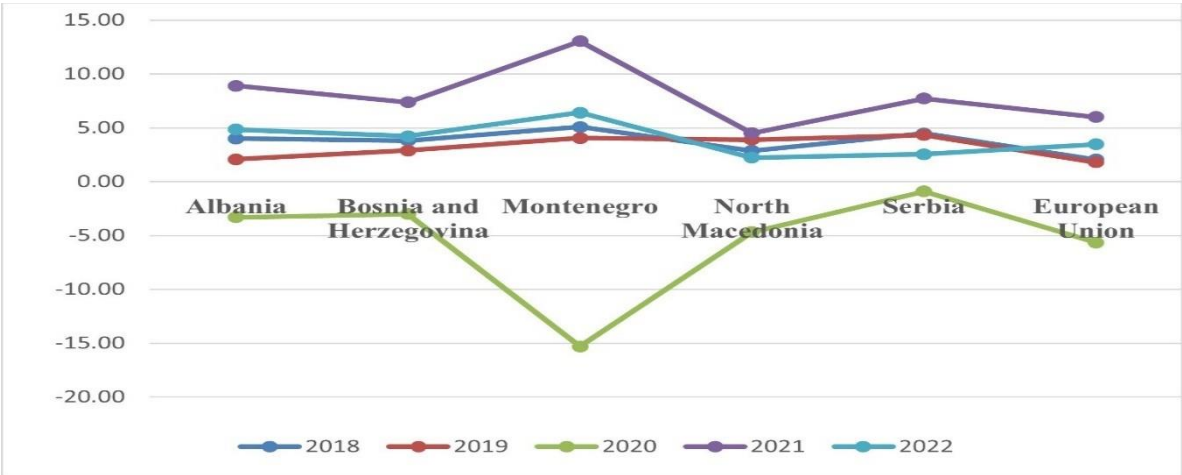
Renewable energy can significantly contribute to the economic development of the Western Balkans through several mechanisms, such as enhancing energy security, reducing dependency on imported fossil fuels, and creating new job opportunities in the green energy sector. Akar (2016) highlights that renewable energy consumption in the Balkans is influenced by various factors including energy prices, production, and economic growth. Increased trade openness and the use of natural gas also positively impact renewable energy adoption, suggesting that a supportive economic and regulatory environment can foster renewable energy development. Vuchkova (2020) examines the political and legal readiness for renewable energy adoption in the Western Balkans, emphasizing the importance of government policies and international obligations in driving sustainable energy transitions. Vukovic et al. (2023) explore the feasibility of solar-powered traffic signalization, which demonstrates the practical applications and economic viability of renewable energy in urban infrastructure. Dunjic et al. (2016) provide an analysis of renewable energy development trends, pointing out the inconsistent growth outside the EU and the impact of political and regulatory barriers. Topalović and Haas (2024) examine the economic viability of energy storage in conjunction with renewable energy sources, highlighting the importance of flexibility and market dynamics in integrating renewables into the grid.

The integration of Sustainable Development Goals (SDGs) with energy transition initiatives is crucial for promoting global sustainability and addressing climate change. Various studies highlight different aspects and impacts of this integration across regions and contexts. Yasin et al. (2024) provide an analysis of Indonesia's energy transition towards achieving SDG 7, emphasizing the importance of renewable energy, energy efficiency, and technological advancements through a PESTEL framework. Danilov (2024) explores the philosophical and methodological foundations of economic-mathematical modeling to identify structural changes due to the energy transition in Russia, underscoring the use of input-output tables and Meadows' method. Yang and Yang (2024) examine the moderating effect of institutional transparency on the relationship between energy transition and income inequality, suggesting that higher transparency can mitigate the adverse effects of energy transition on income distribution. Ibrahim (2023) conducts a legal analysis of SDG 7 implementation in the Arab world, highlighting the challenges and opportunities for legal reforms to support energy transition. Menezes and Vedovato (2023) discuss the connections between energy transition and SDGs in Latin America and the Caribbean, focusing on innovation, equality, and institutional development, and advocating for inter- and transdisciplinary approaches to address these challenges.

3. Economic growth of the Western Balkans

Although the countries of the Western Balkans achieve solid rates of economic growth, they lag significantly behind the members of the European Union. The Covid-19 pandemic has led to negative economic growth rates in all countries of the world. The decline in economic activity was particularly pronounced in less economically developed countries. The countries of the Western Balkans are achieving positive growth rates after the pandemic, but they are insufficient to bring them closer to more developed countries (Figure 1).

Figure 1. GDP growth (annual %) in the Western Balkans and the EU



Source: World Bank, 2022.

