

Between Global Gateway and BRI: A Comparative Study on the Sustainability of Solar and Wind Power Infrastructure in the Western Balkans

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Author's declaration

I, the undersigned, Ajla Ahmetovic, candidate for the MSc degree in Environmental Sciences, Policy and Management declare herewith that the present thesis titled “Between Global Gateway and BRI: A Comparative Study on the Sustainability of Solar and Wind Power Infrastructure in the Western Balkan” is exclusively my own work, based on my research and only such external information as properly credited in notes and bibliography. I declare that no unidentified and illegitimate use was made of the work of others, and no part of the thesis infringes on any person's or institution's copyright. I also declare that no part of the thesis has been submitted in this form to any other institution of higher education for an academic degree.

Berlin, June 8th 2025

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1. Introduction

The energy transition in the Western Balkans¹ is picking up pace (Morina & Popov, 2024). A region notorious for some of the most carbon intensive energy grids in the world, is being shaken by significant prospects in wind and solar power development (Gamez & Kozyba, 2024). Between 2023 and 2024 alone, a 70% increase of projected installation capacities has been announced (Gamez & Kozyba, 2024). Amidst growing ambitions to align with broader EU climate policies, regional governments seek to diversify energy portfolios, reduce reliance on carbon-intensive systems and increase energy security (Rajić, 2022).

However, the region is far from becoming carbon neutral. Serbia and Bosnia and Hercegovina for example regularly rank among the top 10 countries that source electricity from coal fired thermal power plants, averaging at 65% in the mix (Bechev, 2023). At the same time, the region regularly experiences energy shortages especially during peak demand in the winter, exacerbated by an aged energy infrastructure. Next to coal, hydropower is the only other sovereign source that supplements energy production (Mandras et al., 2021).

Acknowledging the immense potential for solar and wind, two major international actors are currently driving the diversification of renewable energy sources in the region: the European Union and China (Bechev, 2023). In 2021 the European Union announced its Global Gateway strategy, an international infrastructure investment programme aligned with the goals of the 2030 Agenda and Paris Agreement (EC, n.d.). Ultimately, this investment offensive aims at positioning the EU as a global normative power against China's decade old Belt and Road

¹ Here: The Republic of Serbia, The Republic of North Macedonia, The Republic of Albania, Montenegro, Bosnia and Hercegovina

Initiative (Urhova, 2025). Within this geopolitical contest, the Western Balkans occupy a central role. On the one hand, the region is promised EU enlargement while also serving as a strategic entry point for Chinese goods into key European markets (Bechev, 2023). Given the long-standing involvement of Chinese actors in the region, China has become one of the largest developers of energy infrastructure across the Western Balkans, with increasing focus on large-scale wind and solar projects (Bechev, 2023).

While both actors promote renewable energy expansion, each investment program applies its own *modus operandi* in a highly complex and sensitive political landscape that is characterized by post-socialist reorganization processes, governance paralysis and corruption (Amxheka et al. 2024). Recognizing the importance of these factors in energy transition processes, this work will not only address the outcomes of wind and solar expansion but also the pathways taken to achieve them. Taking form the United Nations Development Program (UNDP), sustainable infrastructure is the “planned, designed, constructed, operated and decommissioned in a manner that ensures economic and financial, social, environmental (including climate resilience), and institutional sustainability over the entire infrastructure life cycle” (UNEP, n.d.).

With a focus on Serbia, Montenegro, and Bosnia and Herzegovina the thesis will comparatively assess the sustainability of such energy projects, by comparatively analyzing cases from the Global Energy Monitor. The analysis will use the 3P Framework Purpose, Process, People, for structured examination of the strategic intent, planning and governance mechanisms, and social-environmental impacts of 18 projects in selected counties (Wang et al., 2020).

Thus, insight into how international actors influence project development, especially from a geopolitical, environmental, and social dynamics perspective, shaping the region’s energy transition will be provided.

In the following chapters, the thesis will further address:

The background and relevance of the energy landscape and foreign actor involvement (Chapter 2). Present the theoretical and analytical framework, including literature review and the 3P model (Chapter 3). Chapter 4 will detail the methodology and data source used, while Chapter 5 presents the comparative case narratives. These findings are interpreted and discussed in Chapter 6 . Chapter 7 concludes with key takeaways on the region's energy transition.

2. Background and significance

This chapter discusses the influence of the EU and China in shaping the expansion of solar and wind power. It sheds light on policy initiatives taken in the past decade from either actor as well as present a background on the region's energy profile and development. This chapter will also reason the choice of countries selected and highlight the practical as well as academic relevance of the thesis.

2.1. The Regional Energy Context

Historical legacies have mayor impact on the regional energy infrastructure (Đurašković et al. 2021). Following the unbundling from a unified energy system in the 1990's, the successor states of the former Socialist Federal Republic (SFR) of Yugoslavia continued to rely on an already aged and damaged energy infrastructure that is on average more than 40 years old today (Đurašković et al. 2021). Since then, chronic underinvestment in the public sector, clientelism in privatization processes and energy poverty² coin the political economy within the energy sector of the Western Balkans, one that regularly fails to meet energy demand, has much greater energy intensity than the EU average and heavily relies on energy imports (Bechev, 2023).

Despite the fragmentation of the energy markets, similar developments can be observed. National energy utilities continue to dominate electricity markets, backed by coal and hydropower resources (Frey, 2024). At the same time, these utilities perform mayor social and political functions in the region, at the expense of implementation of reforms and strategic reorientation (Bechev, 2023). Employment in the coal sector provides about 23.000 jobs (between 0.4% -1.3 %) while artificially low energy prices are needed to maintain affordability

² Energy poverty" is a common measure of vulnerability to energy price shocks. A household is considered "energy poor" if it allocates more than 10 percent of its budget to energy expenditure. Similarly, a household is "electricity poor" if electricity expenditure exceeds 10 percent of the household budget.

in the region (Ruiz Castello et al., 2021). As such, legislators refrain from drastic reforms in the electricity sectors to maintain social peace and political relevance, despite utility revenue gaps and illiquidity which are eventually compensated from in national budgets. Thus, progress for national commitments to coal-phase outs are slow (Frey, 2024; Bechev, 2023). To better understand regional differences in electricity composition tables are provided below:

Country	Number of TPPs	Installed capacity (gigawatt) (GW)	Share in electricity
Albania	n/a	n/a	n/a
Bosnia and Herzegovina	5	2 GW	67.7%
Kosovo	2	1.2 GW	94.9%
Montenegro	1	0.2 GW	41%
North Macedonia	2	0.8 GW	51%
Serbia	6	4.3 GW	70%

Figure 1: Installed TPP capacities and share in total electricity consumption, Bechev (2023)

While Serbia, Bosnia and Hercegovina and Kosvo rely mostly on coal for electricity production, Montenegro and North Macedonia supply higher percentages electricity through hydropower. Albania is almost entirely powered by hydropower and occasional energy imports. There are no nuclear power sources in

the region (Frey, 2024).

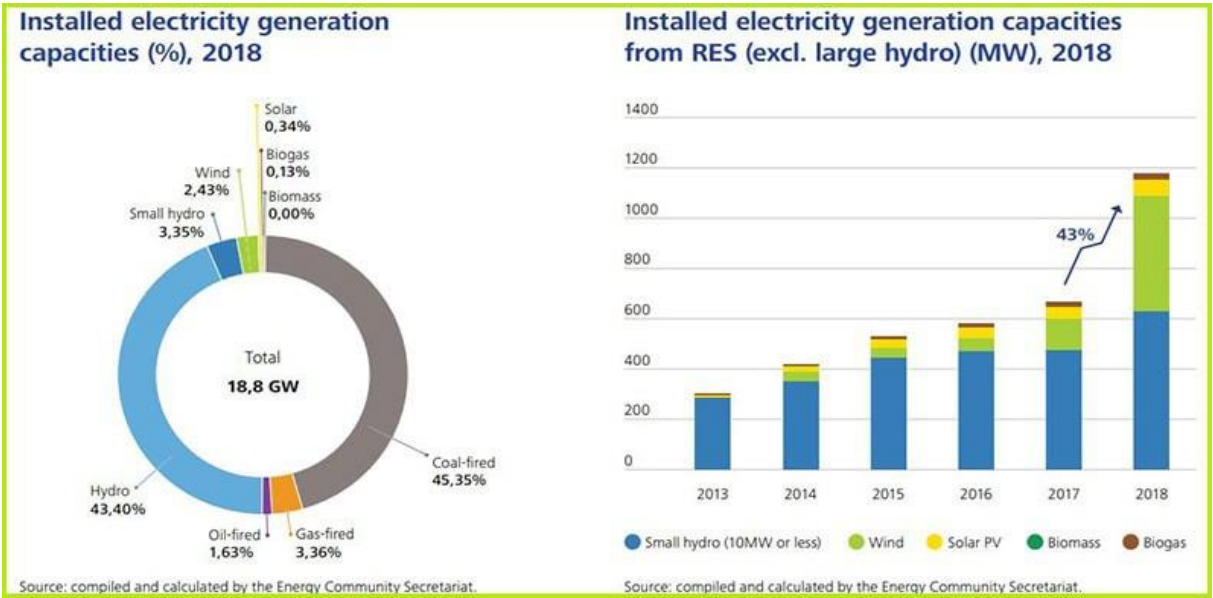


Figure 2: Installed electricity capacities, Spasić (2020)

In terms of installed capacities, coal and hydropower are almost equally present at about 9 GW installed capacities. Realized yield for hydropower however may fluctuate depending on the

country of installation and seasonal load variations (Frey, 2024). While hydro is a renewable energy source, emitting close to no greenhouse gases, there have been serious environmental concerns regarding its installation (Pavlakovic et al., 2022). Small installations (>10MW) in particular had been politically incentivized since 2010 through feed-in schemes, causing a five-fold increase in the number of projects realized by 2021. The sensibility of the installations remains questionable, causing numerous controversies around corruption, mass protest and harm to environmentally protected areas, local communities, tourist, and agricultural areas (Pavlakovic et al., 2022). Against these concerns, their output is not proportional. Evidently, however, hydro remains the largest source of renewable energy in the region, whereas wind and solar are just starting to pick up.

2.1.1. The expansion of solar and wind energy

Solar and wind power are still underdeveloped in the region and only recently started to gain widespread attention. Since 2017 the installed capacity rose from about 200 MW to over 1.9 GW in 2024, or 11% of the region's demand (Gamez & Kozyba, 2024). Between the two technologies, 1 GW of wind and 900 MW of solar are installed. Serbia is the largest operator of these renewables with about 30% share. The dynamic developments in the area are further highlighted by the number of prospective projects expected in the region. Between 2023 and 2024 a 70% uptake of projects has been announced by investors and developers, with a realized potential of 23GW totaling over 109 million tons of avoided Co2 emissions (Gamez & Kozyba, 2024). This would cover the region's current energy demand entirely, marking a remarkable shift away from decades of incentivized hydropower and coal expansion towards alternative and diversified modes of renewable energy production. But caution needs to be exerted, as most projects are in initial stages of planning and permitting processes. Of the prospective projects, only 30% (7 GW) are foreseen to operate by 2028, while the remaining 70% have no investment and planning schedule in place (Gamez & Kozyba, 2024).

