Ecosystem of Un(Just) Energy Transition in Bosnia and Herzegovina

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SUMMARY

This paper provides a political economy analysis of the energy transition in Bosnia and Herzegovina (BiH), demonstrating that current transition processes are fragmented, unequal, and largely shaped by entrenched political and economic interests. Rather than establishing a pathway toward energy justice, democratic participation, and ecological sustainability, the transition is unfolding within a governance system characterized by elite capture, monopolistic public enterprises, extractive practices, weak institutional accountability, and limited community involvement.

BiH's energy system remains dominated by coal (approximately 60% of electricity generation), complemented by large hydropower. Solar and wind collectively account for a marginal share of the energy mix, while overall energy productivity remains among the lowest in Europe. Coal-based generation causes severe pollution, public health burdens, and land degradation, while hydropower concessions frequently disadvantage municipalities that receive few financial benefits yet bear significant social and ecological costs. Current patterns of renewable development risk replicating extractivist models rather than enabling community ownership or just economic restructuring.

The market structure is only partially liberalized and remains largely controlled by politically affiliated state-owned utilities (Elektroprivreda BiH, Elektroprivreda RS, Elektroprivreda HZHB), which function as patronage hubs for ruling parties. Regulatory frameworks exist but are inconsistently implemented, and citizen energy initiatives face procedural, financial, and legal obstacles. Coal labor is politically instrumentalized, employment is inflated through party networks, and workers face unsafe conditions with limited transition planning or social protection guarantees. While a National Energy and Climate Plan (NECP) has been drafted, it lacks clarity on coal phase-out timelines, just transition mechanisms, financing structures, and multi-level governance coordination.

Institutional governance is highly fragmented across state, entity, cantonal, and municipal levels, with weak horizontal and vertical coordination. Municipalities are particularly marginalized in decision-making despite being directly affected by transition impacts. International actors, including the EU, World Bank, EBRD, and bilateral donors, promote transition through project-based interventions, but their approaches often prioritize infrastructure modernization and regulatory alignment over democratic ownership and social equity.

In contrast, civil society organizations, grassroots environmental initiatives, and community-led campaigns have emerged as critical actors advocating for accountability, ecological protection, and community rights. Their strategic use of legal tools, public mobilization, and media advocacy has led to key policy changes, such as restrictions on small hydropower development. However, their involvement in formal planning and regulatory processes remains constrained.

The analysis concludes that a just and transformative energy transition in BiH requires a fundamental reconfiguration of power and governance structures. Policy change must prioritize: (1) decentralized and community-based energy ownership models; (2) municipal-level empowerment with fiscal and regulatory authority; (3) transparent and accountable management of public energy enterprises; (4) legally binding mechanisms for community consent and benefit-

sharing; (5) just transition frameworks that protect workers and create alternative livelihoods; and (6) inclusive policymaking that institutionalizes civil society participation.

Without embedding justice, participation, and redistribution as core transition principles, BiH risks advancing a "green extractivism" that reinforces existing socio-economic inequalities under the guise of decarbonization. A socially just transition must therefore align decarbonization with democratic reform, local development, ecological resilience, and public accountability.

Content

The Analytical Approach

The energy transition in Bosnia and Herzegovina (BiH) is not merely a technical shift toward cleaner energy sources—it is a structural transformation with profound implications for the country's economy, political landscape, and social fabric. As BiH confronts the escalating impacts of climate change and contends with some of the highest levels of urban and environmental pollution in Europe, the imperative for a just and inclusive energy transition becomes even more critical.

Energy transition presents a shift of the energy system from traditional energy sources that are mainly based on fossil fuels, such as coal, oil and gas, to sustainable and low-emission energy sources such as renewable energy sources (wind, sun, water) and energy efficiency.

Globally, all societies are undergoing a transformation of their energy systems. The success or failure of this process will directly determine the extent of irreversible damage to ecosystems and the loss of human lives. For BiH, this transition intersects with long-standing structural challenges: a highly decentralized and fragmented governance system, persistent institutional corruption, and the ongoing emigration of skilled labor. These factors make the transition especially complex and demand innovative approaches to governance, regulation, and cross-sectoral collaboration.

This analysis is motivated by the need to identify bottlenecks and systemic obstacles that hinder a just energy transition in BiH. By focusing on the diverse social actors involved—ranging from public institutions and private companies to local communities and civil society organizations—the paper highlights how the transition is fundamentally a societal process. Achieving meaningful and just change requires new forms of democratic governance and participatory policy-making, which are still nascent both in advanced economies and, even more so, in transitional contexts like BiH.

A just energy transition involves ensuring affordable, reliable and sustainable energy resources for all citizens, taking into account social inequalities, poverty and other factors. The goal is to create an energy system that is economically just, socially inclusive and environmentally sustainable.

At the heart of any systemic transformation lies the configuration of social actors and the power relations between them. Energy transition is no exception. It is not simply a technological or environmental shift—it is an inherently political and social process, shaped by institutions, interests, and unequal access to resources. This report adopts such approach - a political economy lens grounded in the framework developed by McKay, Nehring, and Catacora-Vargas (2024), originally applied to agroecological transitions and here adapted to the context of Bosnia and Herzegovina's energy transition.

The analysis centers on five interrelated analytical dimensions. This systemic and intersectional approach focuses on interactions among all social actors, allowing for the identification of both enabling conditions and structural blockages. The aim is to surface the conflicts, alliances, and governance gaps that shape whether and how energy transition occurs—and for whom.

The analytical process was carried out in three interconnected phases, designed to both construct and iteratively refine the conceptual and empirical understanding of the energy transition landscape in BiH.

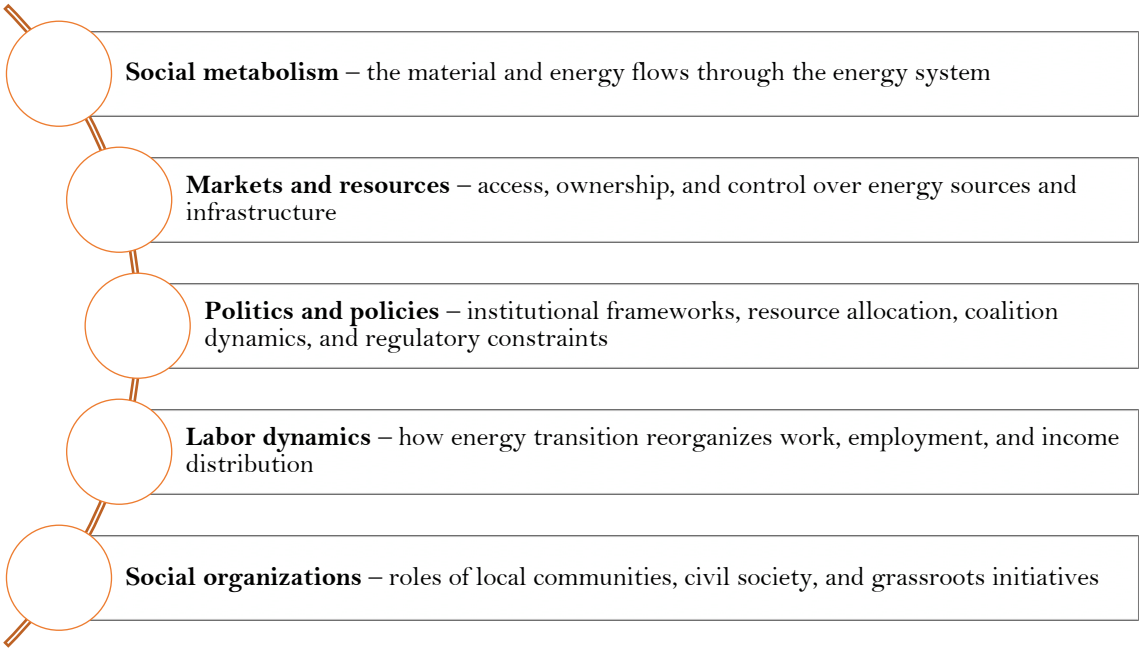


Chart: Five analytical dimensions

The initial phase focused on the development and adaptation of the McKay et al. framework to the specific context of energy governance in BiH. A systematic review of academic and grey literature was conducted, covering policy papers, research articles, public databases, and media reports. This provided the conceptual and empirical grounding to develop a typology of key actors and early identification of initiatives linked to energy transition, climate action, and environmental governance. Special attention was given to locating relevant efforts at the local level, where the impacts of transition are most visible but the governance and decision-making power is most limited.

Building on the preliminary framework, the second phase involved comprehensive data collection and mapping of the energy transition ecosystem in BiH. This included:

- Cataloging initiatives, projects, and funding mechanisms across all administrative levels (state, entity, cantonal, municipal);
- Identifying patterns of collaboration and engagement among actors, including public institutions, civil society, municipalities, academia, public utilities, and the private sector;
- Developing a dataset that traces institutional roles, sources of financing, modes of cooperation, and gaps in implementation.

Actors were categorized into several key clusters: individual citizens, civic initiatives, municipalities and local communities, public enterprises, private companies, ministries and funds, academic institutions, civil society organizations, financial institutions, and international organizations and donors.

In the final phase, semi-structured interviews were conducted with a diverse group of stakeholders—including representatives of public institutions, municipalities, NGOs, researchers, and donor agencies. These interviews served to verify and enrich the mapping results, surface hidden dynamics (e.g., informal coalitions or conflicts), and validate initial assumptions.

This phase also involved identifying structural bottlenecks—such as institutional fragmentation, regulatory ambiguities, or political disincentives—as well as spaces of opportunity for coalition-building, social innovation, and participatory governance.

The triangulation of data was central to the robustness of the analysis. Primary sources included:

- National and entity-level development strategies and action plans;
- Legislative documents, funding calls, and regulatory texts;
- Reports from international organizations (e.g., UNDP, GIZ, Energy Community Secretariat);
- Media coverage and social media posts from activists and energy communities;
- Internal datasets compiled through mapping exercises.

The analysis was guided by a political economy perspective that asks not only what policies exist, but also who benefits, who controls resources, and how institutional arrangements shape societal outcomes. This includes attention to distributional impacts, competing interests, and the often-overlooked role of local communities and marginalized groups.