Albania's GDP growth showed significant fluctuations during the observed period. The growth rate was 4.02% in 2018, which decreased to 2.09% in 2019. The economy contracted by -3.30% in 2020 due to the pandemic, but rebounded strongly with 8.91% growth in 2021, and then stabilized to 4.86% in 2022. Bosnia and Herzegovina exhibited a similar pattern of fluctuation over the observed period. The growth rate was 3.83% in 2018, decreasing to 2.89% in 2019. The economy contracted by -3.02% in 2020, followed by a strong recovery with 7.39% growth in 2021, and then a slower growth of 4.23% in 2022. Montenegro's GDP growth showed significant volatility during the observed period. The growth rate was 5.08% in 2018, which decreased to 4.06% in 2019. The country faced a severe contraction of -15.31% in 2020 due to the pandemic but experienced a substantial rebound with 13.04% growth in 2021, and continued growth at 6.41% in 2022. North Macedonia's GDP growth also fluctuated during the observed period. The growth rate was 2.88% in 2018, increasing to 3.91% in 2019. The economy contracted by -4.69% in 2020, recovered modestly with 4.51% growth in 2021, and then slowed to 2.22% in 2022. These figures indicate a moderate recovery post-pandemic with slower growth in recent years. Serbia exhibited relatively stable growth with some fluctuations during the observed period. The growth rate was 4.50% in 2018, slightly decreasing to 4.33% in 2019. The economy contracted by -0.90% in 2020 but rebounded with 7.73% growth in 2021, and then slowed to 2.55% in 2022 (World Bank, 2022).

The EU-27 experienced fluctuations in GDP growth over the observed period. In 2018, the growth rate was 2.07%, which decreased to 1.81% in 2019. The impact of the COVID-19 pandemic led to a significant contraction of -5.65% in 2020. However, the EU-27 saw a recovery with a growth rate of 6.01% in 2021, followed by a more moderate growth of 3.48% in 2022. This trend highlights the economic challenges posed by the pandemic and the subsequent recovery efforts (World Bank, 2022).

The GDP per capita in PPS (*Purchasing Power Standards*) for Western Balkans countries from 2018 to 2022 reveals several notable trends. The dataset includes data for Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, Serbia, and the average value for the EU-27, which is consistently set at 100 for the years 2018 to 2022. The PPS values are relative to the EU-27 average, which remains constant at 100 (Table 1).

Table 1. GDP per capita in PPS (in PPS EU-27=100)

	2018	2019	2020	2021	2022
Albania	30	30	31	31	34
Bosnia and Herzegovina	32	33	33	34	35
Montenegro	48	50	45	47	50
North Macedonia	41	42	42	43	42
Serbia	40	41	43	44	44

Source: Eurostat, 2022a.

Albania started at 30% of the EU-27 average in 2018, maintaining the same value in 2019. A gradual increase followed, reaching 34% in 2022, representing a growth of 13.33% over the period. Bosnia and Herzegovina began with a value of 32% in 2018, steadily increasing each year to 35% by 2022, showing a growth of 9.38% over the period. Montenegro had an initial value of 48% in 2018, which rose to 50% in 2019 but dropped to 45% in 2020, likely due to the economic impacts of the COVID-19 pandemic. However, it recovered to 47% in 2021 and returned to 50% in 2022. North Macedonia was relatively stable, starting at 41% in 2018, increasing to 42% in 2019 and 2020, slightly rising to 43% in 2021, but falling back to 42% in 2022. Serbia began at 40% of the EU-27 average in 2018 and recorded a gradual increase each year, reaching 44% by 2021 and remaining the same in 2022, representing a growth of 10% over the period. The EU-27 served as a reference point with a constant value of 100 throughout the period (Eurostat, 2022a).

A comparative analysis shows that Albania experienced the highest growth at 13.33%, while Bosnia and Herzegovina had the lowest growth at 9.38%, closely followed by Serbia. Montenegro exhibited the most significant fluctuations, indicating potential economic instability or external influences. Overall, the Western Balkans region, including Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, and Serbia, demonstrated economic progress in GDP per capita relative to the EU-27 average.