To promote the offtake of wind and solar projects, auctions have been set up in Serbia for example. These actions help to allocate projects in the most cost-effective manner and ensure a competitive market (Spasić, 2025). The country implemented a 2023-2025 auctioning roadmap for a total of 1200 MW (1.2 GW) of wind and solar power, following legislative changes in 2021 which redesigned state aid and feed-in tariffs (Ministry of Mining and Energy, 2023). In 2023 and 2024, actions were held for a total of 700 MW of wind and 175 MW of solar, which were met by overwhelming domestic and international demand, especially in the wind segment. Interestingly, not only commercial developers receive awards but also citizen owned projects did (Spasić, 2025).

However, auctions are not employed in all countries of the region yet. Other approaches include bilateral agreements in the form of loans where the procurement is negotiated directly between the state and project developers through development banks or the private sector (Guasch & Glaessner, 1994).

2.1.2. Challenges for RE integration

Despite positive market signals, concerns remain around the possibility to scale wind and solar to their full projected potential because of broader socio-technical issues (Frey, 2024). Firstly, national transmission grids and capacities are limited and need modernization to accommodate the rapid rise in renewables (Hochberg, 2024). Secondly, as outlined before, coal dependency limits radical policy changes and necessitates inclusive transition planning and public engagement (Bechev, 2023). Furthermore, illiquid electricity markets nationally, such as the absence of an organized market in Bosnia and Herzegovina, and regionally limit opportunities of financing and commercialization of renewables by selling surplus (Hochberg, 2024). Lastly, regional coordination would be needed to harmonize fragmented regulatory frameworks and

securely attract investment and to highlight the potential for integrated, large-scale energy development across the region (Frey, 2024).

2.2. The Influence of the European Union

For years, the European Union has been a major donor to the Western Balkan for socio-technical development through financial and technical assistance to facilitate institutional capacity building and reforms (Delivorias, 2025). This finance mainly stems from the Instrument for Pre-Accession, intended to aid in leveling policy and regulatory frameworks for joining the EU. For the period of 2021 to 2027 close to EUR 13 bn. is foreseen to be issued to the Western Balkan in the form of grants, whereas additional loans are made available to the private sector through the Neighbourhood, Development and International Cooperation Instrument (NDICI) (EC, n.d.). Administration of grants and loans is mostly done through European Financial Institutions such as the European Bank for Reconstruction and Development, the European Investment Bank or the German Kreditanstalt für Wiederaufbau (KfW) (Delivorias, 2025). Strategically, these funds are issued for projects that align with the European Green Deal, which is why the EU adopted the Economic and Investment Plan for the Western Balkans in 2020 (EC, n.d.). Under the broader initiative of Global Gateway, these funds facilitate sustainable economic and social development through a green and digital transition. Projects financed or supported by EU institutions require environmental impact assessments, stakeholder participation processes, and public procurement standards as outlined in institutional ESG frameworks (Bilal & Klasen, 2025). As such, the EU's approach is process-heavy, placing significant weight on institutional cooperation and regulatory alignment. In the same year, the Declaration on the Green Agenda for the Western Balkans in Sofia in 2020 was

signed by all six Western Balkan countries (WB6), confirming their commitment to achieving carbon neutrality by 2050 (EC, 2020).

As such, the region has embraced the EU Green Deal as their benchmark for their economic development and convergence path towards the EU. In this regard, the expansion of renewable energy has become central to national energy strategies and decarbonization efforts as underlined by the WBs National Energy and Climate Plans (NECPs) (Bechey, 2023).

Additionally, the new wave of investment programs aims at strengthening the rule of law in the region by offering EU accession prospects and utilize the expansion of wind and solar energy to counter investments from China or Russia (Delivorias, 2025).

2.3. The Influence of China

Despite the recent endorsement of the EU in supporting for renewable energy deployment in the Western Balkans, China has secured a dominant spot in the region's energy infrastructure landscape for over a decade now (Frey, 2024). Through its 14+1 cooperation platform for Central and Eastern Europe, China has been promoting economic cooperation under the Belt and Road Initiative since 2012. Timing couldn't have been better as China capitalized on the urgent need for investments during the 2010s to meet the growing energy demand and security of supply at affordable prices in the Western Balkans during a time where the growing "enlargement fatigue" of the EU created a policy vacuum (Jahns et al., 2020; Yoneva, 2023).

In the following years, Chinese engagement led to the rehabilitation of a number of coal-fired thermal power plants, including Kostolac in Serbia and Tuzla, Gacko, and Stanari Plants in Bosnia and Herzegovina (Csapó, 2020). As Chinese developers bundled labor, equipment, and services for project execution from domestic markets, minimal economic spillovers for the host economies were realized (Nikjow et al., 2021). Thus, the China is one of the most important

drivers of energy infrastructure, playing a critical role in shaping national energy trajectories (Jovanovic, 2025).

In 2021 however, the BRI's underwent strategic re-orientation when Chinese President Xi Jinping announced at the UN General Assembly that China would cease financing new coal power projects abroad, adopting a formal “greening” policy aimed at aligning its overseas investments with the Sustainable Development Goals (SDGs) and global climate ambitions (Curran, 2021).

Despite this pivot, the legacy of Chinese-backed coal investments remains a defining feature of the region's energy system. The newly defined focus on renewable energy not only secures a lead in global green energy markets but also deepens the economic and geopolitical footprint in Europe's periphery (Bechev, 2023). As such Chinese companies have increased their engagement in solar and wind projects across Serbia, Bosnia and Herzegovina, and Montenegro. In 2024, China's renewable energy portfolio in the Western Balkans was estimated 2.5 GW, the largest portfolio in the region (Gamez & Kozyba, 2024). Being at the forefront of foreign investment, the long-term implications of its engagement continue to provoke debate. While filling critical infrastructure gaps, Chinese investments also introduced a governance model that prioritizes expediency over procedural accountability, raising important questions about who benefits from the region's ongoing energy transition and at what cost (Yoneva, 2023).

2.4. Reasoning for Country Selection

To gain a comprehensive understanding of the dynamics that entail the development of renewables in the Western Balkan, Serbia, Bosnia and Herzegovina, and Montenegro have been chosen as units of analysis. Together, these countries account for about 80% of the region's

prospective installed solar and wind capacity, making them central to the regional energy transition and investor activity (Gamez & Kozyba, 2024). In this context, Serbia stands out as the region's economic anchor, hosting the largest pipeline of solar and wind projects. Politically, it pursues a multi-vector foreign policy stance of tightening ties with China while maintaining EU accession ambitions (Shopov, 2021). Bosnia and Herzegovina, though institutionally fragmented and slower on EU integration, has a relatively balanced operational renewable portfolio and is strategically important given its central location in the region (Gamez & Kozyba, 2024). Lastly, Montenegro is chosen due to progress towards EU accession, with membership possible as early as 2030 (Cantone, 2025). Analyzing these countries collectively allows for a nuanced understanding of both converging and diverging patterns in renewable energy development and foreign engagement.

2.5. Significance

By generating an understanding of current processes shaping the energy transitions in the Western Balkans, the insights of this thesis aim to be of practical and academic relevance. On a practical level, up-to-date insights can inform policy discourse and strategic orientation. By comparing how major regional actors (EU and China) shape the development of renewable energy in Serbia, Bosnia and Herzegovina, and Montenegro, the thesis highlights critical governance, financing, equity and sustainability challenges, as countries aim to deliver on their commitments under the Green Agenda for the Western Balkans.

The academic relevance is outlined at the end of the next chapter.

3. Literature Review

The literature review will shed light on how Chinese and European green infrastructure development abroad is conceptualized in different fields of research and has been studied in comparative settings. As such, the review will touch upon issues brought up in political ecology, environmental governance and international political economy to embed the thesis and highlight conceptual gaps relevant for formulating the research question.

3.1. International Political Economy

The Global Gateway presents itself as a norm-based infrastructure initiative, founded on principles of sustainability, comprehensiveness, and rule-based approaches. Karjaleinen (2023) questions if this pre-set allocation of values may pose a risk by the very own standard the Global Gateway aims to set. According to the author the EU's norm-diffusing policy may have an undermining effect on partners' agency by coercing countries into compliance rather than fostering partnership and shared value creation. Karjaleinen (2023) finds that certain country groups in fact do not have a role in the creation of norms. As such, "their agency is limited to accepting (or rejecting) and adhering to the norms of the EU connectivity policies" (p. 307). However, this effect is mitigated in regions where other actors such as China offer alternative models to connectivity, as in the Western Balkans.

From an International Political Economy (IPE) perspective, countries benefit from the presence of multiple actors thus increasing the bargaining power and local agency over norms of connectivity (Chiengkul, 2025). However, the question of who shapes these norms is central to the actual outcomes of connectivity processes. In the past, the BRI was used by national elites to serve their self-interests at the expense of marginalized groups and local communities (Adhikari, 2023). The exclusion of these groups in defining local agency left them to contest projects ex-post, i.e. after negative environmental or social consequences occurred. As such,

researchers from the field of political ecology emphasizes that the discursive construction of “green” infrastructure and its implications for power, equity, and accountability need to be taken into consideration (Harlan, 2023). When green development narratives legitimize infrastructure expansion as a universal public good, they often overlook how inequalities or environmental harm are exacerbated. The BRI’s greening policy is illustrative of this tendency: it promises cooperation and ecological civilization but often lacks the mechanisms to ensure participatory governance or equitable distribution of benefits (Geng and Lo, 2023).

3.2. Environmental Governance

The Environmental Governance approach of the BRI has thus come under major critique for being “aspirational” at best (Petkova, 2021). Given the recently adopted greening policy, the Chinese government has issued environmental policy guidelines, such as the “Guidelines for Greening Overseas Investment and Cooperation” as well as a transnational cooperation forum in collaboration with think tanks and advocacy organizations called the Belt and Road International Green Development Coalition (BRIGC) (Geng & Lo, 2022). While many studies point to the voluntary nature of guideline goals like risk prevention, sustainable trade and green finance, Geng and Lo (2023) highlight that Chinese enterprises operating in host are not the least obliged “to obey the laws and regulations of host countries, or other international organizations” (p.6) even when operating in highly sensitive environmental areas. The voluntary nature of guidelines has been reasoned with China’s foreign policy stance of “non-interference” with internal affairs. The same is expected from countries that partner with China under the BRI (Ginsburg, 2021).