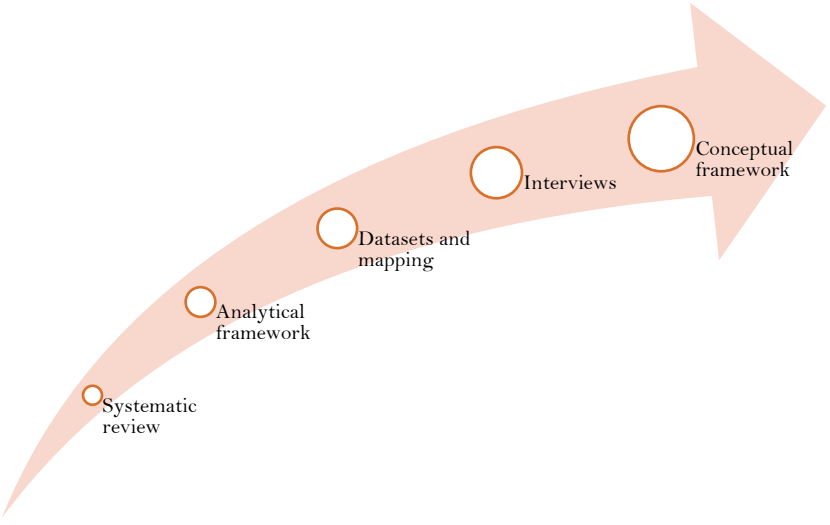


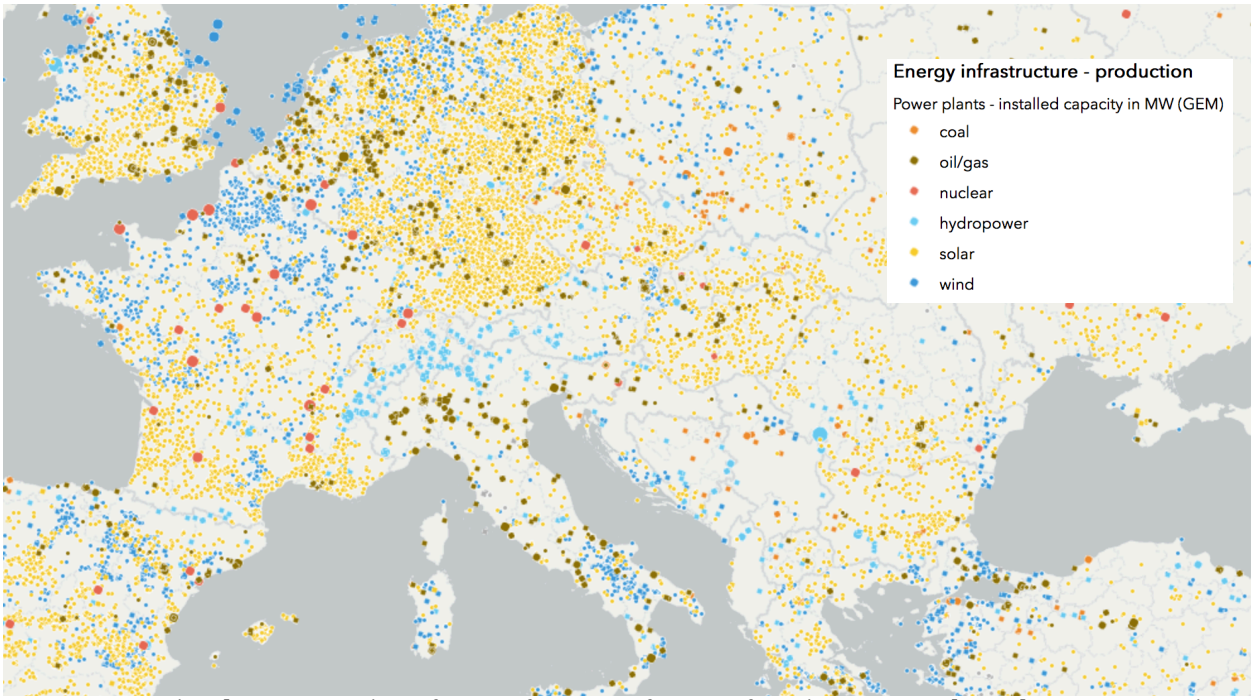
Chart: Research methods

Social Metabolism

BiH continues to rely heavily on non-renewable energy sources, particularly coal and large-scale hydropower, which dominate the country's electricity mix. Approximately 60% of electricity generation stems from coal-fired power plants, while hydropower contributes the majority of the remaining share. In contrast, wind and solar energy combined account for only about 7% of the total electricity output). This reliance on fossil fuels poses significant challenges for decarbonization and climate targets. While BiH has committed to achieving a 43.6% renewable share by 2030, progress remains sluggish (Reuters, 2024; Intellinews, 2025).

The current structure of the energy system in BiH is highly centralized, leaving limited room for community-based or decentralized renewable energy initiatives. This centralization is accompanied by outdated infrastructure and inefficient technologies, leading to high carbon intensity and substantial material inefficiency. According to the United Nations Development Programme (UNDP), the energy efficiency of BiH is among the lowest in Europe, with excessive energy consumption in the residential, public, industrial, and service sectors. Public buildings alone consume approximately three times more energy than the European Union (EU) average, contributing to environmental degradation and unsustainable fiscal burdens on local authorities (Reuters, 2024; Savicic and Miljevic, 2024; Intellinews, 2025; Pipeline Technology Journal, 2025).

Coal use is not only environmentally detrimental but also a significant public health hazard. Emissions from coal combustion in BiH accounted for 44.2% of the country's total carbon dioxide emissions in 2022. The low quality of lignite coal used in thermal power plants further exacerbates this problem. Air pollution is a major consequence, with an estimated 3,300 premature deaths annually linked to pollution from fossil fuels and inefficient heating systems.



Map: Visual representation of types of sources of energy for BiH compared to other EU countries (Energy and Industry Geography Lab, EC JRC)

Although entities are continuously issuing permits for renewable energy projects, shift in BiH's energy trajectory is very slow. These projects mark a growing, albeit still modest, diversification into solar and wind power. Natural gas remains marginal in the overall energy mix, accounting for less than 3% of consumption, and is entirely imported from Russia via the TurkStream pipeline through Serbia (Pipeline Journal, 2023). However, a significant policy shift occurred in late 2024 when FBiH's parliament passed legislation to construct a new gas interconnection to Croatia's liquefied natural gas (LNG) terminal. This move aims to diversify supply and reduce dependency on Russian gas, which accounted for all 225 million cubic meters of the country's 2023 gas consumption (Pipeline Journal, 2024; Energy News Pro, 2024).

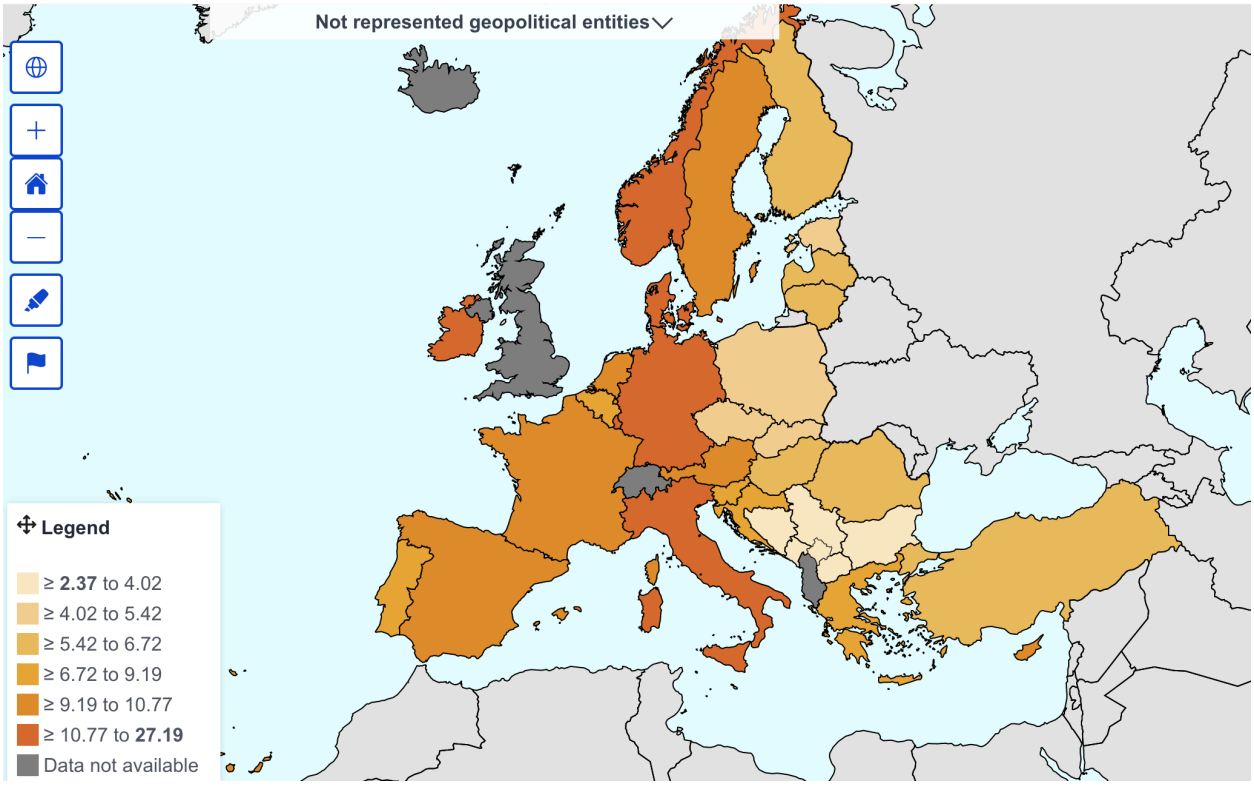
Nonetheless, coal remains the backbone of BiH's energy sector. The country possesses vast coal reserves—sufficient for centuries of use at current rates—and continues to be a net exporter of electricity, mostly generated from coal. Notably, electricity exports to neighboring Serbia have recently doubled, underscoring the ongoing economic role of coal in regional energy trade. (Reuters, 2024; Savicic and Miljevic, 2024; Intellinews, 2025; Pipeline Technology Journal, 2025).