4. Energy indicators in the Western Balkans

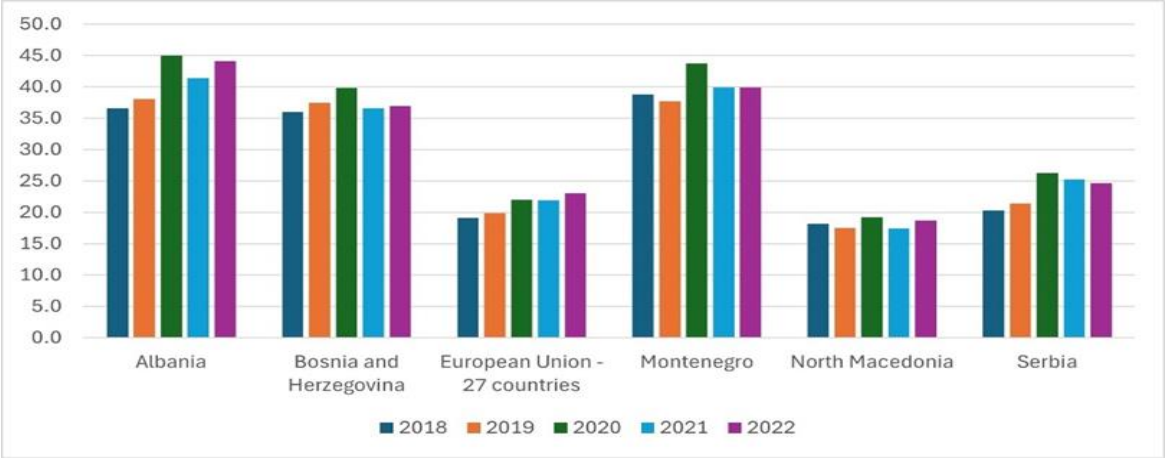
Energy transition contribution to the goals of sustainable development. In order to assess the impact of the energy transition, measurable indicators are needed. Energy indicators that support the achievement of Sustainable Development Goal 7 (SDG 7) were selected for the purposes of this paper. The five-year time period until 2022, for which the latest available data is available, was observed.

4.1. Renewable energy

The EU-27 consistently increased its renewable energy share, reflecting its commitment to sustainability. Among the Western Balkans, Albania and Montenegro had the highest shares, indicating strong reliance on renewable energy, primarily from hydropower. Bosnia and Herzegovina and Serbia also showed positive trends, with Serbia demonstrating significant

growth. North Macedonia had the lowest and most stable share, suggesting limited progress in increasing renewable energy usage (Figure 2).

Figure 2. Share of renewable energy in gross final energy consumption in the Western Balkans and the EU



Source: Eurostat, 2022b.

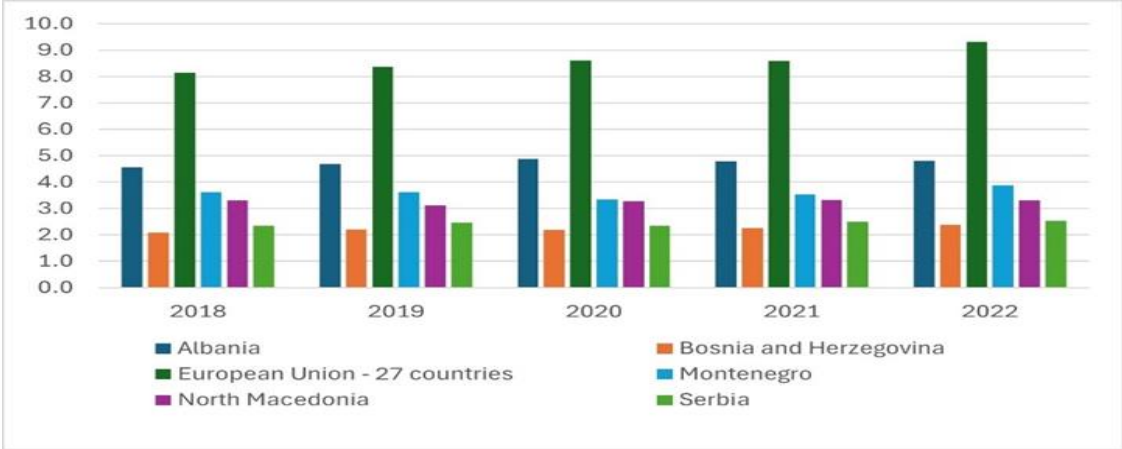
The EU-27 showed a consistent increase in the share of renewable energy in its gross final energy consumption. Starting at 19.1% in 2018, the share rose to 19.9% in 2019 and further to 22.0% in 2020. In 2021, the share was slightly stable at 21.9%, and by 2022, it increased to 23.0%. This upward trend reflects the EU's ongoing efforts to enhance the use of renewable energy sources in its energy mix. Albania exhibited a significant increase in the share of renewable energy. In 2018, the share was 36.6%, which increased to 38.0% in 2019. There was a substantial rise to 45.0% in 2020, followed by a slight decrease to 41.4% in 2021, and then an increase to 44.1% in 2022. This data indicates Albania's strong reliance on renewable energy sources, primarily hydropower. Bosnia and Herzegovina also showed a positive trend, starting at 36.0% in 2018 and increasing to 37.5% in 2019. The share reached 39.8% in 2020 but decreased to 36.6% in 2021. In 2022, it slightly increased again to 37.0%. The fluctuations suggest variability in renewable energy production, likely influenced by hydrological conditions. Montenegro's share of renewable energy fluctuated but remained relatively high. In 2018, it was 38.8%, slightly decreasing to 37.7% in 2019. There was a significant increase to 43.8% in 2020, followed by a decrease to 39.9% in 2021 and stability in 2022 at 39.9%. These variations reflect changes in renewable energy production and consumption patterns. North Macedonia showed minor fluctuations in its renewable energy share. In 2018, the share was 18.2%, decreasing to 17.5% in 2019. It increased to 19.2% in 2020, then decreased again to 17.5% in 2021, and rose to 18.7% in 2022. These figures indicate a relatively stable but low reliance on renewable energy sources. Serbia exhibited a noticeable increase in its renewable energy share. Starting at 20.3% in 2018, it increased to 21.4% in 2019 and saw a significant rise to 26.3% in 2020. The share slightly decreased to 25.3% in 2021 and then to 24.7% in 2022. This trend suggests a growing but somewhat fluctuating adoption of renewable energy (Eurostat, 2022b).