However, the right to self-regulate of Chinese enterprises under these guidelines puts additional pressure on host country legislation and enforcement of environmental and permitting policies. The ability to safeguard policies may differ, especially under considerations of forgone

investment opportunities. As Brombal (2018) and Hughes et al. (2020), show, many BRI projects are implemented in states with poor public consultation mechanisms and limited environmental rights enforcement.

The importance of regulatory enforcement is highlighted by Chen's (2016) study on the comparison of Chinese-financed and European-financed wind farms in Ethiopia. The author emphasizes that the origin of investment is less determinant of development outcomes than the governance capacity of host countries. In the Ethiopian case, both Chinese (Adama) and French (Ashegoda) wind farms delivered comparable benefits in terms of environmental impact, technology transfer, and employment.

3.3. Importance of Bankability

Harlan (2020) further points to the fact that not all countries may access finance to renewables equally. He suggests that companies invested in the BRI do not want to risk loan default and are hesitant to invest in low emission infrastructure in lower-income areas where returns on investments are uncertain and there are no market mechanisms or guarantees that incentivize its development. At the same time, Chinese banks favor larger-scale installations with somewhat developed energy infrastructure (Kong & Kallagher, 2021). This bankability calculus marginalizes more context-sensitive renewable solutions in countries struggling with energy poverty and security looking to innovate energy systems (Kong & Kallagher, 2021). Given the global extent of the initiative, this conservative stance appears sensible.

The EU Global Gateway, however, pursues the involvement of the private sector through Private Public Partnerships and leveraging. "The idea is to provide government funds for Foreign Direct Investment but also encourage private sector involvement through grant financing and guarantees" (Reich, 2024, p. 57). This multi-actor approach allows for centralized planning and privately led implementation. Additionally, innovative financing mechanisms

such as blending, which combine multiple forms of funds, allow to de-risk investments that otherwise would have not been realized. Projects that are of special public added value can thus be realized even if they are otherwise deemed non-bankable (Reich, 2024).

3.4. Between Competition and Collaboration

In their own ways, the European Union and China have been at the forefront of normative leadership in global climate governance, applying their own strategic logics (non-interference vs. Western liberal interventionism) (Karjaleinen, 2023). At the core however, both actors pursue climate diplomacy based on the green growth paradigm. That is the belief that economic growth can be decoupled from carbon emissions by technological innovation. Altun and Ergenc (2023) postulate that this dynamic of ideological collaboration on the one hand and normative competition on the other drive EU – China bilateral climate relations and shape the dynamics of governance of global infrastructure development.

By stimulating debate over values, standards, and institutional models, opportunities for regulatory convergence and shared learning are created (Oertel et al. 2020). In the context of the Western Balkan, this dynamic is especially decisive. Stojanovic and Zakic (2024) find that the most determining factor in renewable energy development is the level of political affinity or distance toward China. Whether driven by pragmatism or ideological sympathy, it is the strongest determinant of project success – before legal compatibility or financial feasibility.

3.5. Summary

This literature review highlights that a) the development of renewable energy needs to be understood at the “collaboration – competition nexus”, b) environmental governance heavily relies on host country capacities for regulatory enforcement and c) that bankability and financial modalities differ among Global Gateway and BRI modalities.

At the same time, there are gaps that are not sufficiently addressed in the literature. Given the relatively recent launch of the Global Gateway, there is little research on actual cases and results of the initiative. On the other hand, literature on the BRI is abundantly available, less so however on wind and solar developments. Understandably, there are very few comparative studies that consider actual installations, especially in the renewable energy sector.

By focusing on installations at different stages of development, this research seeks to provide insights into how these two investment frameworks materialize on the ground and shape sustainability outcomes. In doing so, it contributes to both scholarly understanding and policy debates on the implementation and governance of green infrastructure in geopolitically sensitive regions.

4. Research Questions

The aim of this research is to contribute to a better understanding of how different models of foreign renewable energy investment influence the energy transition in the Western Balkans. By comparing projects financed by Chinese European state affiliated institutions the study seeks to inform policies and strategies that promote more socially equitable, environmentally sound, and procedurally transparent energy transitions. This includes identifying lessons for host country governance and potential avenues for constructive engagement between Chinese and European actors in renewable energy development.

Research Questions:

How do agencies related to the Global Gateway and Belt and Road Initiative influence the sustainability of solar and wind infrastructure projects in the Western Balkans?

Drawing from the literature, the following sub-questions are defined:

- How do differences in normative leadership impact the development of solar and wind installations in the Western Balkans?
- What governance mechanisms are applied by Chinese and European state actors in project planning and implementation, and how do these influence environmental and regulatory compliance?

- How are local communities and civil society actors engaged in the co-production or contestation of solar and wind infrastructures in relation to each financing model?

5. Research Framework

For this thesis, the 3P framework Purpose, Process, and People will be used as the core research framework. The framework originates from the conceptual synthesis of Wang et al. (2020) who identified six clusters along the 3P dimensions in the sustainability of infrastructure project management. As such, it enables a structured analysis of solar and wind infrastructures, developed either by Chinese or European state actors. These can span State Owned Enterprises³(SOEs), Development Banks or other International Financial Institutions (IFIs).

The clusters identified by Wang et al. (2020) are called: mega events, socio-economic, growth coalition, environmental licensing, tension points, and private sector. They can be used as parameters to generate a nuanced understanding of the layered and contested nature of sustainable infrastructure development. Each cluster informs one or more dimensions of the 3P model, enriching its analytical depth and ensuring its relevance for assessing the complex interplay of actors, institutions, and outcomes in infrastructure development.

5.1. Purpose: Strategic Intent and Framing

Adopted to the scope of this thesis, the Purpose dimension generates insights into the reasoning, motivations, and expectations for the development of renewable energy infrastructure. The two clusters that relate to this dimension are mega event and growth coalition.

The mega event cluster questions the symbolic and strategic ambitions behind infrastructure development. For renewable energy projects, this would mostly apply within the context of national commitments to decarbonization and flagship developments under the Global Gateway or BRI.

³ SOEs can be defined as “legally independent firms with direct ownership by the state” (Cuervo-Cazurra et al. 2014, p. 923)

On the other hand, infrastructure is often framed as a means to attract investment and private capital to stimulate economic growth and consolidate political legitimacy. The growth coalition cluster examines the stated benefit of projects undertaking such as energy security and economic modernization.

5.2. Process: Governance, Implementation, and Compliance

Through the Process dimension, procedural aspects to project planning, such as permitting, implementation and financing can be investigated. Environmental licensing and institutional tension points inform this dimension.

Environmental licensing draws attention to the need for regulatory systems and compliance procedures. This includes environmental and social impact assessments (ESIAs), permitting processes, and the enforcement of environmental laws and standards. In regions where regulatory capacities and integrity is still developing, this parameter can be used to assess whether Chinese or European developers follow domestic rules, international standards, or other guidelines.

Tension points refer to conflict governance failures such as lack of transparency, conflicts of interest, or corruption. These issues may emerge in public procurement or in the awarding of concessions. The analysis of “process” in this thesis will thus pay attention not only to formal procedures but also to their implementation and contestation.

5.3. People: Social Embedding and Distributive Outcomes

The People dimension relates to the way renewable infrastructure interacts with society and relevant stakeholders. It looks at local engagement and broader social impacts. Its primarily cluster is socio-economic.

The socio-economic cluster concerns issues such as job creation, community consultation, displacement, environmental health, and access to energy services. Essentially, it addresses equity, benefit-sharing, and social justice through involvement of local communities in planning and implementation, how grievances are addressed, and whether benefits (such as employment or access to electricity) are fairly distributed.

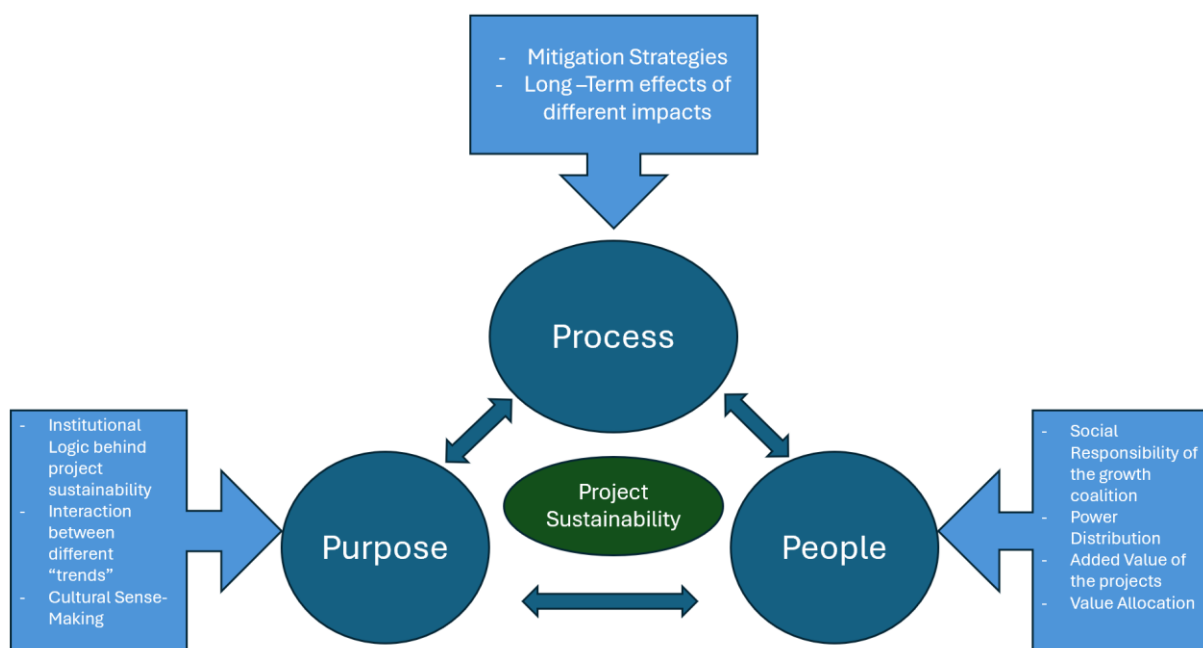


Figure 3: Research Framework adopted from Wang et al. (2020)

6. Methods

Methodologically, this study will be approached through a qualitative, comparative case analysis as described by della Porta (2012). As previously outlined, the study will be limited in location to Serbia, Bosnia and Herzegovina, and Montenegro. Given their shared historical past, socio-economic development and energy profile, the comparison is undertaken by virtue of the most-similar-systems design (della Porta, 2012).

Cases are defined as utility scale solar and wind installations that are operational, under construction or announced. Additionally, they must be either completely or co-financed and/or developed by Chinese or European affiliated state entities. This can include European Development Banks, National Development Banks of EU member states, Chinese Development Banks or State-Owned Enterprises. Projects that are exclusively developed by the private sector or those with unclear ownership structures are excluded. Cases were selected from the Global Energy Monitor (GEM) database, a publicly available repository of different global energy infrastructure projects. Out of 221 overall installations in the three countries, the relevant sample consists of 18 projects. These projects serve as units of analysis for comparison.

