FISCAL IMPLICATIONS OF NATIONAL EMISSIONS TRADING SYSTEM (ETS) AND DECARBONIZATION IN BOSNIA AND HERZEGOVINA

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Abstract

This paper examines the effects of national Emissions Trading System (ETS) implementation within the framework of the existing fiscal system in Bosnia and Herzegovina (BiH) from the perspective of economic analysis of law. Existing studies analyze the effects of the Carbon Border Adjustment Mechanism (CBAM) on foreign trade and the competitiveness of exporters in BiH, but there is a lack of studies and empirical research on the effects of ETS and CBAM on fiscal stability and on qualitative and quantitative structure of public revenues. Furthermore, most of the studies conducted by the public sector are not publicly available apart from certain results and estimations on CBAM/ETS revenues. However, these studies do not consider the effects of domestic ETS introduction on other existing fiscal revenues and public expenditures. As a result, there is a lack of theoretical basis for further empirical studies on fiscal effects across different administrative levels. This paper examines the influence of ETS and National Energy and Climate Plan (NECP) on public revenues, taxation, and public expenditures in BiH to ensure fiscal stability in the short and medium-term upon domestic ETS implementation. The present analysis contributes to understanding the interconnected determinants of the fiscal system, the causal relationship between the qualitative and quantitative structure of public revenues and expenditures on the one side, and decarbonization as imposed standard in modern climate and energy policies on the other. The discussion of the results of the conducted analysis and considerations for future empirical research on individual segments of the analysis are included in the paper, together with certain political and security considerations in the existing geopolitical landscape.

Keywords: fiscal policy and fiscal stability, energy and climate policy, decarbonization

JEL: H23, H30, H50, Q54

1. Introduction

Strong economic development and industrialization of Bosnia and Herzegovina (BiH) in the post-World War II period were based on coal reserves and hydro potential, ensuring a strong and reliable energy sector. In the period after the aggression against BiH in the late 1990s, under post-war conditions and transitional challenges, there was little to no investment in the energy sector. With international efforts in the field of environmental protection and the establishment of new climate policies, the long-standing paradigm of BiH's electrical energy abundance has been called into question. Electricity remains BiH's most important export product, with coal still dominating electricity production. The decarbonization of BiH's economy entails major socio-economic changes and the full commencement of the Carbon Border Adjustment Mechanism (CBAM) adds additional pressure to adopt legal regulations that will ensure the decarbonization of national economy. Introducing a domestic Emissions Trading System (ETS) along with setting up a carbon price appears to be the only rational response to CBAM, ensuring sources of revenue for investments in renewable energy sources (RES) and improvements in energy efficiency. Introducing the domestic ETS represents a *sui generis* internalization of emission costs at the level of the national economy, which affects the general level of prices. Thus, the national ETS would bring tectonic shifts in the existing economic paradigm, with far-reaching consequences for the fiscal system and the preservation of fiscal stability. The choices facing BiH are not simple, since ensuring financing for investments in RES and existing

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thermal power plants without jeopardizing fiscal stability presents a real challenge.

The first part of the paper provides an overview of the EU ETS and CBAM mechanisms, the legal framework of BiH, and its relationship with the Energy Community *Acquis*. It also highlights key data on the vulnerability and exposure of BiH's industry in the context of the start of CBAM implementation. The second part of the paper presents key economic data for BiH related to the introduction of CBAM and evaluates the economic impacts of CBAM on national economic trends from the perspective of economic analysis of law. The data obtained is used to establish causal links between economic trends and fiscal revenues and expenditures at different levels of government in BiH in the context of decarbonization, national ETS implementation and RES investment. Sourcing funds for National Energy and Climate Plan (NECP) implementation, while managing to offset negative social and economic consequences will become one of key challenges in maintaining fiscal stability. Given that BiH is characterized by pronounced legal fragmentation in the distribution of competences within the spheres of energy, climate, and environmental governance, it is evident that the existing legal framework of fiscal public finance may not be sufficient for the effective implementation of NECP. Consequently, there arises a need for normative and institutional mechanisms capable of ensuring adequate fiscal coordination among different levels of government (State/entities, FBiH/cantons). Certain estimated costs for BiH's NECP (therefore the domestic ETS) are linked with possible funding options. Indeed, the key available macro financial data, paired with the normative framework regulating the fiscal system, shows the magnitude of activities within the public finance system that will necessarily be required in order to address the identified challenges at the legal and institutional levels.