4.2. Energy productivity

The EU-27 consistently exhibited the highest energy productivity among the analyzed regions, reflecting its advanced and energy-efficient economies. The Western Balkans countries displayed varying levels of productivity, with Montenegro and Albania showing notable improvements. Bosnia and Herzegovina and Serbia also demonstrated positive trends, albeit at

lower levels compared to the EU-27. North Macedonia's stable productivity suggests consistent energy efficiency (Figure 3).

Figure 3. Energy productivity in the Western Balkans and the EU



Source: Eurostat, 2022b

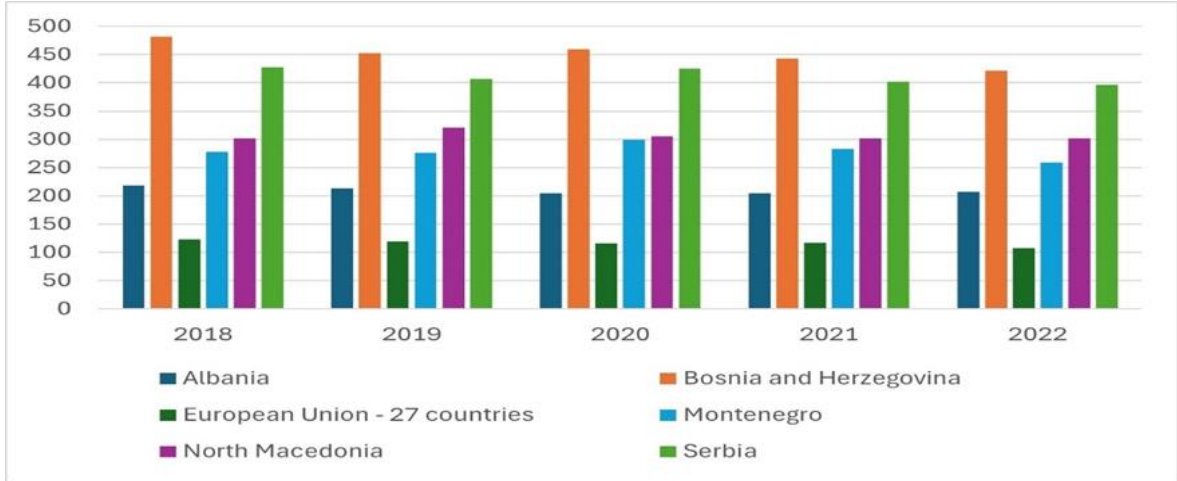
The EU-27 demonstrated a consistent upward trend in energy productivity, starting at 8.1 units of economic output per unit of energy consumed in 2018 and rising to 9.3 in 2022. This increase highlights the EU's commitment to improving energy efficiency and economic resilience, even during the COVID-19 pandemic. Albania showed a generally positive trend in energy productivity, increasing from 4.6 in 2018 to 4.9 in 2020. Although there was a slight decrease to 4.8 in 2021, productivity remained constant in 2022, indicating overall improvements in energy efficiency with a minor setback. Bosnia and Herzegovina exhibited steady improvements, with energy productivity rising from 2.1 in 2018 to 2.4 in 2022. This gradual increase reflects ongoing enhancements in energy use efficiency and economic output. Montenegro's energy productivity fluctuated but showed an overall improvement. Starting at 3.6 in 2018, it remained the same in 2019, decreased to 3.3 in 2020 due to the pandemic, and then rose to 3.9 in 2022, indicating a recovery and potential advancements in energy efficiency. North Macedonia's energy productivity remained relatively stable, with minor fluctuations. Productivity was 3.3 in 2018, decreased to 3.1 in 2019, and returned to 3.3 in 2020, maintaining this level through 2022. This stability suggests consistent energy efficiency. Serbia's energy productivity showed gradual improvement with minor fluctuations. It increased from 2.3 in 2018 to 2.5 in 2019, slightly decreased to 2.4 in 2020, and then returned to 2.5 in 2021, maintaining this level in 2022. This trend indicates ongoing efforts to enhance energy efficiency and economic output (Eurostat, 2022b).