A commonly applied method in qualitative social science, the comparison of small-N cases is particularly suited for studying macro-institutional processes and transnational dynamics in contexts where the number of relevant cases is too limited for statistical analysis, generally between 2 and 20. Its purpose is to generate rich, contextualized insight into causal mechanisms. Della Porta (2012) describes this kind of research as “an in-depth knowledge of a small number of cases [that] provides the basis for generalizations that are temporarily limited to the cases studied and whose wider relevance should be controlled through further research.” (p. 206). Case-oriented research allows for dense narrative reconstruction, permitting the researcher to attend to the complexity and uniqueness of each case while seeking to identify patterns of

convergence and divergence across them (Smelser, 1976). Narratives are constructed in a causal-analytical manner, seeking to explain why certain patterns emerge and how they are sustained, contested, or transformed over time. It engages in what Smelser (1976) calls an “appreciative” act of understanding by looking at how different parts of each project interrelate.

By selecting units of analysis that exhibit most-similar-systems design, variance across contextual control variables is minimized so that one can better isolate the explanatory power of the independent variable i.e., the origin and nature of the foreign developers in renewables construction.

Furthermore, by using an analytical framework guiding the case study comparison, such as the above-described 3P model (Wang et al., 2020), one can ensure that the same conceptual lens is used for each case, enabling cross-case comparability without concept stretching.

6.1. Data Collection

Data was collected from different kinds of sources to build comparative narratives. Firstly, secondary literature was consulted such as project and assessment reports from consultant agencies involved in project development, evaluation reports from Development Banks and project fact sheets.

Additionally, news articles and investigative journalism in English and Bosnian language was examined, which often provided insights into local resistance, corruption allegations, or procedural irregularities.

6.2. Limitations

Notwithstanding the value that a comparative qualitative approach provides for this research question, there are limitations to the choice of design that need to be acknowledged.

Firstly, by choosing cases situated in most similar systems the generalizability of results is limited. As Przeworski and Teune (1970) argue, most similar systems are suited for developing middle-range theories, that is, explanatory models that hold for only a relatively specific domain. In this case, conclusions about the impact of Chinese versus European engagement are likely to hold only within the Western Balkan context. Thus, findings cannot be extrapolated to different contexts where background systems differ. In such cases, a most- different systems design would be more suitable (della Porta, 2012). Similarly, the research is not as sensitive to variability among actors. For example, different European Development Banks (EBRD vs. KfW) may operate under their own set of priorities or conditionalities, depending on their strategic orientation or set mandates.

Secondly, given the assumption of most similar systems, comparative analysis carries the risk of overdetermination. Even though the selected countries (Serbia, Bosnia and Herzegovina, and Montenegro) are comparable in terms of socio-political development, institutional capacities and civil society dynamics for example remain sufficiently different to as not to be able to assume that their influence in the results equals null (Dogan & Pelassy, 1990).

Lastly, while the 3P framework provides a comprehensive lens to structure the analysis, its application is not very straightforward and needs adjustments to the topic of interest. Also, since the three dimensions cannot be fully disaggregated and clusters may overlap among dimensions, the boundaries between purpose and process, or between process and people, often blur. For example, a project development justified by national climate commitments (purpose) may be closely tied to procedural intransparency (process), which in turn may influence local resistance (people). This interdependence of dimensions complicates causal attribution which needs to be considered during interpretation of the results. Especially so, since many projects do not

disclose information on all three levels of analysis due to inaccessibility of information or early project stages.

7. Results

The results will firstly be briefly described to understand the distribution of cases and their financing volumes. Then, more nuanced insights will be given to illustrate the 3P parameters comparatively by delving into cases.

7.1. Description of Results

A total of 221 wind and solar projects were identified in Serbia, BiH and Montenegro. Of them, 120 were wind projects and 99 solar installations at various stages of implementation (announced, cancelled, operating, in (pre-) construction, shelved). Less than 10% of installations were backed by Chinese or European finance. In sum 18 cases were identified that met the inclusion criteria (see Annex I). Involvement of both actors is quite evenly distributed, with 10 projects that received financial assistance from European Development Banks (EBRD, EIB and KfW) and 8 cases that had investments from Chinese State-Owned Enterprises (SOE) such as China National Technical Import & Export Corporation, Power China Resources or China North Industries Corporation (CNGC). European Banks preferred investments in wind projects (9 wind, 1 solar project) whereas Chinese investors had even distribution among types of technologies (4 projects of wind and solar respectively). At the same time, they had on average bigger plants in their portfolio than their European counterparts, especially in Serbia. Here, the average plant size was 727,5 MW for Chinese projects as compared to 106 MW for projects with European funding. Correspondingly, investment volume was the highest in Serbia, with a total of 2,5 billion EUR in Chinese compared to 536 Mio. EUR in European finance. The high share of Chinese foreign direct investment (FDI) is unsurprising as the two countries have significantly deepened economic and political ties in the past decade, with China matching European FDI stock volume since 2022 (Vladislavljiev, 2023).

In contrast, Bosnia and Hercegovina and Montenegro received more funds from European Banks as compared to China due to a larger number of projects. Out of 9 wind farms supported by the EU, 5 were built in Bosnia and Hercegovina. China on the other hand invested only in one single project in Montenegro, the Wind Farm Možura completed in 2017.

7.2. Purpose

7.2.1. Chinese Investments – Being the Biggest

In an almost symbolic manner, China is announcing and implementing wind and solar flagship projects in Western Balkan to demonstrate the seriousness with which it pursues to green the BRI. During the 2021 Central and Eastern European Countries (CEEC) online summit, China announced to fund the largest wind farm in Bosnia – the Iovik wind farm, owned and financed by a consortium of Chinese SOEs (Zvijerac, 2023). The EUR 133 mio. project was completed between 2022-2025 and has a capacity of 84 MW. It was presented as the "first fruit of cooperation" between China and Bosnia with the promise of facilitating the county's energy transformation, improve local infrastructure and fill municipal budgets. Revenue to the municipality comes mostly from concession fees paid by the investors (Zvijerac, 2023). Shortly after project completion, another "mega" project was announced by Chinese developers in BiH, namely the largest solar plant of the country at 125 MW Demand for investment in solar energy was expressed by the city of Stolac, motivated by expected 1.5-2 Mio. EUR profit in concession and utility fees. The solar parks construction is supposed to take only one year (Jowett, 2025).

Likewise, in 2024 China announced a €2 billion investment in Serbia's wind and solar industry. The Shanghai Fengling and Zijin mining companies are expected to build the largest wind farm in the region at 1500 MW and a 500 MW solar facility to decarbonize the Zijin copper mine in Bor, of which it had become a majority shareholder in 2018 and caused numerous headlines for

its severe environmental impacts in the area due to outdated infrastructure (Power Technology, 2024) . As the mine pursues to expand its operation, the announced investments to secure its own energy supply can be seen as a primarily cost-reducing measure, with the added benefit of contribution to national climate goals (Power Technology, 2024). Even more so, since the expected carbon levy (CBAM) imposed on imports to the EU would directly target carbon intensive industries such as mining and smelting from 2026 onwards (Serbia Business, 2024).

China's ambition to impress is not only limited to the regional scale. The Agrosolar project in Kula, Serbia aims to become the largest of its kind in Europe, combining agriculture and solar power production at 800 MW capacity (eKapija, 2024). For this purpose, Chinese stakeholders partnered with Italian-Serbian company Fintel Energija (eKapija, 2024). As such, Chinese investments are mainly framed as major economic and infrastructural partnerships, emphasizing capacity, speed, and strengthening of bilateral cooperation.

7.2.2. European Investments – Being the First

European projects are much less focused on economic cooperation but much more on policy alignment between host counties and EU frameworks. The Vlastic wind farm in BiH, a joint project of the EIB and KfW, highlights how energy projects are imbedded into European integration efforts and policy initiatives (WBIF, 2024a). Citing EU Ambassador Johann Sattler: *“The European Union is ready to provide financial resources and expertise to Bosnia and Herzegovina for the energy transition through the Green Agenda for the Western Balkans, the Economic and Investment Plan and the new Growth Plan, and help the energy transition. The energy transition is key to improving the quality of life in Bosnia and Herzegovina and on its path to the EU.”*(WBIF, 2024a, para.7).

This consistency in policy embeddedness is not only given on a European level but extends to the national level by ensuring alignment to support the achievement of decarbonization targets

as set out in the draft National Energy and Climate Plans of host countries. Additionally, projects funded by European financial institutions, tend to exhibit a pioneering character, not by size as do the Chinese, but by willingness to be first movers in countries with little expertise on given technologies or project development. Unsurprisingly so, since their mandate as Development Banks is to invest in projects where commercial markets would not given the high risk associated with national partners and the investment environment (Peitz, 2022).

In Bosnia, KfW implemented the first wind farm in the country with the national power utility in 2020. Given the pioneering role, authorization procedures in this sector have had to be developed and the restraint of stakeholders overcome leading to significant delays in the implementation of the project (KfW, n.d.a). The EBRD on the other hand, is especially versed in involving the private sector in the development of infrastructure projects. The Dolovo Cibuk I wind farm in Serbia was first large scale private renewable energy project in the country, further stimulating the expansion of renewable resources (EBRD, n.d.). Also, the Gračanica solar park in Bosnia has secured co-financing from the UniCredit bank in partnership with the EBRD (Jones, 2024). As such, the EBRD in particular acts as a catalyst to access domestic and foreign capital markets and enable investors to initiate projects that would otherwise be deemed unfeasible. The case of Gračanica is especially emblematic, as it is also the first project in BiH to be constructed on a brownfield site, i.e. a former coal ash landfill (Jones, 2024). Another such project had been recently constructed by KfW in cooperation with Serbia's national power utility EPS, a wind farm on a depleted open coal mine (KfW, n.d.b).

7.3. Process

7.3.1. Chinese Investments – Compliance where Necessary

The governance, implementation and compliance modalities of wind and solar installations show distinct pathways through which Chinese and European-financed projects operate. In

Serbia for example, Chinese SOE's are increasing their presence not as developers of installations, but through acquisitions of pre-permitted, "ready-to-build" (RtB) stage wind power projects (Velimirović, 2023). By doing so, regulatory hurdles have already been cleared, such as land lease, grid access and building permits (Velimirović, 2023; Grbović, 2023). Essentially, it is a way to streamline project entry to focus on implementation while also securing market share.