The analysis contributes to the understanding of the interconnected determinants of the fiscal system and the causal relationship between the qualitative and quantitative structure of public revenues and expenditures, as well as of the role of various fiscal authorities across different levels of the government. The aim of the analysis is to identify the incentive mechanisms behind ETS, focusing mainly on electricity as BiH's most important export product. The contribution of the analysis lies in modeling a starting point for further quantitative research and Cost-Benefit Analysis (CBA)s, as well as revenue recycling policies. The identified issues are intended to provide a foundation for normative analyses concerning complementary mechanisms which, *de lege ferenda*, are necessary to ensure the coordination of fiscal and other public policies in BiH.

2. The Fiscal and Distributional Dimensions of Carbon Pricing: Academic Evidence and Policy Lessons

Efforts in public policies design and academic endeavors to address the issue of internalizing greenhouse gas emissions have resulted in the introduction of carbon pricing mechanisms. The key idea behind the conceptualization of carbon pricing, as an economic and legal mechanism, is assigning economic price to emissions, either via a carbon tax or emissions trading system. As with other social internalization of costs, internalization of the carbon price generates fiscal and economic redistribution of costs across national economies. Due to the effects on the prices of products, costs are redistributed across industries, households, and governments. While the cost is initially allocated towards the emitter, through pricing of the affected products, the burden is shifted towards consumers. Furthermore, as governments collect carbon tax revenues, a great part of the revenues is, then, allocated towards industries and households in order to mitigate negative economic and social consequences. The entire cycle is implemented through the fiscal system.

The modern literature, as well as key public policies recommendations by the Organisation for Economic Co-operation and Development (OECD) and similar organizations, recognizes the efficiency of carbon pricing in phasing out greenhouse gas emissions, as well as various social effects of carbon pricing, as a direct consequence of the internalization of costs. Green (2021), in meta-review of ex-post

analysis, provides the key quantitative evidence regarding the ex-post analyses across jurisdictions, and concludes that carbon pricing consistently reduces emissions, but its magnitude depends heavily on price levels and policy stringency. Furthermore, the analysis proves that *we still know relatively little about ex-post* performance of carbon pricing mechanisms (p. 14). Other studies also show that the efficiency of carbon pricing instruments in practice is often not achieved. Bayer and Aklin (2020) show that results regarding the effectiveness are mixed mostly due to the fact that lower carbon pricing is implemented in practice, as high carbon pricing means severe social costs and consequences. Thus, carbon leakage occurs via dislocation of the carbon intensive industries to countries with weaker regulations (p. 8809).

As most of the empirical studies, especially of the EU ETS, were focused on either economic or environmental outcomes, a large-scale study with a combined approach was necessary. The OECD (2021) provided evidence that emissions cap and verified emissions decreased over time (p. 98), that firm performance was largely unaffected (p. 101), and that the effects of the EU ETS were heterogenous across sectors (p. 102). Furthermore, market based environmental policies, such as EU ETS are superior to other environmental policies, as they ensure additional fiscal revenues that can be recycled. The use of revenues from environmental policies is a crucial aspect in creating support from the public for ambitious environmental policies. Also, governments can ensure that market-based carbon instruments do not increase the overall tax burden, but no empirical evidence was provided for this assumption (OECD, 2021, p. 38).

Certain theoretical approaches, using analytic tools of economic analysis of law, emphasise that optimal recycling strategies depend on broader tax system distortions. In conclusion, carbon pricing distortions are not eligible for evaluation independently of fiscal structure, as they in the fiscal sense, create additional tax burden. The effects on the economy as a whole differ significantly depending on the recycling method, but the form of recycling makes little difference to the profit impacts in the carbon-intensive industries.At the same time, empirical evidence shows that industries that are coal-fired (electricity generation) conduct business activities with profit losses (Gouldor, 2018, p. 323). Another meta-study shows that even progressive policies increase consumer prices, which raises the risk of poverty for low-income households (Nils Ohlendorf et al., 2020, p. 18).