4.3. Energy intensity

The EU-27 consistently demonstrated the lowest energy intensity values, reflecting its advanced energy efficiency measures and economic structure. Starting at 123 units in 2018 and decreasing to 107 units in 2022, the EU-27's trend highlights significant and steady improvements in energy efficiency (Figure 4).

Among the Western Balkans countries, Bosnia and Herzegovina had the highest energy intensity, indicating lower energy efficiency compared to its regional peers. Albania and Montenegro showed the most significant improvements in reducing energy intensity over the period. North Macedonia's energy intensity remained relatively stable, suggesting consistent energy efficiency. Serbia demonstrated a general decreasing trend in energy intensity, indicating improving energy efficiency (Eurostat, 2022b).

Figure 4. Energy intensity in the Western Balkans and the EU



Source: Eurostat, 2022b.

Albania's energy intensity showed a gradual decrease over the period. In 2018, energy intensity was 219 units, which decreased to 213 units in 2019 and further to 205 units in 2020. The value remained stable at 205 units in 2021 and increased slightly to 207 units in 2022. Bosnia and Herzegovina experienced fluctuations in energy intensity. Starting at 482 units in 2018, it decreased to 453 units in 2019 but increased slightly to 459 units in 2020. It then decreased to 443 units in 2021 and further to 422 units in 2022. The overall trend indicates a general improvement in energy efficiency with some year-to-year variability. Montenegro's energy intensity fluctuated over the period. In 2018, the intensity was 277 units, remaining almost the same in 2019 at 276 units. It increased to 300 units in 2020, decreased to 283 units in 2021, and further decreased to 259 units in 2022. North Macedonia's energy intensity showed relative stability. It was 302 units in 2018, increased to 321 units in 2019, and then decreased to 306 units in 2020. It remained relatively stable at 301 units in 2021 and 302 units in 2022. Serbia's energy intensity demonstrated a decreasing trend. Starting at 428 units in 2018, it decreased to 407 units in 2019, increased slightly to 425 units in 2020, then decreased to 402 units in 2021, and further decreased to 396 units in 2022. This overall trend indicates improvements in energy efficiency (Eurostat, 2022b).

5. Cooperation for a sustainable energy future

Cooperation within the energy sector in the Western Balkans is essential for ensuring sustainable development, energy security, and economic growth. The region’s energy cooperation primarily focuses on integration into the European energy market, development of renewable energy sources, infrastructure modernization, regulatory alignment, and capacity building. The Energy Community Treaty, which includes countries from the Western Balkans, is a cornerstone of this cooperation. The integration of the Western Balkans into the European energy market involves harmonizing national energy regulations with EU standards. This process promotes competition, transparency, and the creation of a unified energy market. By aligning their energy policies with EU directives, Western Balkan countries can attract investment and improve their energy infrastructure (Energy Community Secretariat, 2020).

Promoting renewable energy is a critical aspect of energy cooperation in the Western Balkans. Countries in the region have significant potential for renewable energy, including hydropower, wind, solar, and biomass. National strategies and policies, often supported by

feed-in tariffs, are implemented to encourage the development and integration of these renewable energy sources (Filipović et al., 2022).

Modernizing energy infrastructure is essential for improving energy efficiency, reliability, and security. This includes the development of new power generation facilities, upgrading transmission and distribution networks, and building cross-border interconnections. Key projects like the Trans-Balkan Electricity Corridor aim to enhance the region's energy infrastructure and connectivity with the EU (European Commission, 2021). Aligning national regulations with EU energy policies and liberalizing energy markets are vital for creating a competitive and transparent energy sector. Regulatory bodies in the Western Balkans work towards implementing EU regulations, such as the Third Energy Package, to ensure fair competition and protect consumers' rights (Nechev and Svilans, 2022; Knez et al., 2022).

The Energy Community has played a crucial role in the Western Balkans by facilitating regional cooperation and integration into the European energy market. This strategic collaboration aims to ensure energy security, economic stability, and sustainable development in the region. Neskovic and Bylo (2023) discuss how the Energy Community promotes cooperation between the European Union and Southeast Europe, focusing on achieving geo-economic and energy security. They highlight the importance of this strategic project in stabilizing energy supply and functioning markets in the Western Balkans. Bozoudi (2021) emphasizes the need for "*soft measures*" in energy market reforms, pointing out the delays and challenges that Western Balkan countries face in meeting their commitments to the Energy Community. Manolkidis (2021) explores the geopolitical implications of energy cooperation in the region, particularly through the Western Balkan Six Initiative. He argues for strengthening the Energy Community Treaty and establishing a Tribunal to enhance governance and dispute resolution. The OECD (2022) discusses the green recovery efforts in the Western Balkans, noting significant progress in transposing EU energy policies and the need for a comprehensive plan to transition away from coal.