The Eurostat data show (see table below) that BiH maintains a relatively stable and low level of gross electricity production compared to EU countries, with totals ranging between 1,400–1,600 thousand tonnes of oil equivalent (ktoe) annually from 2014 to 2023. Unlike many EU countries that show a downward trend due to increased efficiency and renewables integration, BiH's figures remain relatively flat, indicating limited structural change in energy production. This reflects BiH's continued reliance on coal and large hydro, and highlights the country's stagnation in transitioning toward low-carbon energy sources, especially when viewed in the context of EU decarbonization trends.

TIME / GEO	2015	2016	2017	2018	2019	2020	2021	2022	2023
European Union - 27 countries (from 2020)	9 930.222	251 785.284	254 603.170	253 064.709	249 972.907	239 871.039	250 741.721	242 722.814	236 333.456
Belgium	5 993.551	7 360.791	7 447.893	6 452.273	8 051.960	7 691.624	8 639.862	8 250.026	7 194.273
Bulgaria	4 232.493	3 893.329	3 921.994	4 027.316	3 807.102	3 504.251	4 090.120	4 342.159	3 461.351
Czechia	7 213.229	7 163.377	7 485.482	7 569.898	7 483.679	7 009.848	7 310.033	7 295.846	6 621.174
Denmark	2 488.446	2 625.830	2 667.460	2 611.365	2 538.001	2 470.220	2 841.841	3 020.111	2 900.510
Germany	5 744.454	55 928.547	56 210.060	55 070.335	52 185.469	49 480.825	50 971.556	49 780.569	44 013.864
Estonia	872.608	1 046.425	1 131.596	1 063.127	654.795	522.653	619.472	768.431	493.985
Ireland	2 450.368	2 632.248	2 665.283	2 689.428	2 675.972	2 791.040	2 753.923	2 927.362	2 738.863
Greece	4 460.396	4 680.820	4 752.028	4 579.775	4 181.083	4 148.915	4 704.654	4 528.810	4 292.058
Spain	4 154.037	23 626.119	23 708.169	23 598.624	23 495.873	22 646.002	23 586.586	25 146.518	24 581.320
France	9 825.940	48 503.587	48 322.376	50 013.358	49 073.075	45 767.630	47 732.717	40 812.453	45 111.827
Croatia	980.454	1 102.314	1 030.396	1 172.115	1 097.188	1 150.929	1 307.859	1 222.743	1 508.280
Italy	4 332.852	24 915.594	25 436.802	24 910.441	25 266.809	24 121.326	24 855.506	24 416.279	22 761.513
Cyprus	389.918	420.263	430.298	435.130	442.089	416.956	440.191	452.961	458.219
Latvia	475.857	552.501	647.566	578.235	553.601	492.248	502.685	432.586	549.233
Lithuania	424.162	366.810	360.034	301.900	341.496	474.420	436.681	411.247	514.067
Luxembourg	237.840	188.958	192.188	189.139	164.095	192.112	190.111	194.161	217.710
Hungary	2 610.560	2 743.037	2 830.181	2 757.266	2 948.495	3 003.439	3 105.787	3 078.397	3 056.391
Malta	112.183	73.696	142.027	168.743	177.113	184.271	190.444	197.193	201.602
Netherlands	9 476.649	9 901.841	10 074.612	9 834.885	10 439.209	10 600.011	10 504.768	10 453.383	10 432.553
Austria	5 614.740	5 873.447	6 132.796	5 900.076	6 383.001	6 238.878	6 095.146	5 949.547	6 402.357
Poland	4 182.742	14 328.152	14 657.382	14 620.762	14 100.473	13 589.230	15 445.530	15 455.556	14 390.543
Portugal	4 507.268	5 187.287	5 110.208	5 127.780	4 570.436	4 563.921	4 383.453	4 196.710	4 216.969
Romania	5 700.338	5 597.854	5 528.463	5 578.372	5 126.638	4 809.536	5 113.522	4 815.359	4 985.612
Slovenia	1 298.334	1 418.905	1 403.803	1 403.864	1 384.313	1 478.134	1 365.170	1 170.810	1 365.315
Slovakia	2 313.242	2 327.085	2 385.039	2 319.089	2 444.884	2 479.622	2 580.911	2 307.653	2 571.195
Finland	5 898.374	5 912.053	5 806.076	6 041.542	5 902.911	5 955.896	6 201.224	6 206.950	7 011.245
Sweden	13 939.187	13 414.414	14 122.958	14 049.871	14 483.147	14 087.102	14 771.969	14 888.994	14 281.427
Iceland	1 616.394	1 594.934	1 654.216	1 705.052	1 675.738	1 644.652	1 686.517	1 730.053	1 740.641
Norway	12 428.719	12 815.305	12 852.966	12 648.081	11 599.881	13 344.425	13 578.778	12 616.590	13 318.579
United Kingdom	29 070.199	29 167.422	29 060.781	28 633.076	27 810.126	:	:	:	:
Bosnia and Herzegovina	1 413.414	1 527.653	1 413.414	1 647.463	1 504.127	1 450.903	1 593.809	1 408.512	1 477.644
Montenegro	258.212	270.094	213.482	327.661	295.211	290.705	324.746	285.658	360.009
Moldova	80.646	77.886	77.042	82.029	80.911	84.523	97.248	85.555	100.516
North Macedonia	485.431	484.050	481.530	482.130	504.709	459.768	475.624	510.959	591.160
Georgia	931.450	995.206	991.505	1 044.592	1 019.501	959.570	1 087.283	1 224.987	:

Table: Production of electricity and derived heat by type of fuel 2015-2023 (Eurostat)

Based on the Eurostat data on energy productivity (measured as euro per kilogram of oil equivalent - KGOE), BiH significantly lags behind the EU average and most member states. As of the latest available data (2022 and 2023), BiH's energy productivity was approximately 2.37 EUR/KGOE, whereas the EU-27 average in 2023 reached 9.84 EUR/KGOE, nearly four times higher. While countries like Denmark (18.81), Ireland (26.16), and Luxembourg (15.08) showcase world-leading productivity by generating high economic output with lower energy input, BiH's performance is closer to countries like Serbia (2.53) and North Macedonia (3.31). These results indicate a relatively inefficient use of energy in economic production in BiH, implying a structural reliance on low-value, energy-intensive industries and a lack of energy-efficient technologies and services. Despite modest improvements since 2015 (from 2.24 EUR/KGOE to 2.37 EUR/KGOE), BiH's energy productivity growth is slow, and the country remains far from aligning with EU decarbonization, green growth, and circular economy goals. This performance gap suggests a critical need for structural reforms, technological modernization, and stronger energy-efficiency policies, particularly if BiH seeks EU accession and integration into the EU's green economy frameworks.



Map: Energy productivity in Europe per country for 2022 (Eurostat)

BiH's heavy reliance on coal for energy, with many coal mines and aging power plants has a substantial toll on the environmental and human health. Coal-fired power plants (biggest are in Tuzla, Kakanj, Gacko, Ugljevik, and Stanari) emit vast quantities of PM2.5, SO_2 and NO_x (Euracoal, 2021). Consequently, air is highly polluted in these areas with roughly 9% of all deaths in BiH are due to air pollution, according to the WHO and the World Bank data. Kakanj power plant, ranks among the ten largest SO_2 emitters in Europe. Gacko power plant was identified as the region's second worst PM10 emitter; NGO analysis of 2016 data attributes 158 deaths and

414 new bronchitis cases that year to Gacko's pollution. Open-pit mines and coal waste dumps create persistent dust. For example, around Stanari (RS) villagers say the mine "devours the nearby hills," leaving heavy dust that settles on homes and fields (Holand, 2016; Env-Health, 2019; Matkovic, 2019; Antunovic, *et al.* 2023; Arnika, 2019). Coal operations pollute water with heavy metals and chemical run-off. For example, Tuzla's coal plant and ash dumps discharge alkaline, metal-laden water into surrounding land and creeks. Heavy metals like nickel, chromium and cadmium have leached from ash ponds into rivers: one study found that only 2 of 6 sampled wells near Tuzla's waste sites met drinking-water standards. In Kakanj (FBiH), waste slag from the mine and plant is stored in open-air dumps; residents note that rain and wind carry coal dust into streams. Downstream, people now must buy bottled water because nearby mines (e.g. near Vares) have elevated cadmium and other toxins in drinking sources. In areas like Kakanj and Breza, open slag heaps flank villages. Rainfall can flush pollutants into groundwater. An NGO found that ash ponds in Tuzla carried bright-blue dye (used to prevent pipeline leaks) into fields and streams. Coal extraction scours the land. The Tuzla basin is ringed by huge open mines and ash dumps that now dominate the landscape. Satellite and photo evidence show formerly green fields buried under gray ash. In Kakanj, poorly-stabilized slag heaps have slid onto villages – one landslide in 2015 buried part of Bare settlement, killing at least one resident and forcing dozens of families to evacuate. Locals report cracks in houses and roads from mine vibrations. Even after some sites are "closed," they sit unremediated; a field study near Tuzla found nickel levels 6–12 times above safe limits in soils atop an old ash dump. Some older underground mines (e.g. Zenica region) pose risks of ground collapse, though this has been less documented in public reports. Abandoned pits and un-compacted backfill can lead to sinkholes or poor drainage in former mining areas, further degrading usable land. (Holand, 2016; Env-Health, 2019; Matkovic, 2019; Antunovic, *et al.* 2023; Arnika, 2019). Unlike coal, hydropower itself emits virtually no smoke. However, construction of dams and associated works (roads, quarries) distrust whole ecosystems. Dams change river flows and water availability. Small hydropower plants divert entire streams into pipes, often leaving riverbeds dry. This not only destroys aquatic habitat but also denies local people access to water. NGOs document villagers being cut off from drinking and irrigation water when small dams go in without proper consultation. Larger projects have even more severe effects. For example, the planned Upper Horizons scheme in RS (including the Dabar dam) would reroute 85% of the water from tributaries of the Neretva (rivers Buna, Bregava, Bunica) into a reservoir, leaving the lower Neretva basin severely depleted. Such diversions threaten downstream wetlands (two Ramsar sites, Hutovo Blato and the Neretva Delta) and local water supplies for towns like Stolac and Blagaj. Large dams inundate land and alter geomorphology. In RS, plans for dams on the Vrbas River (Bocac 2 is operating; Krupa HPP was proposed) would flood parts of scenic canyons and agricultural terraces. Ecologists warn that any dam on the upper Vrbas "would deteriorate water quality and threaten the Danube salmon," an endangered native fish. (Balkan Insight, 2022; Mayer, 2021; Council of Europe, 2023; Arnika, 2019, Bankwatch).