3. Legal framework: CBAM

CBAM is a climate policy instrument, legally and technically structured to prevent *carbon leakage*. Fundamentally, it is closely linked and designed in conjunction with the EU ETS. CBAM supports the objectives of the Paris Agreement by incentivizing emission reductions by operators and producers in non-EU countries, whereas the EU ETS internalizes negative externalities of greenhouse gas emissions within the EU market. Empirical data shows that, without CBAM, for every ton of CO_2 emissions avoided within the EU due to tighter EU ETS regulations, approximately 0.19 tons of emissions would "leak" (OECD, 2025). The key idea behind introducing CBAM is to complement the ETS, to expand the reach and strengthen the incentive for decarbonization among the EU's key trading partners. CBAM will gradually replace the existing mechanisms used by the EU to mitigate carbon leakage risk, especially the free allocation of emissions allowances under the EU ETS. CBAM certificates, tied to the payment of additional levies, will be introduced from 2027.

CBAM has been established under the Regulation on the establishment of a carbon border adjustment mechanism (Regulation (EU) 2023/956, 2023), based on Article 191(2) of the Treaty on the Functioning of the European Union (Consolidated version of the Treaty on the Functioning of the European Union, 2012), which enshrines the fundamental "polluter pays" principle, the same legal basis underpinning the ETS. Although both instruments are designed to reduce greenhouse gas emissions and accelerate the transition to RES, there are significant differences. The EU ETS is based on the allocation of emission permits to polluters, aiming to stimulate reductions through innovation and investments in renewable energy (RE). This way, negative externalities

are internalized. Surplus unused allowances can be sold on the emissions market. From the producers' perspective and economic rationale, emissions become a production cost, influencing the final price of products by increasing production costs. Thus, emissions are given a market price. CBAM primarily aims to prevent the relocation of energy-intensive production outside the EU borders to avoid the costs imposed by the EU ETS. It seeks to expand the cost effects of emissions globally, pressuring third countries to adopt equivalent climate policies, specifically the domestic ETS. The revenue from the EU ETS remains within the EU Member States and is earmarked for domestic decarbonization efforts, while CBAM is designed to project EU climate policies beyond its borders onto global trade.

3.1 The Energy Sector and Energy Transition in Bosnia and Herzegovina

The Constitution of BiH has resulted in a complex state's structure. BiH consists of two entities, the Federation of BiH (FBiH) and Republika Srpska (RS), as well as the Brčko District of BiH (BDBiH) (Annex IV of the General Framework Agreement for Peace in Bosnia and Herzegovina, 2009). FBiH is further divided into 10 cantons as administrative units. One of the fundamental problems in creating preconditions for the economic and industrial development of the state is the division of competences, according to which traditionally understood state competences have been assigned to the entities, while entity policies are merely coordinated at a state level due to the legal obligation on transposition of certain aspects of the European Community's *Acquis* at a state level. Given the constitutionally established competences, a consensus regarding the model of ETS implementation at the state level will be necessary. As the implementation of the ETS in BiH implies the liberalization of the electricity market, the prices of electricity and coal, and above all the carbon price in the domestic ETS, as well as the fiscal balances of the entities in BiH, will affect the implementation of the domestic ETS. The second biggest issue in introducing the domestic ETS lies in coal and electricity price. Regarding electricity, two parallel systems of price determination are currently in place. For households and small businesses, electricity prices are determined by the entities. This price primarily depends on electricity production costs and transmission, as well as distribution costs. At the same time, there is a partially liberalized system for determining electricity prices for large consumers and industries. Such electricity buyers negotiate prices directly with suppliers and the price is influenced by local production costs, electricity import prices, regional market prices, as well as supply and demand in the market. However, competition in the electricity sector, compared to the EU market, is almost nonexistent. The coal market is also not fully liberalized. Economic entities in the coal mining industry are mostly owned or controlled by the entity governments. The main buyers of coal are also owned or controlled by the entity governments. Therefore, the price of coal is heavily regulated. This is a key factor affecting economic stability after CBAM/national ETS introduction, since rising prices will create challenges to economic and fiscal stability and, consequently, social stability.