Feed-in tariffs (FiTs) are a policy mechanism designed to accelerate investment in renewable energy technologies by offering long-term contracts to renewable energy producers. In the Western Balkans, various countries have implemented FiT schemes to promote the use of renewable energy sources. Stevanović and Pucar (2012) analyze the investment viability of small photovoltaic plants in Serbia under the current FiT framework, revealing that the existing tariffs are insufficient to attract significant investment in solar energy. Krkoleva et al. (2011) discuss the implementation of FiTs in North Macedonia, highlighting that the scheme has minimal financial impact while supporting renewable energy adoption. Almahmeed et al. (2018) provide a broader perspective on FiTs, discussing their effectiveness globally and emphasizing the importance of well-structured policies for renewable energy development. Chalvatzis (2011) discusses the broader implications of FiTs, noting that while they promote renewable energy and job creation, they can also distort competitive markets and are primarily successful in Europe.

The "Green Agenda for the Western Balkans" significantly impacts economic development by promoting sustainable growth and reducing environmental degradation. The EU's Green Agenda for the Western Balkans is a strategic framework. Launched in October 2020 as part of the European Commission's Economic and Investment Plan for the Western Balkans, the Green Agenda aligns with the European Green Deal and aims to assist Western Balkans countries in addressing environmental challenges, enhancing energy security, and fostering economic growth through sustainable practices. By focusing on decarbonization, the agenda aims to shift the region's energy mix from coal to renewable sources, fostering investments in green technologies and infrastructure (Kaplarevic, 2023; Zvezdanović Lobanova, 2024). This transition not only improves energy security but also creates new jobs and business opportunities in the renewable energy sector (Šogorov-Vučković et al., 2022). Additionally,

aligning with EU environmental standards enhances the region's competitiveness and attractiveness to foreign investors, further boosting economic development (OECD, 2022). However, the transition poses challenges such as the need for substantial financial resources and overcoming political and economic interests that favor the status quo (Emerald Expert Briefings, 2023). The Green Agenda's comprehensive approach integrates environmental sustainability with economic growth, aiming to create a resilient and prosperous future for the Western Balkans.

6. Conclusion

The economic implications of transitioning to renewable energy in the Western Balkans are complex and significant. Currently, the region's heavy reliance on fossil fuels incurs high costs due to substantial expenditures on imported energy sources. In contrast, developing renewable energy sectors offers numerous opportunities for job creation and economic growth. Furthermore, achieving energy independence would mitigate vulnerability to global energy price fluctuations, thereby enhancing economic stability.

The EU-27 and Western Balkans countries experienced significant economic impacts from the COVID-19 pandemic, followed by varying degrees of recovery. Montenegro faced the most severe contraction but also the highest rebound, reflecting high economic volatility. Albania, Bosnia and Herzegovina, and Serbia showed strong recoveries post-pandemic, while North Macedonia had a more moderate recovery.

Albania consistently had the highest share of renewable energy among the Western Balkans countries, reflecting its significant reliance on hydropower. Montenegro also maintained a high share, though with more fluctuations. Bosnia and Herzegovina showed steady improvements with some variability, while Serbia exhibited notable growth with slight decreases in recent years. North Macedonia had the lowest and most stable share of renewable energy, indicating limited progress compared to its regional counterparts. From 2018 to 2022, the EU-27 and selected Western Balkans countries showed significant improvements and fluctuations in energy productivity. The EU-27's high and increasing productivity underscores its leading position in energy efficiency and economic resilience. The Western Balkans countries, despite lower productivity levels, are on a positive trajectory towards improved energy use and economic output. Among the Western Balkans countries, Bosnia and Herzegovina had the highest energy intensity, indicating lower energy efficiency compared to its regional peers. Albania and Montenegro showed the most significant improvements in reducing energy intensity over the period. North Macedonia's energy intensity remained relatively stable, suggesting consistent energy efficiency. Serbia demonstrated a general decreasing trend in energy intensity, indicating improving energy efficiency.

To overcome these challenges, a multifaceted approach is necessary. Investment in renewable energy sources, such as wind, solar, and hydropower, is crucial. Policy reforms and regulatory support, including incentives for clean energy projects and the removal of subsidies for fossil fuels, are essential. Regional cooperation and international support, through initiatives like the Green Agenda for the Western Balkans and the Energy Community, can provide the necessary financial and technical assistance.