Overall, BiH's energy system remains heavily reliant on coal, with a smaller share derived from hydropower. Despite growing awareness of climate and environmental challenges, there has been little structural change in energy production practices over the past decade. Only modest progress has been made in adopting solar and wind energy. The continued dominance of coal and outdated infrastructure has resulted in significant environmental degradation—contributing to severe air, land, and water pollution—and poses serious risks to both human health and ecological systems.

Markets and Resources

The organization of the electricity market in BiH reflects the country's broader institutional complexity and political fragmentation. The market is not unified but segmented across the two entities—Federation of BiH (FBiH) and Republika Srpska (RS)—and Brcko District, each with distinct legal frameworks and operational practices. At the state level, the electricity sector is coordinated by the State Electricity Regulatory Commission (DERK), which oversees transmission system operations, cross-border trade, and harmonization with the EU's internal energy market. Regulatory responsibilities are also fragmented. In addition to DERK at the state level, two entity regulators—FERK (FBiH) and RERS (RS)—are responsible for tariff setting, licensing, and technical oversight in their jurisdictions. Coordination among these bodies is weak and often subject to political interference, leading to overlapping responsibilities, regulatory uncertainty, and delays in key decisions such as tariff reforms or cross-entity infrastructure development. The transmission company, Elektroprenos-Elektroprijenos BiH, is jointly owned by the entities and operates across the entire country.

The liberalization process in BiH's electricity market formally began in the early 2000s, aligning with EU Directives. Unbundling of the sector has led to the separation of generation, transmission, and distribution. However, full market opening remains incomplete. While eligible customers (mostly industrial consumers) can select their supplier, household consumers largely remain within regulated markets. The pace of liberalization is uneven, with RS advancing a centralized approach and FBiH experiencing stagnation due to institutional delays and political disputes (Mujcinagic 2007, 2021; DERK 2024).

Three vertically integrated, entity-level public power utilities dominate electricity production and distribution: Elektroprivreda BiH (EPBiH) and Elektroprivreda HZ HB (EPHZHB) in the Federation, and Elektroprivreda RS (ERS) in Republika Srpska. These utilities control the majority of generation assets, primarily coal-fired power plants and large hydropower facilities. Despite formal commitments to market competition, these utilities continue to hold monopolistic positions in their respective territories and exert significant influence over infrastructure investment and energy planning.

Several barriers hinder the creation of a fully functioning electricity market in BiH. Firstly, there is no wholesale electricity market platform, and bilateral contracts dominate the market structure. Cross-border trade remains limited, despite BiH's integration into the Energy Community and participation in regional initiatives like the SEEPEX exchange. Secondly, the lack of independent, consumer-oriented retail suppliers restricts competition. Regulatory uncertainty, political obstruction, and limited institutional capacity further erode investor confidence, particularly in renewable energy investments (Mujcinagic 2007, 2021; DERK 2024).

The energy market's structure also raises concerns about equitable access to energy resources. State-owned utilities and politically connected firms control access to generation assets, grid infrastructure, and energy subsidies. This centralization excludes citizens, municipalities, and civil society actors from participating in energy production and governance, undermining efforts to democratize the sector and pursue energy justice. Small producers and cooperatives face burdensome procedures and lack support schemes, limiting opportunities for community-based

renewables (Mujcinagic 2007, 2021; Savicic and Miljevic, 2024; Transparency International BiH 2021, 2020).

In fact, in numerous instances, both coal and hydro projects have sparked direct land disputes with local communities. In Sokolac, citizens passed a local ban on new small hydropower to protect rivers Kaljina and Biošticа. In Krupa na Vrbasu, villagers overwhelmingly voted in 2018 against giving land or concession rights for a proposed dam, fearing loss of homes and livelihoods. Coal mining expanses (e.g. proposed expansion around Livno's Tusnica mine) also face protests from farmers whose fields lie in the path of new pits. These cases highlight a growing resistance to energy projects perceived as imposed and extractive, underscoring the urgent need for inclusive, community-centered approaches to energy transition in BiH.

Furthermore, these issues stay in the way of full adoption of citizen energy regulation and decentralization of the energy market. Citizen energy refers to the active participation of individuals, communities, and local entities in producing, consuming, and managing renewable energy, and the EU promotes it through directives and initiatives like the European Green Deal and RED II to democratize energy systems and accelerate the clean energy transition. Key obstacles to the development of citizen energy in BiH stem from a fragmented and incomplete legal and regulatory framework, administrative complexity, and lack of institutional coordination. Although both entities (Federation of BiH and Republika Srpska) have adopted laws recognizing prosumers and renewable energy communities, the implementation is hindered by the absence or delay in adopting essential by-laws, such as rules governing renewable energy communities and procedures for simplified grid connection. Regulatory agencies like FERK and RERS have not fully operationalized these laws, and existing procedures are often non-transparent, technically complex, and financially burdensome for citizens. Additionally, energy communities are not adequately incentivized nor treated as equal market participants, and credit mechanisms for surplus energy often result in losses for prosumers (e.g., forfeiting credits or being unable to monetize them). This legal and procedural uncertainty, combined with the lack of financial and advisory support for local initiatives, discourages wider citizen participation in energy production and obstructs the democratization and decentralization of the energy system in BiH. (Savicic and Miljevic, 2024).

The regulatory landscape for citizen energy in Bosnia and Herzegovina has recently evolved with the adoption of the Regulation on Prosumers in the Federation of BiH (Official Gazette of Federation of BiH 34/2025), which formalizes the rights of households and legal entities to install renewable energy systems for self-consumption and introduces a net metering scheme. This represents a formal alignment with EU directives such as RED II and is a step toward recognizing citizen energy as a legitimate and integral component of the energy system. However, despite this progress, critical barriers remain that limit the transformative potential of the regulation. Implementation is constrained by technical, administrative, and financial burdens, including complex procedures for grid connection, unclear timelines for permit approvals, and non-transparent criteria for determining connection capacity. The regulation does not sufficiently address the role of energy communities, and does not provide dedicated incentives or support mechanisms for low-income households or marginalized municipalities to participate in citizen energy production. As a result, while the legal foundation for citizen energy has been improved, the practical, inclusive, and democratic realization of energy citizenship in the Federation of BiH remains limited. Without substantial institutional reform, advisory support,

and mechanisms for citizen co-ownership and fair compensation, the regulation risks becoming a symbolic gesture rather than a driver of genuine decentralization and energy justice.

The blockage of energy sector reforms in BiH, particularly the slow progress in creating an enabling environment for renewable energy and citizen energy communities, is closely tied to the entrenched role of state-owned energy enterprises (SOEs) in the political power structures of the entity governments. Despite partial liberalization and unbundling efforts, key resources in electricity generation and coal supply chains remain under the control of politically connected public companies like Elektroprivreda BiH and its affiliated coal mines. These state-owned enterprises (SOEs) function as "financial departments" of ruling political parties, as documented by Transparency International, enabling party elites to extract rents and maintain patronage networks through politically motivated appointments and clientelist employment practices. For instance, coal mines within Elektroprivreda BiH have accumulated over 300 million KM in losses between 2015–2020 while continuing to receive public subsidies, with no meaningful restructuring. At the same time, these enterprises show widespread evidence of mismanagement, non-transparent procurement, and inflated payrolls driven by party loyalty rather than performance. The political instrumentalization of SOEs obstructs market reforms, undermines regulatory independence, and deprioritizes investments in decentralized, citizen-led renewable energy projects that would diminish elite control over energy assets and employment leverage. (Mujcinagic 2007, 2021; Transparency International BiH 2021, 2020).

Unfortunately, even the renewable energy projects in BiH are increasingly being shaped by extractive practices, as authorities co-opt them into existing systems of political control and resource capture. A recent study on the land use for renewable energy project in Europe (Kiesecker et al, 2024), finds that renewable energy expansion often clashes with biodiversity conservation and land-use constraints in Southeastern Europe, including Bosnia and Herzegovina, as projects are located on high conflict land. The conflict land indicate use of land areas as locations where renewable energy development would significantly overlap with protected natural areas, carbon-rich soils (e.g. peatlands, wetlands), high-quality agricultural land needed for food security, and culturally significant or densely populated areas. This improper renewable energy infrastructure can lead to habitat fragmentation, degradation of protected areas, and social conflict. This directly applies to BiH, where hydropower projects (especially small hydropower) have frequently been criticized for damaging river ecosystems and bypassing environmental assessment protocols. The study observes that renewable energy projects in these regions, including BiH, often suffer from poor planning processes and limited public participation. The authors stress that avoiding high conflict land is critical to ensuring a just and sustainable renewable energy transition. Instead, they recommend prioritizing "low conflict" land—like degraded, contaminated, or already developed land (e.g., rooftops, brownfields, former industrial sites).

Although new actors—particularly private investors and international stakeholders—are increasingly present in BiH's renewable energy landscape, this liberalization remains predominantly top-down, technocratic, and market-driven. Rather than enabling grassroots participation or equitable access to energy systems, it replicates entrenched inequalities by privileging well-capitalized investors and politically connected entities. Licensing procedures, access to grid infrastructure, and financial incentives such as feed-in tariffs or subsidies are largely out of reach for small producers, cooperatives, or civil society organizations without significant political or financial backing. Empirical analyses highlight that instead of

democratizing energy, the transition is being structured to serve large private actors and international corporations, often through concession agreements that bypass public consultation and ignore environmental justice concerns (Kraske, ed. 2021; Bjelavac 2020; Beslagic, eds. 2022; Marovic and Knezevic 2023).

Moreover, investment opportunities and subsidies in renewable energy are concentrated in the hands of a few elite investors, while local communities face expropriation, lack of transparency, and minimal benefit-sharing. In several cases, small hydropower and solar projects have been established without adequate environmental assessments or public input, fueling discontent among affected populations. Meanwhile, regulatory bodies and planning frameworks remain inaccessible to marginalized groups due to bureaucratic hurdles, legal ambiguity, and lack of technical support. This has led to a system where the energy transition reinforces centralized control and extractive practices, rather than fostering energy justice or participatory governance (Kraske, ed. 2021; Bjelavac 2020; Beslagic, eds. 2022; Marovic and Knezevic 2023).