In the context of the implementation of the *Acquis*, the latest Annual Implementation Report for BiH, published by the Secretariat of the Energy Community (EC), brings concerning data, where the implementation status of *Acquis* per Cluster in BiH is as follows: Market and integration 26%, Decarbonization of Energy Sector 27%, Ensuring Energy Security 9%, Improving the Environment 31% and Performance of Authorities 51% (Energy Community Secretariat, 2025, p. 2). The electricity sector is crucial for BiH. In this area, BiH has not transposed the Electricity Integration Package (EIP), the Third Energy Package, as well as other legal sources. In terms of RE, the target of achieving a 43.6% share of RE in the gross final energy consumption is in line with the 2030 target set by the EC (Energy Community Secretariat, 2025, p. 9). The adequacy of the overall RE share is a result of the large hydro potential, whereby the dominant share comes from the existing pre-war capacities of hydroelectric power plants.

3.2 CBAM: Scope, Revenue and Exposure

In terms of the CBAM's scope, it covers a total of six sectors, all of which represent carbon-intensive industries. These are cement,

aluminum, iron and steel, electricity, fertilizers, and hydrogen. The idea behind determining the scope is based on achieving the broadest possible coverage of targeted emissions with the narrowest possible range of products to minimize the market impact. The CBAM's scope is limited: covered trade flows represent 3% of EU imports from non-EU countries. In the EU, CBAM-covered sectors account for 7.0% of manufacturing production, 2.3% of total gross output, 1.1% of value-added and 0.6% of employment (OECD, 2025b, p. 1). There is a legal basis for the expansion of CBAM's effects by introducing additional products into CBAM's reach, however, the OECD's research suggests that adding 1,400 more products would only marginally reduce global emissions (-0.02%). Therefore, further expansion would represent a potentially unjustified broadening of the CBAM's scope, which would impact the potential cost increase of these products without an adequate proportional result (OECD, 2025).

Although there is a legal framework for exemption from CBAM, BiH is far from meeting these conditions. In terms of compliance with the CBAM exemption criteria for electricity, it is stated that progress in the electricity market coupling as a precondition for an exemption from CBAM for electricity remains weak. The very main reason is the transposition of the EIP, which has not been completed by any Contracting Party of the EC, including BiH (Energy Community Secretariat, 2024, p. 5). In principle, three forms of exemption from CBAM payment have been established. The first relates to the participation of the exporter state in the EU ETS while the second refers to the implementation of its own carbon pricing system (partial or full exemption). The third form of exemption is achieved through the integration of the electricity sector with the EU electricity market. In this case, there are additional criteria primarily related to the goals of climate neutrality by 2050 (Allert et al., 2023, p. 5). The introduction of its own carbon pricing system – the domestic ETS, in BiH represents the most adequate response to the introduction of CBAM.

CBAM is primarily designed as a climate measure; however, CBAM can also be perceived as a fiscal measure. There are two dimensions regarding the distribution and use of the funds collected through CBAM: the use of CBAM revenues as grants, that is, as aid to non-member states to mitigate the effects of the introduction of CBAM, and on the other hand, the choice of beneficiaries of these funds in the form of governments of non-EU member states or exporters in those states affected by CBAM. Funds from CBAM will be collected by the competent authority in the EU Member State, and the state will be able to retain 25% of the revenues, while the remainder belongs to the EU budget. In the case of funds usage as a source of financing/crediting decarbonization measures in non-EU member states, BiH could potentially have significant access to the funds which could be used to foster RES investments. Actual CBAM revenue collection will commence in 2027, when revenues related to imports made in 2026 will be collected retroactively. CBAM revenues should be clearly distinguished from the burden of CBAM, in the sense of identifying the subject that ultimately bears the burden of CBAM, that is, whose economic strength is reduced by the amount of CBAM.