References

- Akar, B. G. (2016). "The Determinants Of Renewable Energy Consumption: An Empirical Analysis For The Balkans", *European Scientific Journal, ESJ*, 12(11), 594-614.
- Aleksić, V., Batas-Bjelić, I. (2021). "Do We Need More Ambition for the Renewable Energy Transition in Serbia? Foundations of Energy Governance and Planning", *Energija, ekonomija, ekologija*, 23(3), 1-9.
- Almahmeed, M. Y., Koh, W., Al-Ammar, E. A. (2018). K.S.A Feed in Tariff. In *2018 International Conference on Advanced Renewable Energy Systems (ICARES)* (pp. 1-6). IEEE.
- Batas-Bjelic, I., Rajakovic, N. (2021). "National energy and climate planning approach for the Western Balkans: between the carrot and the stick of the EU Green Agenda", *International Journal of Global Environmental Issues*, 20(2-4), 123-134.
- Bonomi, M., Uvalic, M. (2019). The economic development of the Western Balkans: The importance of non-EU actors. In *The Western Balkans in the world* (pp. 36-58). Routledge.
- Bozoudi, M. (2021). Soft Measures for Energy Market Reform in the Western Balkans. In *Energy and the European Union* (pp. 121-138). Springer.
- Brkljača, M., Tabaković, M., Vranjkovina, M., Ćorović, D., Dedić, L., Krzović, M., Skenderović, M., Hubana, T., Avdakovic, S. (2020). "Western Balkans Green-Deal: Zero Emissions by 2050", In *Energy Transition* (pp. 25-47). Springer.
- Carnegie Europe. (2023). *The green transition and the Western Balkans*. Retrieved from: <https://carnegieeurope.eu/2023/10/09/green-transition-and-western-balkans-pub-89547>
- Chalvatzis, K. (2011). Feed-in Tariff. In *Green Energy: An A-to-Z Guide* (pp. 219-221). SAGE Publications.
- Danilov, D. E. (2024). Philosophical and methodological foundations of economic-mathematical modeling in the context of achieving goals of sustainable development and energy transition of the Russian economy. *Naučnye issledovaniâ èkonomičeskogo fakul'teta*, 16(1), 7-23.
- Dunjic, S., Pezzutto, S., Zubaryeva, A. (2016). "Renewable energy development trends in the Western Balkans", *Renewable & Sustainable Energy Reviews*, 68, 631-645.
- Đurašković, J., Konatar, M., Radović, M. (2021). "Renewable energy in the Western Balkans: Policies, developments and perspectives", *Energy reports*, 7, 481-490.
- Emerald Expert Briefings. (2023). *Green transition will move slowly in Western Balkans*. Emerald Expert Briefings.
- Energy Community Secretariat. (2020). *Annual Implementation Report*. Retrieved from: <https://www.energy-community.org/implementation/IR2020.html>
- European Commission. (2020). *The European Green Deal*. Retrieved from: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en
- European Commission. (2021). *Western Balkans: Regional Energy Market and Interconnections*. Retrieved from: https://ec.europa.eu/commission/presscorner/detail/en/IP_21_1829
- Eurostat. (2022a). *National accounts and GDP*. Retrieved from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=National_accounts_and_GDP
- Eurostat. (2022b). *Environment and energy*. Retrieved from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Category:Environment_and_energy
- Fanku, L. (2023). *Green enlargement: How the EU's growth plan for the Western Balkans can promote climate action*. European Council on Foreign Relations. Retrieved from: <https://ecfr.eu/article/green-enlargement-how-the-eus-growth-plan-for-the-western-balkans-can-promote-climate-action/>