Therefore, the energy market in BiH stands at a critical juncture, where the rhetoric of transition masks a deeper reproduction of structural inequality and elite control.

Politics and Policies

The governance of the energy transition in BiH reflects the broader political and institutional fragmentation of the country. Energy and climate policy are managed within a complex, decentralized structure that encompasses state-level coordination, entity-level governance, and limited roles for cantonal and municipal governments. This structural complexity has led to a patchy and uneven implementation of energy transition measures and has constrained the development of a coherent, just, and inclusive transition framework.

At the state level, energy transition governance is formally coordinated by the Council of Ministers of BiH, supported by the Ministry of Foreign Trade and Economic Relations (MOFTER) and the Ministry of Finance and Treasury (MFT). A key state-level strategic document is the Low Emission Development Strategy adopted in 2013, which remains the only comprehensive national document on climate and energy policy to date. More recently, work has begun on a draft National Energy and Climate Plan (NECP) for 2021-2030. The draft NECP outlines a vision for BiH's energy future, aiming to align the country's energy transition with EU requirements. It emphasizes cross-entity coordination, regional alignment, strategic infrastructure investments, and clear climate targets. In theory, the NECP seeks to harmonize fragmented policy approaches and establish a unified direction for decarbonization and sustainability across both entities.

However, an expert analysis by CAN Europe of the BiH's draft NECP finds the plan lacks weak long-term clarity, clear emissions baseline, and has a modest 2030 goal. Although BiH aspires to reach climate neutrality by 2050, the NECP only projects data up to 2030, with no concrete pathway or projections for 2040–2050. There's no comprehensive inventory of gross emissions. The plan lacks differentiation between actual and LULUCF-adjusted figures. The 2030 target (12.62% GHG reduction from 2022) is considered low, especially as emissions have stagnated around 26 $MtCO_2eq$ for over a decade. Despite no new coal plant construction, coal will still contribute over 40% of emissions in 2030. Plants like Tuzla 4 and Kakanj 5 have exceeded EU

operational hour limits (20,000 hours) but will remain active. The NECP's plan shows periods where emissions rise due to increased plant utilization despite planned phase-outs. NECP lacks a clear date and strategy for coal exit, undermining its decarbonization vision. Further, CAN Europe points out that targeted emissions, renewables, and efficiency remain largely aspirational: unquantified benefits, absence of cost or timeline estimates, and no SMART objectives are evident in the plan. For example, most PaMs lack quantification, timelines, expected impacts, or cost analyses. Removal of fossil fuel subsidies is proposed but lacks detail on sequencing, protection for vulnerable groups, or linkage to renewables and efficiency. A 43.6% renewable share in gross final energy consumption by 2030 aligns with regional targets—but is overshadowed by poor historical progress. BiH achieved only ~37.6% by 2020, missing its prior goal, and electricity-specific renewables are projected to lag behind expectations (54.9% in generation vs ~70% target). The NECP includes energy efficiency targets—such as capping primary energy at 6.844 Mtoe and final energy at 4.339 Mtoe by 2030—with only moderate projected gains (e.g. –5.5% PEC). However, CAN Europe criticizes the lack of clarity around implementation: no quantified savings per measure, vague deadlines, and over-reliance on donor funding and energy/CO_2 fees. The overlapping ETS and fee mechanisms add complexity rather than coherence. Crucially, CAN Europe highlights a weak governance framework: absence of sectoral trajectories, transparent monitoring, and mapped financing. The plan fails to embed a Just Transition strategy or protections for workers and vulnerable populations. Missing multi-level engagement—especially from civil society—reduces the final NECP to a technocratic document unlikely to inspire ownership or drive transformative change.

Furthermore, the draft NECP remains in draft form and has not yet been adopted or implemented. As such, it currently lacks the authority to direct significant public investments or reshape budgetary priorities. Its development has also been hindered by BiH's highly decentralized governance structure, where ministries and institutions at various levels often compete for limited resources and decision-making power. The process of drafting the NECP has largely bypassed meaningful consultation with civil society, local communities, and other non-state actors, limiting its legitimacy and the potential for broad-based support. Consequently, the NECP risks becoming another technocratic document with limited transformative impact unless it is finalized through an inclusive process and backed by coordinated, adequately funded implementation mechanisms.

Despite formal commitments, the state level lacks the executive authority and fiscal tools to drive the energy transition meaningfully. Coordination is weak between entities, and civil society and local actors are largely excluded from national-level planning processes. Specialized environmental funds at the state level do not exist; instead, financing is fragmented and flows through entity-level mechanisms or international donor support (e.g., EU, UNDP, World Bank).

In the Federation of BiH, responsibility for energy lies with the Federal Ministry of Energy, Mining, and Industry, while environmental governance is managed by the Federal Ministry of Environment and Tourism. The Federation Environmental Protection Fund plays a crucial role in financing transition-related projects, including building retrofits and solar energy systems. However, the fund's scope is limited relative to the scale of the transformation required. Budgetary allocations remain modest and not transparent, and no dedicated just-transition program has been implemented for coal-dependent regions such as Tuzla and Kakanj.

Despite efforts at the entity level, the role of cantons is poorly defined. Cantonal governments possess significant autonomy, particularly in spatial planning, licensing, and environmental permits, yet lack coordinated frameworks or capacities to contribute to the energy transition. While some cantons (e.g., Sarajevo Canton) have adopted their own climate and energy plans, others have no strategic orientation. The absence of a unified federal-cantonal coordination mechanism inhibits vertical integration and policy coherence.

Republika Srpska (RS) has a more centralized approach to energy governance. The Ministry of Industry, Energy, and Mining is the lead institution responsible for energy policy and planning. The Energy Strategy of Republika Srpska until 2030 envisions continued exploitation of lignite reserves while gradually increasing the share of renewables, especially hydropower and solar. This dual-track approach reflects the influence of entrenched coal interests, particularly around Ugljevik and Gacko, and raises questions about the depth of RS's commitment to decarbonization. Plans for new thermal power plants, including Ugljevik 3, directly conflict with EU climate goals and complicate inter-entity coordination.

In parallel, the Industrial Development Strategy of Republika Srpska 2021–2027 and its 2025–2027 action plan introduce elements relevant to the green transition, such as support for technological modernization and circular economy models, financial incentives for firms adopting green production technologies (e.g., 6 million BAM for transition to green and circular models), and investments in innovation and digitization, with co-funding from ministries and development funds. However, the overall industrial support still favors export-led growth and heavy industry, and lacks clear emissions reduction targets or green conditionalities.

The entity Environmental Protection Funds and the Energy Efficiency Funds are operational, but lack transparency and long-term budgeting frameworks. Civil society involvement in policymaking is minimal, and social dialogue around energy transition remains weak. No comprehensive just-transition program exists. Both entity governments have adopted several key legal instruments, including the Law on Renewable Energy and Cogeneration, which introduce feed-in premiums, net metering, and incentives for decentralized energy production, but in reality they are unimplementable since lower level legislation is missing.

From the perspective of the political economy of the energy transition, BiH's policy and governance landscape reveals significant structural and distributional challenges. Policies tend to be designed and implemented through technocratic, top-down processes led by ministries and international experts. Local governments, workers' unions, marginalized communities, and civil society organizations are generally excluded or only superficially engaged.

Budgetary flows remain disproportionately tilted toward infrastructure investments and legacy energy systems, with limited attention to social equity, frontline worker protection, or inclusive governance mechanisms. The distribution of public resources reflects political coalitions aligned with incumbent energy interests, particularly in coal-producing regions, while transformative coalitions advocating for energy democracy or community energy remain underpowered. Regulatory frameworks are expanding but often lack enabling provisions for participatory governance, accountability, and equitable benefit-sharing. For instance, while both entities have legal instruments supporting renewables, mechanisms for citizen energy, cooperatives, or participatory budgeting are absent or underdeveloped.

Despite the increasing use of public calls as a formal funding mechanism at the entity and cantonal levels in BiH, the overall funding landscape remains opaque. While many institutions have adopted public calls as standard practice, comprehensive transparency is still lacking. Key information—such as the list of applicants, criteria and processes for selection, details of approved projects, funding amounts, implementation reports, and independent evaluations—is either not published or only partially available.

This lack of transparency undermines public accountability and raises concerns about potential clientelism, elite capture, and inefficient allocation of resources. Without open access to data on how public funds are distributed and monitored, it becomes difficult to assess the effectiveness, equity, and strategic orientation of these investments—particularly in sectors critical to the energy transition and climate resilience. Establishing clear reporting standards, publishing detailed evaluation outcomes, and creating accessible public databases are essential steps to ensure the legitimacy and impact of public funding mechanisms.

Although many strategies and action plans, beside the draft NECP related to energy transition and renewable development exist in BiH, their implementation has been minimal or entirely stalled for decades. As such, analyzing these largely dormant documents for the purpose of this report appeared absurd.

Labor Dynamics

One of the main arguments put forward by political decision-makers against closing coal mines is that these facilities employ a significant number of workers, and their closure would lead to substantial job losses and higher unemployment. However, this argument has persisted for years without any meaningful investment in alternative industries or long-term strategies for workforce transition.

In BiH, the mining and quarrying sector employs a total of 14,996 workers, of whom 1,376 are women. In the electricity, gas, steam, and air conditioning supply sector, there are 18,012 employees, including 4,324 women (Agency for Statistics of BiH, 2025). Considering that the total number of employed persons in BiH in March 2024 was 854,831, these two sectors together account for approximately 3.86% of the country's total workforce. This figure includes all companies operating in these sectors, both public and private.

Focusing on the Federation of BiH[1], available company performance data for 2024 show that the mining and quarrying sector included 152 registered companies, representing 0.54% of all businesses in the entity. Among them, 60 companies operated at a loss. Biggest companies in this sector are coal mines Banovici, Kreka Tuzla, Djurdjevik Zivinice, and Kakanj. The sector's total financial loss in 2024 increased by 13.96% compared to the previous year (Financial Information Agency of Federation of BiH, 2025).

In the electricity, gas, steam, and air conditioning supply sector, 551 companies were active in 2024, accounting for 1.97% of all registered companies in the Federation. During the same period,

[1] Here we focus on Federation of BiH simply because the data can be openly accessed.

this sector recorded a total financial loss of 6.42%. (Financial Information Agency of Federation of BiH, 2025).