Processes like these have taken place from 2023 onwards, such as the majority stake acquisition of 300 MW wind farm project Vetrozelena by PowerChina. It is (again) the largest acquisition of a Serbian renewable project to date. The project had secured or was in the process of securing all land rights and permits, including environmental, prior to purchase (Grbović, 2023). Likewise, in December 2023, a joint venture between China National Technical Import and Export Corporation (CNTIC) and Shanghai Electric Power & Energy Development Limited (SEP) acquired 100% stake of Crni Vrh Power d.o.o., which was developing a 150 MW wind farm in eastern Serbia, in proximity to the Zijin copper mine in Bor. Crni Vrh was also a RtB project, and the buyers gained access to a fully permitted site that included 28 turbine locations across three municipalities (Velimirović, 2023).

At the same time, the Chinese turbine manufacturer Zhejiang Windey has gained significant ground in Serbian wind energy procurement. In 2023, Windey was selected to supply two major portfolios by Fintel Energija—the Serbo-Italian company partnering with Power China on the Agrosolar farm—as the preferred supplier for two major wind portfolios: the 854 MW Maestrale Ring project and five additional wind farms (Košava 2, Kula 2, Kula 3, Kula 4, and Ram) totaling 110 MW. In addition to the procurement of turbines, the agreements also include 10-year service and maintenance contracts (Todorović, 2023).

These developments, however, are particular to the Serbian-Chinese dynamic and unfold differently in Bosnia or Montenegro for example. Early Chinese investments took place in Montenegro between 2017 and 2019, when the Možura wind farm was constructed under the BRI through the joint venture of Malta Montenegro Wind Power JV Limited and Enemalta, contracting Shanghai Electric Power Engineering Montenegro LLC with the construction of the 46 MW project. It was agreed to lease the land for a period of 20 years to the developers after which it will change ownership to the state. Until then the developers pay an annual concession fee of EUR 186,057 while the state, in an aim to incentivize the project, pays a fixed feed-in tariff of EUR 95.99/MWh over the first 12 years of the project's lifespan (AidData, n.d.).

While the project was formally a success given its timely completion, the Možura project turned out to be deeply entangled in international corruption scandals, raising serious questions about the integrity of procurement and investment processes. Investigative reporting revealed that the project was linked to an offshore company registered in the United Arab Emirates, which earned an undisclosed profit of EUR 4.6 million from the sale of an equity stake in the Možura Wind Park to Enemalta before the construction of the project began (AidData, n.d.). The Maltese journalist investigating the case, Daphne Caruana Galizia, was murdered in 2017. In 2020, the European Union requested the state of Montenegro to investigate the case, which is still ongoing in 2025. The subsidies given through the feed-in scheme will amount to over €115 mio., while the contract value was €90 mio (AidData, n.d.). Since then, China has not been engaged in any other renewable energy projects in the country.

In Bosnia and Herzegovina, regulatory loopholes and political complexities on the state level have opened the door for widespread abuse of the system, including from Chinese investors. Such as in the case of the Ivovik wind farm, where the sale and upsale of concessional rights has sparked disputes over land ownership. The wind farm stretches over two municipalities,

which handled the registration of ownership differently (Zvijerac, 2022). While in Tomislavgrad, ownership was automatically retained and compensation issued from the developers, in the municipality of Livno, land that was not re-registered was seized. This inconsistency arises from different cantonal laws that take precedence over federal law in Bosnia (Zvijerac, 2022).

Furthermore, without specific agreements such as Power Purchase Agreements (PPA) between producers and buyers, specifying the price and duration power supply to the national grid, Chinese companies are free to channel electricity to preferred off-takers for the duration of their concessions, usually 30 years (Šabanović, 2024). As such, power may be sold directly to local heavy industries or exported to markets in Croatia and Western Europe where they can fetch much higher prices than in the national grid. By bypassing the public energy system, the availability of affordable green electricity to local populations is limited (Šabanović 2024). Without stronger regulation, renewable resources are extracted for foreign benefit without securing domestic energy needs or public returns.

7.3.2. European Investments – The Benefit of Technical Assistance

European public financial institutions favor governance models anchored in procedural accountability resulting in additionality of the project to the client, i.e. an added benefit or impact that is not available from commercial sources (Reich, 2024). Projects funded by the EBRD, KfW, or EIB typically undergo multi-stage due diligence, environmental and social impact assessments (ESIA) and action plans, public tendering processes, and transparency mechanisms that lengthen development timelines but enhance regulatory legitimacy by obliging European standards (Jahns et al., 2020). To do so, all projects receive grants for technical assistance (TA) which facilitate the transfer, mobilization, and use of services for carrying out policy studies, supporting project preparation and implementation as well as

enhancing human and institutional capabilities. In the case of wind and solar projects, these TA funds can be used to commission feasibility studies, ESIA's and drafts for installation design (Delivorias, 2025). On an institutional level, technical assistance measures have been used by the EBRD to successfully implement a central auction mechanism with the Serbian Ministry of Energy and Mining through which installation capacities for wind and solar are allocated in the most cost-effective manner (Spasić, 2025). This way, TA can be used to retain knowledge and build local capacities. However, when it comes to procurement of equipment and consulting services, Chinese as well as EU developers prefer to rely on domestic companies such as Windey or Siemens Gamesa respectively.

Coming back to the Mesihovina wind farm, the first one in Bosnia funded with loans from KfW. As a pioneering effort, the project demonstrated the promise and the procedural hurdles of EU-financed renewable energy infrastructure. Since the project underwent the first full application of permitting and authorization procedures for wind energy in BiH, significant delays due to the novelty of the procedures and hesitancy from approval bodies incurred (KfW, n.d.a). On the other hand, however, this procedure also generated substantial learning effects among stakeholders. As such, the executing agency (state utility EP-HZHB) reported improvements in understanding legal obligations, documentation standards, and procedural requirements (KfW, n.d.a). These learnings have since been shared informally and incorporated into future planning processes, including for follow-up projects developed by the state utility such as in Podveležje (KfW, n.d.a). The project also led to efficiency gains on the side of state authorities, which arguably benefit private and public investors alike.

Operationally, the wind farm belongs to the national power utility which ensures national supply. Additionally, the utility is able to sell electricity abroad to generate revenues, with export prices of up to EUR 400–500 per MWh, compared to EUR 43–63 per MWh on the domestic grid. The project is also used as a demonstration site for regular study visits from

students, professionals, and international observers. These interactions reinforce capacity-building and ensure that technical and procedural lessons are broadly disseminated (KfW, n.d.a).

7.4. People

7.4.1. Chinese Investments – Keeping Silent

Lastly, the social-environmental dimension of renewable energy development reveal contrasts between European and Chinese-backed projects in the Western Balkans. In Chinese-financed developments, local resistance is often met with institutional silence due to procedural intransparency. In the recently commenced Stolac solar project in Bosnia and Herzegovina, citizens expressed their dissatisfaction over changes made to the spatial plan that way amended during the COVID-19 pandemic, effectively excluded any public participation on the matter (Bačić, 2025). These changes led to the repurposing of 1200 hectares of state land for business use. Additionally, insufficient studies on environmental and waste management were approved by the local authorities which are not specific to the project, its implications or site conditions (Bačić, 2025). The initiative "Za Komanje Brdo" has therefore persistently raised concerns about a lack of transparency, disregard for environmental laws, and the absence of meaningful public consultation (Bačić, 2025). While the developers claim legal compliance and promise jobs and strategic value, residents assert that the project was imposed against their will. Despite formal complaints and public outcry, construction has gone ahead, demonstrating the limited reach of grievance mechanisms and the sidelining of affected communities in the planning process (Jowett, 2025).

At the same time, municipalities with high potential for wind and solar are especially keen on attracting investment to the region given the potential revenue for municipalities through concession fees of 2-2.5% of annual production, VAT, other taxes, fees, and contributions (Bačić, 2025).

7.4.2. European Investments – Not without Flaws

Although European-financed projects are not immune to controversy, they tend to have more robust grievance mechanisms in place. The Poklečani Wind Farm in Bosnia and Herzegovina is a EIB funded project, located near ecologically sensitive areas and sites with cultural and historical heritage such as the Blidinje Nature Park and the Duvanjsko Polje (Ralev, 2024). Due to this ecological value, residents protested the clearing of 350.000 m² of forests. Despite the site's significance, it had been exempted from conducting a full EIA by the Federation of BiH authorities, a decision which was later challenged in court by the Aarhus Centre Sarajevo and lead to the annulation of the urban permit and thus interrupted any further implementation of the installation (Ralev, 2024). It is unclear why the EIB did not adhere to its internal regulation on conducting the necessary ESIA as regulated in European Law.

Similar tensions unfolded at the Krnovo Wind Farm in Montenegro. Here, landowners protested unresolved compensation claims against the EBRD and KfW, arguing that the fee of EUR 0.50 per square meter fell far below what was mandated by law (ISSP, n.d.).

These dynamics point to a recurring issue, while European frameworks offer procedural safeguards and perform institutional accountability through grievance mechanisms, their enforcement can be inconsistent and dependent on local governance capacity. The degree to which these frameworks can compensate for host country governance shortcomings remains an issue for debate.

8. Discussion

The discussion will first summarize the main findings of the research and highlight its relevance to the research question. Findings will be interpreted and contrasted with other relevant literature to discuss their relevance and implications. Lastly, limitations are acknowledged and recommendations for future research are given.

8.1. Summary of Results

The analysis of cases along the 3P framework revealed noteworthy relationships and patterns. The Purpose dimension showed that Chinese investors prefer to fund on average larger installations for both, solar and wind technologies, while also implementing them at remarkable speed. The objective of cooperation is mainly economic nature, emphasizing the synergies of cooperation for municipal development and public service. However, we also find that investments are embedded in broader strategic considerations of the BRI. In Serbia, where Chinese SOE's acquired a number of mining enterprises, renewables are developed to reduce operational cost by supplying energy directly, thereby further bundling competencies and gaining operational autonomy.

Projects funded under the Global Gateway, however, exhibit a strong degree of vertical integration along multiple scales of energy and climate policy frameworks. Implementing agencies such as EIB or KfW purposefully enter markets where little-to-no-experience in project development exists to facilitate institutional learning and de-risk investments. These partners are not only pioneers in market entry, but also for deployment of unconventional and challenging installation areas such as on brownfields.

As such, one can assume that the engagement of European actors also facilitated the entry of Chinese developers that are traditionally more concerned with the bankability of a project rather than their spill-over effects.

In contrast to the purpose dimension, processes are shaped to a large degree by bilateral relations between states. Recently, the acquisition of wind parks which already passed permitting procedures and securing large procurement orders have been observed in the Sino-Serbian relationship. This development appears to be part of a larger acquisition strategy observed all over Europe in wind, solar and grid systems. Socour (2025) sees Beijing's strategy beyond investment, but to access markets and benefit from opportunities of technology transfer.

We also find that China tends to develop projects themselves or in cooperation with private sector actors from Europe. European Development Banks on the other hand mainly partner with national power utilities. While Chinese SOEs secure long-term energy supply contracts through concessions paired with favorable feed-in tariffs, European actors channel finance through loans and grants. In turn, they do not have a stake once projects become operational so that the utility has autonomy over the project and revenues.