- Filipović, S., Lior, N., Radovanović, M. (2022). “The green deal—just transition and sustainable development goals Nexus”, *Renewable and Sustainable Energy Reviews*, 168, 112759.
- Ibrahim, I. A. (2023). “Energy transition and Sustainable Development Goal 7: A legal analysis in the context of the Arab world”, *Journal of World Energy Law & Business*, 16(1), 67-89.
- Ignjatović, J., Filipović, S., Radovanović, M. (2024). “Challenges of the green transition for the recovery of the Western Balkans”, *Energy, Sustainability and Society*, 14(1), 2.
- International Renewable Energy Agency. (2019). *Renewable Energy Market Analysis: Southeast Europe*. Retrieved from <https://www.irena.org/publications/2019/Dec/Renewable-Energy-Market-Analysis-Southeast-Europe>
- Islamov, D. R. (2023). “Role of the European Union and Turkey in the Energy and Transport Policies of the Western Balkans (2014-2021)”, *Bulletin of Higher Education Institutes. Northern-Caucasus Region. Social Sciences*, 2(78), 82-95.
- Jednak, S., Minović, J., Kragulj, D. (2020). “A review of economic and environment indicators and energy efficiency: Evidence from the EU and Serbia”, *Economic themes*, 58(4), 459-477.
- Jednak, S., Minović, J., Kragulj, D. (2021). “The role of foreign direct investment, energy and pollution in obtaining sustainable economic development”, *Polish Journal of Environmental Studies*, 30(6).
- Kaplarevic, M. L. (2023). Research and innovation for the European Green Deal: Western Balkans. In *The conference proceedings were prepared and published with the financial support of the Erasmus+ Jean Monnet Projects Program of the European Union, No. 619927* (p. 309).
- Knez, S., Štrbac, S., Podbregar, I. (2022). “Climate change in the Western Balkans and EU Green Deal: status, mitigation and challenges”, *Energy, Sustainability and Society*, 12(1), 1-14.
- Krkoleva, A., Taleski, R., Markovska, N., Taseska, V., Kanevce, G. (2011). Implementation of the feed-in tariffs in the Macedonian power system. In *2011 8th International Conference on the European Energy Market (EEM)* (pp. 438-443). IEEE.
- Manolkidis, S. (2021). Geopolitical Challenges and Cooperation in the European Energy Sector: The Case of SE Europe and the Western Balkan Six Initiative. In *Energy and the European Union* (pp. 89-105). Springer.
- Menezes, D. F. N., Vedovato, L. R. (2023). Sustainable Development Goals and energy transition in Latin America and the Caribbean: The quest to reduce social and economic inequalities. *Preprint*.
- Mitrescu, S. (2023). “Energy Diplomacy in the Western Balkans”, *Foreign Policy Review*, 1(1), 78-90.
- Nechev, Z., Svilans, A. (2022). *Western Balkans: more resilience for the energy sector*. European Union Institute for Security Studies (EUISS).
- Neskovic, S., Bylo, A. (2023). “Energy Community in the Concept of Achieving Geo-economic and Energy Security of the Countries of the Western Balkans”, *Monte*, 29(1), 58-70.
- OECD. (2022). A Green Recovery in the Western Balkans. In *OECD Green Growth Studies: Towards Green Growth in Southeast Europe* (pp. 45-66). OECD Publishing.
- Šogorov-Vučković, J., Piksiades, D., Trifunović, I. (2022). “Governmental investment in the environmental economy in the Western Balkan”, *The European Journal of Applied Economics*, 19(1), 45-66.
- Stevanović, S., Pucar, M. (2012). “Investment appraisal of a small, grid-connected photovoltaic plant under the Serbian feed-in tariff framework”, *Renewable & Sustainable Energy Reviews*, 16(4), 2771-2780.
- Streimikiene, D. (2024). “Western Balkan Countries in Green Transition: Assessment of Results and Challenges”, *ELIT—Economic Laboratory for Transition Research*, 20(4), 203.

- Vasquez, C., Begolli, R., Van Gelder, L., Shukla, S. (2018). *Western Balkans: Directions for the Energy Sector*, World Bank Report, 1-50.
- Vuchkova, I. (2020). Transformation in the Western Balkans: The readiness for a sustainable energy landscape. *Energy Policy Review*, 1-20.
- Vukovic, M., Miskic, M., Kastelan, I., Lale, S., Forcan, M., Vukovic, G., Ilic, M. (2023). “Renewable Energy-Powered Traffic Signalization as a Step to Carbon-Neutral Cities (The Case of Western Balkans)”, *Sustainability*, 15(7), 6164.
- World Bank. (2021). *Western Balkans Regular Economic Report No. 19: Spring 2021*. Retrieved from: <https://www.worldbank.org/en/region/eca/publication/western-balkans-regular-economic-report>
- World Bank. (2022). *World Development Indicators*. Retrieved from: <https://data.worldbank.org/>
- Yang, Q., Yang, Z. (2024). “Bridging energy transition and income inequality: The moderating effect of institutional transparency”, *Sustainable Development*, 32(1), 45-58.
- Yasin, T. R., Anna, Z., & Utama, G. L. (2024). Unpacking Indonesia's energy transition through a PESTEL analysis, for achieving Sustainable Development Goals. *E3S Web of Conferences*, 495, 01007.
- Young, J., Macura, A. (2023). “Forging Local Energy Transition in the Most Carbon-Intensive European Region of the Western Balkans”, *Energies*, 16(4), 2077.
- Zvezdanović Lobanova, J. (2024). The Green Transition and Energy Security in the Western Balkans Countries. In *Global Sustainability and Innovation in Energy Systems* (pp. 123-145). IIPE.