Notably, the economic activities with the highest losses in the Federation were the mining sector, which reported a loss of BAM 128 million, and the electricity production sector, with a loss of BAM 33 million. (Financial Information Agency of Federation of BiH, 2025).

According to the Transparency International BiH report on the business operations of coal mines within Elektroprivreda BiH, the total number of employees in these mines remained persistently high from 2015 to 2020, despite declining production and worsening financial performance. Specifically:

- In 2015, there were 7,944 employees across the seven coal mines.
- By 2020, the number had slightly decreased to 7,678 employees.

This represents a reduction of only 266 employees over five years, despite consistent operating losses, growing inefficiencies, and overstaffing noted across most mines. The report emphasizes that employment dynamics have been heavily influenced by political interests, with recruitment often based on party affiliation rather than operational needs, contributing to financial instability and obstructing restructuring efforts. The management of Elektroprivreda BiH recently admitted that it has over 2,200 redundant workers and that this number refers exclusively to administrative staff.

Furthermore, financial analysis reveals that millions have been funneled into contracts with private firms through opaque and non-transparent arrangements. In many cases, assets belonging to coal mining enterprises have been systematically dismantled and sold off, allowing private companies to gradually take over the provision of key services. This process has not only undermined the integrity of public ownership but also raised serious concerns about mismanagement and potential conflicts of interest.

In fact, throughout the 2019–2025 period, public policy has attempted to reconcile this faltering coal economy with political patronage. In practice, the coal-energy complex is deeply politicized: industry executives are often political appointees, and jobs are dispensed as political patronage (Carlone & Benazzo 2019). Western observers note that "political parties control the industry and appoint their henchmen to executive positions, while also granting employment to their rank-and-file members" (Carlone & Benazzo 2019). This politicization underpins labour organization, mobilization and control in Bosnia's coal regions (especially Tuzla canton and Zenica-Doboj canton).

Namely, coal mines in BiH are almost entirely state-owned (in the Federation entity, 7 of 8 mines belong to public Elektroprivreda BiH). Unlike a decentralized private sector, hiring and management reflect political hierarchies. Union leaders and analysts report that employment in the mines far exceeds operational needs – a byproduct of party patronage. For example, one report notes that EPBiH's coal mines employ 6,800 miners (FBiH), of whom 2,000 are on disability leave (a legacy of decades of accidents). Meanwhile, thousands of administrative and technical staff are redundant, padding the payroll. In 2021 EPBiH proposed cutting 2,000–2,300 jobs (mostly administrative/technical) out of 11,000, but all mine unions rejected the layoffs (Gutic 2021). As a Kakanj miners' union leader quipped, "in our union there is no surplus" –

calling instead for any reductions to follow past social plans (Gutic 2021). In short, labour is "over-employed by party affiliation" (Gutic 2021), meaning production is kept stable by political calculation.

Unions themselves are fragmented by politics. In Banovići (Tuzla region), for example, two rival miners' unions exist. The older, more militant union with long tradition was decimated when a new union backed by SDA party minister Mirsad Kukić forced "everyone…to be members …under threats". Only after a management change did miners rejoin the old union (its membership jumped from ~100 back to 1,500 out of 2,900 employees). These splits show how unions can be co-opted by political interests. In practice, the independent union leaderships often find themselves balancing worker demands with political realities.

Despite political pressures, miners' unions remain active in collective bargaining and protest. Each mine typically has its own union (often affiliated to larger federations). In the Federation entity, the Samostalni sindikat radnika rudnika FBiH (Union of Federation Mine Workers) coordinates among mines. Union leaders have repeatedly mobilized workers over wages, safety and job security. For instance, in mid-2023 Zenica's mine union (president Nedžad Duraković) led repeated *radnički neposluh* ("workers' disobedience" stoppages) after wages for May 2023 were delayed. In one protest miners simply refused to descend, halting coal production, until back pay was secured. Likewise, the Banovići and Kreka mines saw solidarity warning strikes in June 2023 backing their Zenica colleagues. In 2022 protests in Tuzla and Banovići, miners demanded that collective-bargaining rules be honored and criticized irregular wage practices. Unions also organized marches: Zenica miners even walked on foot to the Federation government to demand pay and pensions. Overall, unions exert strong influence as workplace bargaining bodies – they can freeze coal output with strikes, and all seven mine unions in the Federation united to block the 2021 layoff plan. At the same time, unions often focus on preserving jobs and benefits, sometimes resisting transition reforms. Their role is therefore double-edged: protecting workers in the status quo, while often deferring to political or party goals. Nevertheless, unions face limits. Political interference at mines can dilute union power (as in Banovići). Some union leaders are themselves politicians or party allies. And while unions might block abrupt layoffs, they often resist acknowledging that a gradual phase-out of coal is inevitable. As one historian observed, post-socialist privatization downplayed environmental threats by forcing workers overwhelmingly to fight for their livelihoods. This dynamic continued into the 2020s: unions prioritized job security and immediate livelihood issues over broader transition debates.

By and large, Bosnia's coal sector has seen little technological innovation. Mines still rely on outdated infrastructure. Investment in modernization has been minimal relative to needs. For example, Elektroprivreda reports having spent roughly €80 million over three years (pre-2020) on mine modernization – a "huge figure" by past standards – yet industry experts say an equivalent sum is needed again just to approach safe conditions. Without these investments, accidents remain common. Independent union leaders warn that mines "should be closed" given current safety, but close them then "hundreds of people would remain out of work". In general, mining equipment lags EU standards (one news report noted coal is still hauled by vintage locomotives) and no major automation projects have taken hold. In contrast, some renewable/efficiency pilot projects are emerging (e.g. small solar installations at Banovići and Kreka under new transition plans), but these remain token next to the entrenched coal system.

Thus, labour productivity in mines stays low, and workers' tasks remain as they have been for decades – strenuous, hazardous underground work with minimal mechanization.

Mining remains a hazardous, low-paid occupation. Even before accounting for accidents, pay is meager: published reports suggest an average miner earns only about €500 per month plus meal allowances. These wages reflect the general economy: Bosnia's minimum wage is low and informal or "envelope" payments are common in many sectors, but the coal industry pays the state-set rates with little additional informal bonus. Workers sometimes endure irregular pay: salary delays are routine. In June 2023, for example, Zenica miners had to protest multiple times to receive their May salaries. Pay is guaranteed only by collective agreement (must be paid by the 25th of each month), but enterprise liquidity problems frequently breach these rules. In an extreme 2021 case at Kreka mine, management announced rotating one-month layoffs just to preserve the wage fund. Such measures left even permanently employed miners idled for up to a month at a time, though officially on salary.

Safety is the most acute problem. Bosnia's coal mines have a very poor accident record. A cursory list of recent disasters highlights this: in 2015 five miners died in a Kakanj mine collapse, and similar tragedies killed five in Zenica in 2014. The worst single year saw 14 miners killed nationwide (four were illegally digging coal near Tuzla). The April–June 2025 Zenica collapse (pictured) tragically underscored ongoing risks: a minor earthquake triggered a gas explosion underground, collapsing two tunnels. Rescue teams evacuated 29 miners but 5 were left behind and presumed dead. Union leader Mehmed Oruć reported the blast and collapse as exceptional (gas explosion from quake) but the incident again showed that safety systems are precarious.

These accidents occur against a backdrop of dilapidated conditions. Investigations and union statements consistently cite lack of investment: mines that "should be closed immediately" for safety remain open. Protective equipment is dated, ventilation and monitoring systems are often faulty, and emergency response capacity is low. In the 2014 accident, trapped miners had to dig free by hand for hours. Medical and social protections are also precarious: miners' union leaders repeatedly complained that unpaid social contributions leave workers unable to retire or see a doctor. The World Bank notes that a very high share of coal miners end up disabled (due to accidents), straining the system and forcing mines to reassign them to "non-essential" roles, which further inflates labour costs. All in all, a miner's job is low-security, high-risk and low-pay, with frequent wage disputes and dangerous working conditions.

Mining work is overwhelmingly done by male, blue-collar workers. According to recent analysis, 56% of FBiH coal mine employees are low-skilled blue-collar (mainly underground extraction) – far above the national average of 21%. Mine workers tend to be older and less formally educated than the average Bosnian worker. Support roles (engineers, supervisors, administrators) make up the rest, but those too are mostly men. A particularly glaring feature is the surplus of administrative staff relative to miners: one report notes that Elektroprivreda BiH mines have roughly 2,200 "redundant" office and technical employees alongside too few actual miners. This imbalance partly reflects the legacy of political patronage (white-collar jobs are easier to distribute).

Income and labour time are thus unevenly distributed. A coal miner typically works long shifts underground (often a week on/one off rotation) for that modest wage and allowances. Support staff usually have normal hours and steadier pay. Within mining communities, households are

highly dependent on the miners' wage: in Banovići, 80% of a miner-household's income comes from coal employment. If a mine were to close or a miner lose his job, this spells a catastrophic income shock: 75% of households in Banovići and about 20% in Zenica would face major hardship. Decision-making, meanwhile, is top-down. Real decisions about mine operations and closures lie with Elektroprivreda BiH management and the state ministries (ministry of energy/mining, committees on transition) – not with the workers. In practice, worker autonomy is limited: rank-and-file miners can only protest or strike to influence outcomes.

Bosnia and Herzegovina is now under pressure to align with EU decarbonisation. Early steps are being taken: in mid-2025 the World Bank approved an €83 million "Just Transition" project for Banovići, Zenica and Kreka. This program will repurpose mined lands, finance small solar plants at two mines, and importantly provide social protection and retraining for coal workers. Component 4 explicitly "aims to mitigate the social and labour impacts" on miners – by covering unpaid pensions/severance and funding skills development for displaced workers. World Bank officials stress this is to "make sure no one is left behind". These measures acknowledge that coal jobs will disappear: models predict 2,000–3,000 mining positions will be cut by 2030 (mostly in support roles, but also in underground mines).

Miners' readiness to transition is mixed. Surveys show workers are willing to look for new employment if needed, but only if comparable pay and benefits can be obtained. High reservation wages and loyalty to the mining sector mean only a small fraction (8–17%) would train for an entirely new profession. In Banovići, for example, a mine union leader argues the plant should stay open as long as possible (targeting 2050 closure to meet climate pledges).