Here we also have to consider spillover effects that can be attributed to European involvement. Development Banks not only loan money but also provide technical assistance for the creation of market mechanism as was the case for Serbia's auctioning scheme through which renewable installation quotas are allocated (Pajic, 2024). This created favorable market pull effects, through subsidies, feed-in tariffs, and guaranteed purchase agreements that Chinese SOEs capitalized on. Paired with the long-standing Sino-Serbian friendship, this situation created the ideal investment opportunity for Chinese developers, reflected in their overwhelming market share. In fact, Fenkart (2021) highlights that China does not oppose the EU-path of the Western

Balkans since it benefits from the stability created by the EU prospect, important for Chinese investments.

On the contrary, Montenegro does not seem to engage much in joint energy projects. Following tense relations regarding the loan and construction of the road between Bar and Boljare as well as major corruption incidents in the aftermath of the Možura wind farm, Montenegro has focused on keeping relations with European partners (Stojadinovic, 2023).

Furthermore, European funded projects include mechanisms for transparent and competitive procurement, legal appeal and grievance mechanism, when Chinese-backed initiatives often proceed in the face of social resistance with minimal institutional recourse as seen in Bosnia. This reflects broader differences in the underlying governance approaches of the two actors. The EU's emphasis on participatory development and legal compliance contrasts with China's non-interference stance and preference for streamlined implementation (Vulovic, 2023). This finding strongly aligns with the findings of Chen (2016) who argues that sustainability outcomes are mainly shaped by host country's governance capacity. In the case of Bosnia, the lack of governance capacity is partially mitigated by the strong engagement of civil society and local interest groups that challenge procedural injustices.

8.2. Sustainability Implications

The sustainability implications of Chinese vis a vis European renewable energy investment in the Western Balkans reflect the growing strategic presence of both actors, aiming to accelerate the region's energy transition and introducing new geopolitical dynamics.

8.2.1. Environmental Compliance

Despite China's formal adoption of green investment principles under its Belt and Road Initiative, i.e. the Guidelines for Greening Overseas Investment and Cooperation, we find no evidence that supports its application in any of the given cases. As such, the adherence to these standards remains largely declarative. European-backed projects for example did publish EIAs and other consulting reports accessibly and their impacts were reported on, however there was no reference to any environmental and social standards applied consistently across BRI-related renewable energy developments. While China positions itself as a climate leader and supplier of green technologies, its overseas engagements are not governed by binding environmental compliance mechanisms.

8.2.2. Corrosive Capital

CIPE (2018) refers to the type of investment originating from authoritarian regimes and weakening the institutions of fragile or transitioning democracies “corrosive capital”. Essentially, financing that lacks transparency, accountability, and market orientation. The term captures a spectrum of effects, from tolerating corruption to explicitly advancing geopolitical agendas, with democratic erosion as a possible outcome. Cases like the Možura wind farm in Montenegro or the Iovik wind farm in Bosnia underline the potential for “corrosive capital” by Chinese investors.

In Bosnia and Herzegovina, this has even led to concerns of undermining nation building efforts, as the Chinese investors stepped into funding projects that have been cancelled by European counterparts as sanctioning measures for separatist movements in Bosnia’s Republika Srpska (Balkan Green Energy News, 2022). An entity often seen as politically closer to Serbia and more amenable to Chinese interests. This shows that the provision of alternative financing channels does weaken the effectiveness of EU conditionality mechanisms.

8.2.3. Energy Colonialism

In Bosnia, where energy poverty is high and security of supply not steady, Šabanović (2024) points to the “devastating consequences of what could be seen as a potentially criminal process of granting concessions for the construction of large solar and wind power plants.” (para. 5), where investments are undertaken at the cost of local communities. Questioning aspects of distributive justice, such as the fair allocation of benefits and accessibility to resources she concludes that “electricity produced will not contribute to the public supply at favorable rates for citizens; instead, it will be sold where profits are maximized. Consequently, valuable and location-limited resources are effectively given away for criminally low concession fees, without improving the security of energy supply for citizens.” (para. 8). This, however, only applies to a concession-based model of supply without set Power Purchase Agreements, highlighting the impact corrosive capital can furthermore have in fragile and low governance states such as Bosnia and Hercegovina. The analysis of claims on energy colonialism deserves more attention, as it demands understanding a “multiscalar phenomenon that manifests as power over energy transition processes, as an epistemic force influencing knowledge orders and knowledge transfer, and as an intervention on an individual scale, affecting livelihoods and human–nature relations.” (Müller 2024, p. 708).

8.2.4. Policy Coordination

Lastly, this research supports the finding of Zhang (2022) in their analysis of the role of development banks in climate finance, which goes beyond resource mobilization towards policy coordination. European examples have shown how financial flows can align with national and international climate policies by providing expertise, reducing policy gaps and facilitating learning. The proximity of Development Banks to local markets and political systems enable them to effectively align renewable energy investment with long-term sustainability goals.

8.3. Limitations

The scope of this research is not able to sufficiently cover the entire extent of market and stakeholder behavior in the renewable energy sector in the Western Balkans. As mentioned, the results only include less than 10% of all prospective installations in the Western Balkans. Yet, the region is attracting more and more foreign investment. Other prominent actors include Saudi Arabia and Turkey. At the same time, this research does not sufficiently touch upon private market dynamics, which most of these actors are involved in. As such, only a very limited view of overall developments is portrayed in this research. In addition, most installations are in very early stages of development and have not even commenced construction. This limits the overall generalizability of results.

8.4. Future research

In light of dynamic market developments, future research can delve into the role-model function that Chinese vis a vis European investments have. How are governance models copied, or new ones developed? How is compliance with national legislation structured or contested in the private domain?

Müller (2024) also highlights the novelty of the research field of energy colonialism that can be further explored in the Balkans or by tracing BRI activities elsewhere to generate insights into this field of research.

9. Conclusion

This thesis addressed the question of how agencies related to the Global Gateway and Belt and Road Initiative influence the sustainability of solar and wind infrastructure projects in the Western Balkans. The utilization of the 3P framework has been useful in comparing Chinese and European approaches to financing and implementing solar and wind projects. Findings of the study highlight differences in terms of procedural standards, stakeholder involvement and benefit sharing that informed overall sustainability implications.

On the one hand, Chinese investments have accelerated the deployment of wind and solar energy across the region. By engaging in especially large projects that are implemented fast and flexibility, Chinese investors gain geopolitical appeal. However, these benefits come with trade-offs: undisclosed financing practices, weak environmental safeguards, and a tendency to bypass participatory mechanisms raise concerns about undermining governance as well as weakening EU conditionality mechanisms. These trade-offs are best termed “corrosive capital”, which captures the risks associated with such investment flows, especially in fragile democratic contexts.

On the other hand, EU-financed projects tend to impose more rigorous environmental and social standards and knowledge transfer but often suffer from procedural inertia and slow delivery.

Importantly, the thesis shows that outcomes are not entirely determined by the origin of capital, but by the interaction between external actors, civil society and domestic institutions. Host-country bargaining power, mobilization of civil society, and regulatory capacity play a decisive role in shaping the developmental and environmental outcomes of renewable energy projects.

At the same time, the dependencies of EU-China relations unfold in the region. Where the EU invests in de-risking market entry of renewable energy technologies and market reform agendas, China benefits from its spill-over effects in terms of bankability of its own projects.

Against the backdrop of rising geopolitical rivalry between the EU and China, the governance of green infrastructure is becoming a key site of both normative competition and climate policy convergence. For the Western Balkans, the central challenge is to navigate external pressures and demands while ensuring that their renewable energy transitions are not only fast and ambitious, but also equitable, transparent, and locally accountable.

10. Sources

Adhikari, M. (2023). The BRI as an iterative project: Influencing the politics of conflict-affected states and being shaped by the risks of fragile settings. *Journal of Contemporary China*, 33(150), 971-986. <https://doi.org/10.1080/10670564.2023.2238630>

AidData. (n.d.). China Global Development Dashboard. Retrieved May 28, 2025, from <https://china.aiddata.org/projects/95399/>

Altun, S., & Ergenc, C. (2023). The EU and China in the global climate regime: A dialectical collaboration-competition relationship. *Asia Europe Journal*, 21(3), 437-457. <https://doi.org/10.1007/s10308-023-00664-y>

Amahkekaj, G., Qehaja, D., & Gara, A. (2024). The Role of Institutions in Energy Transition and Economic Growth in West Balkan Countries. *Институт за икономически изследвания при Българска академия на науките*, (3), 18-45. <https://www.cceol.com/search/article-detail?id=1231072>

Balkan Green Energy News. (2022, April 22). *Germany to suspend financing for wind farm Hrgud, other projects*. Retrieved June 4, 2025, from <https://web.archive.org/web/20240327063742/https://balkangreenenergynews.com/germany-to-suspend-financing-for-wind-farm-hrgud-other-projects-in-republic-of-srpska/>

Bačić, N. (2025, March 27). *ŠTO se krije iza SOLARA u STOCU Prodali državno zemljište I grade solare, a građane ništa nisu Ni pitali*. Vijesti Hercegovina.Info. Retrieved June 1, 2025, from <https://www.hercegovina.info/vijesti/bih/sto-se-krije-iza-solara-u-stocu-prodali-drzavno-zemljiste-i-grade-solare-a-gradjane-nista-nisu-ni-pitali/236773/>

Bechev, D. (2023). *Energy in the Western Balkans*. The Balkans in Europe Policy Advisory Group. <https://www.biepag.eu/publication/energy-in-the-western-balkans>

Bilal, S., & Klasen, A. (2025). *Scaling up Global Gateway: Boosting coordination in development and export finance*. ecdpm. <https://ecdpm.org/application/files/2317/4040/6040/Scaling-Up-Global-Gateway-Boosting-Coordination-Development-Export-Finance-ECDPM-Discussion-Paper-385-2025.pdf>

Brombal, D. (2018). Planning for a Sustainable Belt and Road Initiative (BRI): An Appraisal of the Asian Infrastructure Investment Bank (AIIB) Environmental and Social Safeguards. In: Shan, W., Nuotio, K., Zhang, K. (eds) *Normative Readings of the Belt and Road Initiative*. Springer, Cham. https://doi.org/10.1007/978-3-319-78018-4_7

Cantone, S. (2025, May 12). *Albania and Montenegro could join the EU before others, costa says*. euronews. Retrieved May 14, 2025, from <https://www.euronews.com/my-europe/2025/05/12/western-balkans-how-albania-and-montenegro-could-join-the-eu-before-the-others>

Center for International Private Enterprise. (2023, September 18). *Channeling the tide: Protecting democracies amid a flood of corrosive capital*. Retrieved June 3, 2025, from <https://www.cipe.org/resources/channeling-the-tide-protecting-democracies-amid-a-flood-of-corrosive-capital/>