On the policy side, apart from the new World Bank initiative, Bosnia's transition planning is nascent. Only in 2025 did the Federation of BiH government adopt a formal strategy (via a European Bank-requested NECP) recognizing the need to gradually phase out coal by 2050. So far, no domestic funds exist for retraining or early retirement of miners. The World Bank notes that existing public employment services and adult education programs are weak. If transition is to be just, experts warn financial obligations to workers (unpaid contributions, severance) must be honored, and active re-employment support (counseling, retraining) provided early. Unions have demanded such guarantees. At the same time, any attempt to forcibly close mines without a credible plan risks social unrest – something BiH's leaders are acutely aware of from the 2022–23 protest experience.

In Bosnia and Herzegovina's coal industry, labour is organized in a paradoxical mix of strong unions and strong politics. On one hand, miners enjoy permanent contracts, union protection, and historically high pensions – reflecting coal's privileged status in a socialist legacy. On the other hand, wages remain low, conditions hazardous, and jobs doled out by political deal-making. Over the past five years, workers have continued to fight for wages and safety through collective action, illustrating the unions' entrenched role. Yet with global and EU pressure mounting to close coal mines, the same organization and political entanglement may both enable and constrain a just transition. Powerful unions will insist on protecting miners' interests, but entrenched party control may slow reforms. The outcome will depend on whether new transition plans can effectively link mining communities to alternative livelihoods – a challenge that Bosnia's government and international partners are only beginning to address.

Social Organizations

Although the energy transition unfolds most visibly at the local level—through infrastructure changes, community impacts, and shifts in labor and resource use — cities and municipalities in BiH have limited or no direct influence over key decision-making processes related to energy policy, planning, and investment.

As part of the analytical groundwork for this report, a mapping of energy transition initiatives across local cities and municipalities in BiH was conducted. Out of 143 municipalities, 88 have adopted some form of local development strategy or an Action Plan for Sustainable Energy Management and Climate Adaptation (SECAP) with a planning horizon up to 2030. These documents, to varying degrees, address issues related to energy transition within their jurisdictions. However, implementation capacities and institutional frameworks at the local level remain weak.

Despite legal obligations, only 25% of municipalities have officially appointed energy managers. Furthermore, just 13% of municipalities have introduced any form of dedicated financial support—such as subsidies or co-financing schemes—for energy efficiency improvements, and programs supporting the transition to renewable energy are virtually absent. Only in the past year has solar energy been introduced in a handful of municipalities, mostly through externally funded pilot initiatives.

Most cities and municipalities have not developed internal organizational structures or human resource capacities to systematically manage energy transition processes. The topic has only recently entered the local political agenda and is often driven by civil society organizations rather than local governments themselves. Tensions also persist between local authorities, entity-level institutions, and public enterprises—particularly in municipalities affected by industrial pollution or dependent on coal-based employment. The involvement of local governments in just energy transition processes remains sporadic and largely project-based, typically initiated by international donors or non-governmental organizations. A comprehensive and coordinated approach to supporting municipal roles in the energy transition is still missing.

Bosnia and Herzegovina's energy sector remains dominated by legacy coal power and hydropower enterprises tied to political elites, even as external donors push for a green transition. In the past five years, reforms have been slow and uneven. Key stakeholders form three overlapping alliances: (1) state-owned utilities and political patrons, (2) international donors/investors, and (3) grassroots activists and supporting NGOs. These alliances shape whose interests prevail, often along ethnic/party lines, with significant implications for justice and inclusion.

As explained earlier, the major utilities in the energy sector are three large power companies – Elektroprivreda BiH (FBiH), Elektroprivreda RS (Republika Srpska), and Elektroprivreda HZHB (Herzegovinian Croats) – are 100% state-owned and deeply politicized. Their boards and management are filled by party loyalists. For example, in 2023 Sanel Buljubašić (SDP member) became acting director of EP BiH after the Tuzla miners' union (allied with the Social Democratic Party) agitated for management change. In RS, Luka Petrović, long-time acting director of ERS, is also vice-president of Dodik's SNSD party. EP HZHB (Mostar) has historically been a HDZ-

aligned patronage network (a 2004 audit found "kick-backs to the HDZ's privileged elite"). In short, FBiH and Croat areas are led by Bosniak/Croat party appointees (SDP, HDZ BiH), while RS utilities answer to Serb party bosses (SNSD, SDS). All three companies control vast resources (mines, dams, grid, thousands of workers), making them focal points of elite rent-seeking.

These SOEs' huge asset bases (coal mines at Tuzla/Kakanj, hydro reservoirs, distribution grids) are basis for political patronage and resource exploitation and are embedded in party networks. The ruling elites treat energy companies as "cash cows" or patronage schemesba.boell.org. For instance, Chinese firms have won major contracts at EP BiH (e.g. flue-gas equipment for Tuzla plant) in deals now under police investigation for favoritism. Local politicians and cronies partner with foreign suppliers (e.g. DEC/ITC Zenica) to bid on power-plant upgrades, sidelining other firms. The Boell Foundation observes that BiH's "environmental policy is in the hands of corrupt ruling elites" who protect fossil-industry monopolies. Such elite capture means most profits flow upward (to SOEs and party cronies), while local communities bear environmental costs.

Municipal and cantonal bodies have limited autonomy, but they can be implicated. In FBiH, cantonal governments often sit on utility boards or influence local distribution companies. For example, Tuzla Canton officials backed calls to sack EP BiH management in 2023. Some mayors align with environmental demands: by mid-2022 at least 12 municipalities (e.g. Mrkonjić-Grad) had officially pledged *"dams-free"* status, refusing new small HPP approvals without local consent. However, others side with business: in RS President Dodik has supported a new branch of Russia's TurkStream gas line into Republika Srpska, overriding FBiH objections. Overall, decision-making remains top-down: local councils have little real power over state-owned utilities or large projects, unless mobilized by public pressure.

In terms of international institutions and donors, the European Union through its Energy Community is the leading reform backer. Since 2022 the EU-funded *EU4Energy* project (DAI consortium) has helped harmonize BiH's laws with the EU Third Energy Package. The EU also finances flagship investments: in Feb 2024 the European Investment Bank (EIB), under the Global Gateway, loaned €36M to EP BiH to build a 50 MW wind farm on Vlašić Mountain (plus €21M EU grants). These projects serve EU/Green Agenda goals (renewables, grid integration) but require cooperation from all BiH levels – a challenge given political fragmentation.

The World Bank frames its engagement in terms of a *"just transition."* In May 2025 it approved a $90.7M loan (and $3.3M grant) to repurpose two major coal-mining areas (Banovići, Kreka) for renewables and to fund social measures. WB support is tied to BiH's National Energy & Climate Plan and aims to meet modest climate targets. Regional development banks (EBRD, KfW) also fund green projects. The EIB/EU loan for Vlašić wind was matched by KfW (€16.5M) and state funds. The EU and EBRD have provided lines for solar on public buildings and small hydro projects, though those have been controversial.

In late 2024 USAID launched a new 5-year, $9.9M *Energy Policy Activity* continuing prior USAID work. Its stated goals are energy security, EU market integration, renewables, efficiency, and even advancing the "Southern Interconnection" gas pipeline. The U.S. promotes BiH joining European networks (electricity market coupling) and diversifying from Russian gas. Likewise, GIZ (with EU co-financing) runs local programs: a 2023–29 *"Community Action for Energy Transition"* helps municipalities retrofit buildings and form energy communities.

Outside Western donors, China and Russia exert influence. Chinese state firms (e.g. Dongfang DEC) have gained EP BiH contracts – often amid corruption allegations. There is also talk of Chinese investment in lignite plant modernization. Russia's Gazprom now supplies BiH via its TurkStream line into RS, bypassing FBiH-controlled routes. Dodik has pressed for an RS branch of TurkStream, giving Russia political leverage. These relationships run counter to EU interests (market liberalization and climate goals) but align with entity-level patronage in RS.

Donors and investors are eyeing BiH's mineral wealth. A new lithium deposit in Majevica (RS) has attracted Swiss and Canadian firms (Arcore, Rock Tech) for battery minerals. Local activists fear water and habitat loss and have petitioned (6,000+ signatures) to protect the mountain as a nature park. Hungary is reportedly partnering with RS on rare-metal mining. Hydrogen is also on the radar: one announced green hydrogen pilot (Prozor-Rama municipality) is in planning. These "green" extraction projects promise jobs and strategic resources (for EU battery supply) but risk serious local impacts – illustrating how external climate agendas can conflict with community interests.

Grassroots groups are the main opponents of large hydro and extractive projects. The Centre for Environment (CZZS) in Zenica, ACT Foundation (Fondacija Atelje za društvene promjene), and citizen initiatives (e.g. *"Stop building small HPPs"* on the Kruscica and Kasindolska rivers) have led decade-long campaigns against dozens of planned mini-hydros. For example, women in Kruščica waged a 504-day protest sit-in against a dam, and students on Kasindolska won court annulments of hydropower permits. These activists stress that small HPPs destroy rivers, not clean energy. In June 2022 their pressure helped the Bosniak-Croat Federation ban all new small hydropower plants (later confirmed by the FBiH Upper House). In RS too there was a 2022 law capping small HPP sizes. More broadly, activists formed coalitions like *"Save the Blue Heart of Europe"* and the *"Coalition for Rivers,"* sometimes linking with NGOs from neighboring countries. Their tactics include river-blockade protests, public rallies, petitions (e.g. >6,000 signatories against Majevica mining), and strategic litigation. Notably, two student-activists sued the Belgian company Green Invest (BUK d.o.o.) and in 2021 forced a RS court to cancel three hydropower permits. These victories show civic agency, though success often requires external attention (the SLAPP lawsuits against them prompted EU/Amnesty interventions).

A number of Bosnian NGOs back the activists with expertise and funding. Green Action (Zelena Akcija), Center for Research, Transparency and Accountability (CRTA), Center for Ecology and Energy (CEE in Podgorica), and others share technical analyses of projects and media advocacy. Regional NGOs like EuroNatur and Riverwatch have also contributed. These civil society actors publish reports (on biodiversity loss, hydrology, etc.) and mobilize international solidarity (writing open letters, e.g. ACT wrote to the EU and Belgian embassy in 2022).