- Chen, Y. (2016). A Comparative Analysis: The Sustainable Development Impact of Two Wind Farms in Ethiopi. *China Africa Research Initiative (CARI), School of Advanced International Studies (SAIS), Johns Hopkins University*. <https://www.econstor.eu/bitstream/10419/248135/1/sais-cari-wp07.pdf>
- Chiengkul, P. (2025). Towards a greener BRI? Critical IPE, the Belt and Road initiative, and renewable energy transitions. *Australian Journal of International Affairs*, 79(3), 385-405. <https://doi.org/10.1080/10357718.2025.2482719>
- Csapó, D. G. (2020). Chinese backed energy projects in the Western Balkans: where supply and demand could meet. *Romanian Journal of European Affairs*, 20(2), 100-119. https://rjea.ier.gov.ro/wp-content/uploads/2020/12/RJEA-vol-20-no-2_Dec-2020_articol-8.pdf
- Cuervo-Cazurra, A., Inkpen, A., Musacchio, A., & Ramaswamy, K. (2014). Governments as owners: State-owned multinational companies. *Journal of International Business Studies*, 45(8), 919-942. <https://doi.org/10.1057/jibs.2014.43>
- Curran, K. (2021, March 24). *Is China a sustainable partner on issues of environmental sustainability? – chinaobservers*. ChinaObservers. Retrieved May 8, 2025, from <https://chinaobservers.eu/is-china-a-sustainable-partner-on-issues-of-environmental-sustainability/>
- Delivorias, A. (2025). *EU energy relations with the Western Balkans*. [https://www.europarl.europa.eu/RegData/etudes/BRIE/2025/769552/EPRS_BRI\(2025\)769552_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2025/769552/EPRS_BRI(2025)769552_EN.pdf)
- EBRD. (n.d.). *Dolovo Cibuk I wind farm*. Retrieved June 2, 2025, from <https://www.ebrd.com/home/work-with-us/projects/psd/43764.html>
- EKapija. (2024, December 6). *First agri-solar project in Balkans to be located in Serbia – Agricultural fields in Kula to produce electricity on over 700 ha*. Retrieved May 23, 2025, from <https://www.ekapija.com/en/news/4977630/first-agri-solar-project-in-balkans-to-be-located-in-serbia-agricultural>
- European Commission. (2020). *Guidelines for the Implementation of the Green Agenda for the Western Balkans* (COM(2020) 641 final). https://enlargement.ec.europa.eu/system/files/2020-10/green_agenda_for_the_western_balkans_en.pdf
- European Commission. (n.d.). *Overview - Instrument for pre-accession assistance*. Enlargement and Eastern Neighbourhood. Retrieved May 14, 2025, from https://enlargement.ec.europa.eu/enlargement-policy/overview-instrument-pre-accession-assistance_en
- Fenkart, S. (2021, March 25). *China's influence in the western Balkans: Partnership or confrontation?* Institute of New Europe. Retrieved June 2, 2025, from <https://ine.org.pl/en/chinas-influence-in-the-western-balkans-partnership-or-confrontation/>
- Frey, B. (2024). *The Energy Transition in the Western Balkans: The Status Quo, Major Challenges and How to Overcome them*. wiiw. <https://wiiw.ac.at/the-energy-transition-in-the-western-balkans-the-status-quo-major-challenges-and-how-to-overcome-them-dlp-6896.pdf>
- Gamez, A., & Kozybay, Z. (2024). *A Race to the Top 2024: Western Balkans*. Global Energy Monitor, REScoop.EU, CEE Bankwatch Network. <https://bankwatch.org/wp-content/uploads/2024/07/GEM-WesternBalkans-wind-solar-report-2024.pdf>

Geng, Q., & Lo, K. (2022). China's green Belt and Road initiative: Transnational environmental governance and causal pathways of orchestration. *Environmental Politics*, 32(7), 1163-1185. <https://doi.org/10.1080/09644016.2022.2156176>

Geng, Q., & Lo, K. (2023). Global ecological civilization: An analysis of macro-level policies of the Belt and Road initiative. *Research in Globalization*, 7, 100141. <https://doi.org/10.1016/j.resglo.2023.100141>

Ginsburg, T. (2021). The BRI, Non-Interference, and Democracy. *Harvard International Law Journal*, 62. <https://journals.law.harvard.edu/ilj/wp-content/uploads/sites/84/BRI-Non-interference-and-Democracy-Ginsburg.pdf>

Grbović, R. (2023, November). *Kinstellar advises PowerChina on the acquisition of a 300 MW wind farm in Serbia (Detail) - Kinstellar*. www.kinstellar.com. Retrieved June 1, 2025, from <https://www.kinstellar.com/news-and-insights/detail/2481/kinstellar-advises-powerchina-on-the-acquisition-of-a-300-mw-wind-farm-in-serbia>

Guasch, J. L., & Glaessner, T. (1993). Using auctions to allocate and price long-term credit. *The World Bank Research Observer*, 8(2), 169-194. <https://doi.org/10.1093/wbro/8.2.169>

Harlan, T. (2020). Green development or greenwashing? A political ecology perspective on China's green Belt and Road. *Eurasian Geography and Economics*, 62(2), 202-226. <https://doi.org/10.1080/15387216.2020.1795700>

Hochberg, M. (2024, September 27). *Renewables offer opportunity in the western Balkans. But challenges remain*. Atlantic Council. Retrieved May 11, 2025, from <https://www.atlanticcouncil.org/blogs/energysource/renewables-offer-opportunity-in-the-western-balkans-but-challenges-remain/>

Hughes, A. C., Lechner, A. M., Chitov, A., Horstmann, A., Hinsley, A., Tritto, A., ... & Yu, D. W. (2020). Horizon scan of the belt and road initiative. *Trends in Ecology & Evolution*, 35(7), 583-593.

Institute for Strategic Studies and Prognosis (ISSP). (n.d.). *Krnovo Wind Farm: Pilot case analysis*. Interereg. https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://keep.eu/api/project-attachment/36301/get_file/&ved=2ahUKEwi7t_3P7eGNAXd_7sIHUOgL1wQFnoECCMQAQ&usg=AOvVaw1p_I8iIDNbDB46AATIPyKf

Jahns, H., Emmerich, M., Stojiljkovic, M., Jelisic, S., Rink, S., & Löffler, K. (2020). *Greening BRI Projects in the Western Balkan Countries*. Frankfurt School. https://www.fs-unep-centre.org/wp-content/uploads/2020/11/2020-11-02_FS-UNEP-Centre_Greening-BRI-projects-in-Western-Balkan-Countries_study.pdf

Jones, C. (2024, August 29). *EBRD arranges €40.1m financing towards Bosnia and Herzegovina's green transition*. Construction Briefing. Retrieved June 1, 2025, from <https://www.constructionbriefing.com/news/ebd-arranges-401-million-financing-towards-bosnia-and-herzegovinas-green-transition/8038910.article>

- Jowett, P. (2025, May 21). *Bosnia and Herzegovina breaks ground on 125 MW solar plant*. pv magazine. Retrieved May 19, 2025, from <https://www.pv-magazine.com/2025/05/21/bosnia-and-herzegovina-breaks-ground-on-125-mw-solar-plant/>
- Karjalainen, T. (2023). European norms trap? EU connectivity policies and the case of the global gateway. *East Asia*, 40(3), 293-316. <https://doi.org/10.1007/s12140-023-09403-x>
- KfW. (n.d.a). *Ex-post evaluation: Mesihovina wind farm, Bosnia-Herzegovina*. https://www.kfw-entwicklungsbank.de/PDF/Evaluierung/Ergebnisse-und-Publikationen/PDF-Dokumente-A-D_EN/BosnienH_Mesihovina_2022_E.pdf
- KfW. (n.d.b). *Erneuerbare Energien Projekt Kostolac*. Retrieved June 3, 2025, from <https://www.kfw-entwicklungsbank.de/ipfz/Projektdatenbank/Erneuerbare-Energien-Projekt-Kostolac-30362.htm>
- Kong, B., & Gallagher, K. P. (2021). Inadequate demand and reluctant supply: The limits of Chinese official development finance for foreign renewable power. *Energy Research & Social Science*, 71, 101838. <https://doi.org/10.1016/j.erss.2020.101838>
- Ministry of Mining and Energy. (2023, April 29). *Law on amendments to the law on the use of RES adopted*. mre.gov.rs. Retrieved May 13, 2025, from <https://mre.gov.rs/vest/en/233/law-on-amendments-to-the-law-on-the-use-of-res-adopted-.php>
- Morina, E., & Popov, J. (2024, December 23). *Balka-seltzer: How to avoid excess gas in the western Balkans*. ECOR. Retrieved May 28, 2025, from <https://ecfr.eu/publication/balka-seltzer-how-to-avoid-excess-gas-in-the-western-balkans/>
- Müller, F. (2024). Energy colonialism. *Journal of Political Ecology*, 31(1). <https://doi.org/10.2458/jpe.5659>
- Nikjow, M. A., Liang, L., Qi, X., & Sepasgozar, S. (2021). Engineering procurement construction in the context of Belt and Road infrastructure projects in West Asia: A SWOT analysis. *Journal of Risk and Financial Management*, 14(3), 92. <https://doi.org/10.3390/jrfm14030092>
- Oertel, J., Tollmann, J., & Tsang, B. (2025, May 19). *Climate superpowers: How the EU and China can compete and cooperate for a green future*. ECFR. Retrieved May 26, 2025, from <https://ecfr.eu/publication/climate-superpowers-how-the-eu-and-china-can-compete-and-cooperate-for-a-green-future/#the-changing-narrative-on-eu-china-relations>
- Pajic, J. (2024, November 27). *Serbia launches second renewables auction with EBRD support*. EBRD. Retrieved May 8, 2025, from <https://www.ebrd.com/home/news-and-events/news/2024/serbia-launches-second-renewables-auction-with-ebrd-support.html>
- Pavlaković, B., Okanovic, A., Vasić, B., Jesic, J., & Šprajc, P. (2022). Small hydropower plants in western Balkan countries: Status, controversies and a proposed model for decision making. *Energy, Sustainability and Society*, 12(1). <https://doi.org/10.1186/s13705-022-00335-7>
- Pelitz, L. (2022). *Multilateral Development Banks Mission, Business Model, Financial Management*. Hertie School. <https://opus4.kobv.de/opus4-hsog/frontdoor/deliver/index/docId/4656/file/Pelitz-2022-MDBs.pdf>
- Petkova, M. (2021, November 26). *High ambitions but no teeth in China's environmental guidelines for investing abroad – chinaobservers*. ChinaObservers. Retrieved May 23, 2025, from

<https://chinaobservers.eu/high-ambitions-but-no-teeth-in-chinas-environmental-guidelines-for-investing-abroad/>

Porta, D. D. (2012). Comparative analysis: Case-oriented versus variable-oriented research. *Approaches and Methodologies in the Social Sciences*, 198-222. <https://doi.org/10.1017/cbo9780511801938.012>

Power Technology. (2024, January 29). *Serbia gains \$2.2bn renewables investment commitment*. Retrieved May 16, 2025, from <https://www.power-technology.com/news/serbia-2-18bn-renewables-investment-china/>

Przeworski, A., Teune, H. (1970). *The Logic of Comparative Inquiry*. Wiley-Interscience.