Major international foundations finance this civil society ecosystem. The Heinrich Böll Foundation (Green Party) in Sarajevo runs a Green Transition program that analyzes policy options and advocates EU-aligned reforms. German party foundations (Friedrich-Ebert-Stiftung, Rosa-Luxemburg-Stiftung) and philanthropic groups (Open Society Foundations Western Balkans, Helvetas, etc.) fund workshops, legal aid (support for court cases), and community projects like "energy communities" for renewables. For example, OSFWB's *"Just Green Transition"* initiative is researching inclusive energy frameworks across the Western Balkans. These organizations generally have autonomy from the state, although they depend on

foreign funds. They build local capacity (training, research) and sometimes sit at advisory tables, but they wield influence mostly through advocacy and networks rather than formal power.

Bosnian environmentalists use a mix of legal and civic tools. Petitions to parliaments and appeals to the Constitutional Court have been common. Grassroots activists often organize community "councils" or use social media to draw public attention (e.g. exposing deforestation by foreign companies). They have allied with sympathetic local officials when possible – e.g. the mayor of Mrkonjić-Grad (SDA party) signed the dams-free declarationarnika.org. However, they have also clashed with authorities: several face defamation lawsuits (SLAPPs) filed by energy firms aiming to silence critics. The rule of law is a mixed bag: courts have occasionally upheld activists (as in the Kasindolska case), but enforcement is uneven. International bodies have shown support (e.g. Council of Europe workshops on anti-SLAPP measures where activists' cases were discussed), but much depends on donor pressure. Overall, civil society remains relatively small and often fragmented along ethnic lines, limiting its ability to influence big decisions directly.

Decision-making is heavily dominated by party-aligned elites and SOEs. Federal and entity energy ministries (e.g. FBiH Ministry of Energy, RS Ministry of Industry and Mining) largely rubber-stamp these companies' plans. The fragmentation of BiH's government – with multiple layers (state, two entities, 10 cantons, dozens of municipalities) – actually entrenches elite interests. For example, even adopting an integrated electricity market requires approval by nine parliamentary houses. As the EU accession report notes, energy regulators remain under partisan sway, and legislative reform is often stalled by entity vetoes. In practice, utilities and ministers (tied to SDA/SNSD/HDZ) have far more say than ordinary citizens.

There is a stark imbalance between large and small actors. Resource-intensive projects (coal blocks, big dams, mines) are driven by state-owned or foreign-backed companies with government support. Local communities often have little voice. The protests against small HPPs and lithium mining reveal deep tensions: rural residents who depend on rivers or farming feel excluded from a transition that seems to benefit distant cities, foreign investors, or export markets. One analysis warned that municipalities lose out when hydropower is built – most profits go to the state budget or owners, while local communities bear negative impacts. Indeed, in many dam projects villagers receive few jobs or royalties, fueling resentment and conflict.

BiH's legal and regulatory systems are weak and politicized. Transparency is low (e.g. procurement irregularities) and corruption allegations are common. The country ranks poorly on governance indices. Regulatory bodies (for electricity, hydropower) lack independence, and enforcement of environmental and labor laws is uneven. While activist victories (court cancelations of permits) show that legal avenues can work, they often require drawn-out litigation and international attention. Conversely, powerful interests face little accountability: until 2020 the High Representative had to directly dismiss utility managers due to nepotism (notably in 2006 EP BiH, 2009 EP HZHB). The residue of that political influence persists today.

The alliance structure tends toward an *unjust* transition. Coal-reliant regions (Tuzla, Zenica, Ugljevik) and ethnically marginal areas struggle to benefit from green investments concentrated in other areas or sectors. Unions of miners have resisted rapid coal phase-out, fearing job losses, and they have campaigned to keep elites' control over coal revenues. Meanwhile, urban consumers see limited gains: electricity prices remain high and pollution (from coal plants) still

blights many towns. The small HPP ban shows that some public input can prevail, but even that was a reactive fix (enacted after massive protests). In sum, the energy transition in BiH is constrained by entrenched patronage, low transparency, and uneven playing fields. Civil society and citizens have scored some successes, but the path to a truly just transition – one that prioritizes local needs, social equity, and environmental protection – will require both stronger rule of law and more inclusive governance across entity and territorial levels.

From Extractive Energy to Socially Just Transition

The political economy of Bosnia and Herzegovina's energy transition reveals not a neutral modernization trajectory, but a continuation of entrenched extractive governance shaped by elite-controlled institutions, centralized state-owned enterprises, politically aligned private investors, and international actors whose interventions often reinforce technocratic rather than democratic reform pathways. Coal mines and large hydropower utilities, rather than being phased out toward democratic, decentralized renewable systems, continue to operate as financial arms of ruling parties. Even new renewable projects have frequently been captured by political and economic elites through concession-based models that dispossess local communities, externalize ecological harm, and provide no meaningful redistribution of benefits. Municipalities often lose revenue and control when hydropower concessions are issued, while profits accumulate at higher political levels or among private operators. The result is a transition that risks becoming a green extension of long-standing extractive political logics rather than an opportunity for social justice, participation, and ecological restoration.

We argue for a reconfiguration of power around energy systems—one that centers rights, recognition, redistribution, and participation as core principles of a just transition. Bosnia and Herzegovina's current institutional configuration fragments governance, marginalizes local governments, weakens accountability, and limits democratic control over energy decisions. The analysis has shown that public utilities remain monopolistic and non-accountable, market liberalization is partial and favors incumbents, and regulatory bodies lack independence and legitimacy. Labor remains trapped in politically controlled, unsafe, and financially unsustainable coal operations, while just transition planning is nascent and donor-driven rather than bottom-up. Civic initiatives, particularly grassroots environmental movements, are often the only actors actively contesting destructive energy practices, yet they remain structurally excluded from formal decision-making.

A transformative roadmap for energy justice in BiH must therefore strategically shift power away from centralized, elite-controlled, extractive structures toward a new coalition-led model grounded in democratic accountability, local ownership, and ecological well-being. Public institutions at the state and entity levels must move beyond formal alignment with EU directives toward substantive reforms that enable the decentralization of energy production, strengthen regulatory integrity, and embed just transition mandates within economic planning, budget distribution, labor restructuring, and social protection. This requires institutionalizing participation through legally binding mechanisms for community consent in all energy project approvals, introducing transparent benefit-sharing systems for municipalities and affected communities, mandating full disclosure of concession and subsidy data, and embedding just transition targets into national and entity-level energy and climate plans with robust monitoring and accountability frameworks.

Municipalities, currently bypassed in decision-making, must be repositioned as key agents of transformation. Empowering local governments with fiscal tools, profit-sharing arrangements from energy production, legal authority to protect community resources, and capacity to develop municipal energy plans will allow them to transition from passive recipients of environmental harm to active stewards of local energy futures. Through local energy offices, participatory budgeting models, and support for community-owned and cooperative renewable projects, municipalities can build citizen-based energy democracy from below, especially in coal regions where socio-economic restructuring must prioritize worker retraining, local infrastructure revitalization, and alternative employment pathways aligned with green industrial strategies.

The private sector cannot continue to operate under a rent-seeking, concession-driven model that extracts profit without social or environmental accountability. A just transition requires reorienting industry and private capital toward fair partnership-based renewable production models that mandate local participation, co-ownership mechanisms, social benefit clauses, and strict environmental safeguards. Large energy companies must be subject to transition conditions requiring investment in worker reskilling, local value creation, and decarbonization commitments, while new entrants into the renewable market must adhere to community-rights-based licensing frameworks that center justice rather than least-cost extraction. International investors and development banks must align with these justice principles rather than reinforcing technocratic green growth pathways that ignore power imbalances.

Civil society, labor unions, activist groups, and independent media form the most promising counter-power to elite-driven energy governance. Their current resistance—through strategic litigation, protest mobilization, investigative journalism, and cross-regional coalition building—has already led to landmark wins such as bans on certain hydropower developments and public scrutiny of concession corruption. However, their influence must move from reactive resistance to proactive political shaping of energy futures. Strengthening alliances between environmental movements, coal workers' unions, youth groups, and municipal actors can help build a multi-class coalition for energy democracy that demands restructuring of ownership models, recognition of environmental harms, and redistribution of benefits. Civic organizations should also serve as intermediaries that translate just transition policies into participatory dialogue at community level, especially in marginalized rural and post-industrial coal regions. Independent media must continue to expose elite capture and amplify alternative models of community energy, while also re-framing the energy transition as a matter of fairness, health, and dignity rather than external obligation.

Ultimately, shifting the trajectory of BiH's energy transition depends on changing the political calculus of power. A just transition cannot be achieved through donor-funded pilot projects or technocratic plans alone; it must dismantle structures of extractive accumulation, challenge elite monopolies over energy assets, and redistribute control over production, decision-making, and revenue flows. Justice-oriented energy governance must be anchored in legally protected social rights, recognition of ecological commons, equitable redistribution of costs and benefits, and real participation with veto power for affected communities. Only by democratizing who controls energy, who benefits from it, and who has a voice in designing its future can Bosnia and Herzegovina move beyond a façade of transition toward a socially just, ecologically restorative, and politically emancipatory energy system.

The future of energy in BiH will be determined not by technological availability, but by the capacity of society to rebalance power away from closed circles of extractive elites toward open, community-centered coalitions grounded in justice. A transformative transition is not just about replacing coal with solar panels—it is about replacing exclusion with participation, patronage with accountability, and exploitation with shared prosperity. The task ahead is not merely to decarbonize energy, but to democratize it.

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Association for Research and Social Innovation „Analysis, Design, Transformation“ is a non-governmental organization established in 2014 with commitment to creation of open and knowledge-based communities in Bosnia and Herzegovina that foster inclusive and sustainable development that protects the public interest and the common goods. The organization utilizes novel methods in social engeering and uses design thinking, mixed-method analysis and multistakeholder approach in fostering social innovations. One of its hallmakrs is utilization of the feminist action participatory research method that ensures that organization's programs, initatives and activities are aligned with the needs of communities and staleholders involved in the social innovation design and implementation. The organization works with diverse audiences, depending on the initiative. However, it always strives to include reserachers, experts, entreprenurs, civic activits, journalists and social media professionals, relevant governmental officials, students/youth and community representatives directly affected by a specific social intervention.

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