Ralev, A. (2024, June 19). *Poor planning by the European investment bank puts at risk one of the largest wind energy projects in the western Balkans*. Bankwatch. Retrieved May 21, 2025, from <https://bankwatch.org/blog/poor-planning-by-the-european-investment-bank-puts-at-risk-one-of-the-largest-wind-energy-projects-in-the-western-balkans>

Reich, M. (2024). China's state capitalism and international responses: A comparative analysis of infrastructure investment strategies. *Asian Perspective*, 48(1), 41-69. <https://doi.org/10.1353/apr.2024.a919881>

Ruiz, P., Medarac, H., Sommers, J., & Mandras, G. (2021). *Recent trends in coal and peat regions in the western Balkans and Ukraine*. European Commission. <https://op.europa.eu/en/publication-detail/-/publication/805def66-315a-11ec-bd8e-01aa75ed71a1/language-en>

Serbia Business. (2024, February 7). *In the previous year, 2,400 Serbian companies exported CBAM goods to the EU*. Retrieved May 29, 2025, from <https://serbia-business.eu/in-the-previous-year-2400-serbian-companies-exported-cbam-goods-to-the-eu/>

Shopov, V. (2021, April 7). *Serbia turns multi-vector foreign policy into development model... with China's help – chinaobservers*. ChinaObservers. Retrieved May 8, 2025, from <https://chinaobservers.eu/serbia-turns-multi-vector-foreign-policy-into-development-model-with-chinas-help/>

Soceur, O. (2025, April 21). *Chinese investments in Europe's energy sector creates risk*. 3GIMBALS. Retrieved June 2, 2025, from <https://3gimbals.com/insights/chinese-investments-in-european-energy-infrastructure-threaten-long-term-strategic-stability/>

Smelser, N. (1976). *Comparative Methods in the Social Sciences*. Englewood Cliffs, N.J., Prentice-Hall.

Spasić, V. (2020, December 15). *Renewables share in WB6 is still only at around 6% of installed electricity generation capacity*. Balkan Green Energy News. Retrieved May 8, 2025, from <https://balkangreenenergynews.com/renewables-share-in-wb6-is-still-only-at-around-6-of-installed-electricity-generation-capacity/>

Spasić, V. (2025, February 24). *Serbia allocates entire quota at second auctions, investors to install 645 MW of wind, solar*. Balkan Green Energy News. Retrieved May 8, 2025, from <https://balkangreenenergynews.com/serbia-allocates-entire-quota-at-second-auctions-investors-to-install-645-mw-of-wind-solar/>

Stojadinovic, S. (2023) Political and financial conditions for infrastructure investments of China and EU in the Western Balkan countries. In: Andrea, B. and Brian F. G. Fabrègue. (eds) *The Dragon at the*

Gates of Europe: Chinese Presence in the Balkans and Central-Eastern Europe. Blue Europe, ISBN: 979-8989739806.

Todorović, I. (2023, March 22). *Fintel selects Windey as preferred supplier for giant wind park in Serbia*. Balkan Green Energy News. Retrieved May 26, 2025, from <https://balkangreenenergynews.com/fintel-selects-windey-as-preferred-supplier-for-giant-wind-park-in-serbia/>

UNEP. (n.d.). *Sustainable Infrastructure Investment*. Retrieved May 8, 2025, from <https://www.unep.org/explore-topics/green-economy/what-we-do/sustainable-infrastructure-investment#:~:text=Green%20Economy,-Why%20does%20green&text=Sustainable%20infrastructure%20systems%20are%20those,the%20entire%20infrastructure%20life%20cycle>

Urhová, D. (2025, April 23). *Poor man's BRI: The global gateway as a strategic tool? – chinaobservers*. ChinaObservers. Retrieved May 12, 2025, from <https://chinaobservers.eu/poor-mans-bri-the-global-gateway-as-a-strategic-tool/>

Velimirović, M. (2023, December). *Kinstellar advises Chinese investors on Serbian wind farm venture (Detail) - Kinstellar*. www.kinstellar.com. Retrieved May 30, 2025, from <https://www.kinstellar.com/news-and-insights/detail/2525/kinstellar-advises-chinese-investors-on-serbian-wind-farm-venture>

Vladislavljev, S. (2023, September 7). *How did China become the largest investor in Serbia? – chinaobservers*. ChinaObservers. Retrieved May 29, 2025, from <https://chinaobservers.eu/how-did-china-become-the-largest-investor-in-serbia/>

Vulović, M. (2023). *Economic relations between the western Balkans and Non-EU countries*. Stiftung Wissenschaft und Politik (SWP). <https://www.swp-berlin.org/publikation/economic-relations-between-the-western-balkans-and-non-eu-countries>

Wang, G., Wu, P., Wu, X., Zhang, H., Guo, Q., & Cai, Y. (2020). Mapping global research on sustainability of megaproject management: A scientometric review. *Journal of Cleaner Production*, 259, 120831. <https://doi.org/10.1016/j.jclepro.2020.120831>

Western Balkan Investment Framework (WBIF). (2024, February 7). *EU and EIB support the construction of the Vlašić wind power plant in Bosnia and Herzegovina*. Retrieved June 2, 2025, from <https://52.157.111.252/news-details/eu-and-eib-support-construction-vlasic-wind-power-plant-bosnia-and-herzegovina>

Zhang, F. (2022). The policy coordinator role of national development banks in scaling climate finance: Evidence from the renewable energy sector. *Climate Policy*, 22(6), 754-769. <https://doi.org/10.1080/14693062.2022.2038063>

Zvijerac, P. (2024, March 22). *Chinese wind farms in Bosnia spotlight clash of interests, corruption in the heart of the Balkans*. RadioFreeEurope/RadioLiberty. Retrieved May 21, 2025, from <https://www.rferl.org/a/bosnia-china-wind-farms-corruption-balkans/32871321.html>

Đurašković, J., Konatar, M., & Radović, M. (2021). Renewable energy in the western Balkans: Policies, developments and perspectives. *Energy Reports*, 7, 481-490. <https://doi.org/10.1016/j.egy.2021.07.104>

Šabanović, E. (2024, July 18). *Colonialization of energy: From Chinese to hungarians through private capital*. Tacno.net. Retrieved June 1, 2025, from <https://tacno.net/colonialization-of-energy-from-chinese-to-hungarians-through-private-capital/>

Šekarić Stojanović, N., & Zakić, K. (2024). Renewable energy as a connecting spot between China and central and Eastern European countries: Status, directions and perspectives. *Energy, Sustainability and Society*, 14(1). <https://doi.org/10.1186/s13705-024-00439-2>

Yoneva, E. (2023). China's energy projects and investments in the Balkan countries: patterns and trends of cooperation within the transition to new energy models. In: Andrea, B., Brian F. G. Fabrègue. (eds) *The Dragon at the Gates of Europe: Chinese Presence in the Balkans and Central Eastern Europe*. Blue Europe, ISBN: 979-8989739806.

ANNEX I – Overview of Cases

	Country	Project Name	Status	Size	Investor	Volume in €
China	Montenegro	Wind Farm Možura	Completed 2017	46 MW	Shanghai Power Electronics, Enemalta plc	87 Mio.
	Serbia	Agrosolar in Kula	Expected completion in 2026	800 MW	Power China MK Group Fintel Energy all at 33% Stake	340 Mio.
		Wind and Solar for Zijin Copper	Announced	1.5 GW Wind and 500 MW Solar	Chinese Shanghai Fengling Renewables and Serbia Zijin Copper	2 bn.
		Saraorci Solar Farm	Completed 2024	10 MW	Power China and AVR Solar Park (Germany)	Unknown
		Sombor Solar Farm	Announced in 2021	100 MW	CMC Europe -subsidiary of state-owned China National Machinery Import and Export Corp.	100 Mio.
	BiH	Ivovik Wind Farm	Finalized 2025	84 MW (Largest Operation in BiH)	China National Technical Import & Export Corporation, Powerchina	133 Mio.
		Hrgod Wind Farm	Announced 2024	48 MW	Zhongbo Group and China Power	Unknown
		Stolac Solar Farm	Announced 2025	125 MW	Norinco subsidiary of China North Industries Corporation (CNGC)	110 Mio
EU	Montenegro	Wind Farm Gvozđ	Started 2022	54.6 MW	SPV between EPCG and EBRD	82 Mio Loan

		Wind Farm Krnovo	2014 completed	72MW	Special Purpose Vehicle between Akou Energy (France) and EBRD + Proparco (France) TA Loan + KfW (Co-lender)	139 Mio. of which 47.5 Mio. EBRD Senior Loan + KfW 48.5 Mio. Loan
	Serbia	Kostolac Wind Farm	Completed 2025	66 MW	KfW and EPS	145 Mio. Total Cost, of which 80 Mio. Loan, 30 Mio. as EU grant , 30 Mio. own contribution EPS
		Dolovo Cibuk I Wind Farm	Completed 2019	158 MW	EBRD, Taaleri Group, IFC	300 Mio. of which 60 Mio. EBRD DEG has 10 % share in Project
		Extension of Kovacica Wind Farm	Announced 2024	94 MW	EBRD+ Erste Bank Serbia	91.4 Mio. – evenly split loan among EBRD und Erste
	BiH	Vlastic Wind Farm	2023 (ongoing)	45 MW	Mutual Reliance Initiative – KfW and EIB	36 Mio. Loan EIB, 21 Mio. Grant, 16 Mio. Own contribution, 16 Mio. KfW loan – Total 91 Mio.
		Podvezlje Wind Farm	Finished in 2021	48 MW	KfW and EPBiH	loan of 65 mio. + 6.8 Mio own contribution
		Proklecani Wind Farm	2023 (ongoing// on hold)	132 MW	EIB + KfW and energy utility EPHZHB	Total: 200 Mio. of which 44 Mio. Grants (IPA) + Loans 150 Mio. (75 Mio. Respectively between KfW and EIB) + 6.2 Mio. own contribution
		Mesihovina Wind Farm (first wind park in BiH)	2010-2020)	50.6 MW	KfW and EPHZHB	82 Mio. – 1 Mio. Grant, 71 Mio. Loan from KfW
		Gracanica solar park	2024 ongoing	45 MW	EBRD+ UniCredit with EPBiH	40.1 Mio. Loan, 25 Mio. from EBRD and 15 Mio. UniCredit

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