Not all the EU's trading partners are equally affected by the introduction of CBAM. For a few reasons, BiH falls within the group of more severely impacted countries, as demonstrated by numerous available studies and analyses. According to the available World Bank's data, the aggregate CBAM exposure index is very high for Zimbabwe, Ukraine, Georgia, and Mozambique, and high for India, the Russian Federation, Kazakhstan, Belarus, South Africa, Egypt, and others (World Bank, 2025). The Western Balkans (WB6), including BiH, face a dual challenge: these countries need to accelerate decarbonization, while maintaining macro-fiscal stability becomes challenging. At the same time, social cohesion is always affected in case of potential emerging of the fiscal instability.

Regarding the convergence of the Western Balkan economies with the EU in terms of the Greening cluster, BiH lags the WB6 average in all segments, except for water production. The data indicates that, in terms of CO_2 emissions intensity and energy production, Kosovo, Serbia, and BiH are in the most unfavorable position. The only aspect of the Greening

cluster in which BiH performs well is the segment of RE generation capacity, primarily owing to hydropower plants (OECD, WB6, p. 100).

The same OECD report indicates that the introduction of CBAM most significantly affects BiH, Montenegro, North Macedonia, and Serbia due to the structure of their exports. At the same time, the entire region is characterized by slow progress in the introduction of carbon pricing, given that only Montenegro has implemented the ETS, while segments of state aid in the sphere of fossil fuels remain pervasive throughout the region (p. 102). Serbia is planning CO_2 tax from 2027 with gradual increases in carbon price, from EUR 4 per ton of CO_2, to EUR 40 in 2030, while the existing ETS in Montenegro has a minimum price of EUR 24 per ton of CO_2 equivalent (Balkan Green Energy News, 2024). The analysis conducted by the French Development Agency in 2022, points to the potential rise in unemployment and the decrease in labor value in BiH due to the introduction of CBAM. BiH also belongs to the group of trading partners with the most carbon-intensive economies in 2019 (Ülgen, 2023). Moreover, BiH, along with Serbia, is more severely affected by the indirect consequences of CBAM, reflected in the dynamics of supply and logistics chains at the national level (Espagne et al., 2022, p. 7). An additional study suggests, given the potentially significant adverse impact of a CO_2 emissions tax in the Western Balkan countries, that governments must coordinate its implementation in order to mitigate negative effects on the energy and other industrial sectors, where revenue recycling becomes the highlighted mechanism (Abdurrahmani & Deva, 2024, p. 3657-3658).

It is important to understand that different trading partners export the products covered by CBAM to the EU in varying volumes. For some trading partners, the export of these products represents an extremely large share of their total exports, making it exceptionally difficult to find alternative markets. Coal, as a solid fossil fuel, does not hold the same significance in all countries. BiH belongs to the group of countries where coal represents an essential foundation of the economic (energy sector's) paradigm, particularly considering its role in electricity generation through thermal power plants. The average carbon intensity of electricity generation in BiH, Montenegro, Serbia, and Kosovo is 1.4 tCO_2/MWh, while the EU average is 0.255 tCO_2/MWh (Allert et al., 2023, p. 8). Key data on the volume of trade between BiH and the EU confirms the significant dependence of BiH's industry on the EU market. Trade deficits constantly increase over time. Electricity represents 6.32% of the total exports in 2023, while iron and steel constructions represent 3.64% of the total exports in 2023 (Ministry of Foreign Trade and Economic Relations of BiH, 2024, pp. 23 and 30). Even though all electricity is not mostly exported to CEFTA, it is still important to understand that the CBAM mechanism will deter other non-EU countries (such as the CEFTA members) from importing electricity from BiH originating from solid fossil fuels.

Table 1. Annual balance of electricity statistics 2021-2023, BiH, in gwH

	2021	2022	2023
Gross/net production	18,536/17,343	16,384/15,162	17,186/16,046
Gross/net production – Hydro power plants	6,796/6,755	4,739/4,706	6,761/6,723
Gross/net production – TPP and CHP	10,872/9,821	10,706/9,628	9,389/8,405
Gross/net production – Autoproducers	868/767	939/828	1,036/918
Import	3,259	3,828	3,655
Export	8,014	6,856	7,886
Final consumption	10,792	10,562	10,265
Final consumption - Industry	3,031	2,705	2,291

Source: BHAS 2022-2024

The data in Table 1 shows a surplus in electricity production, indicating export potential in the electricity sector. An insight into the structure of electricity production in FBiH and RS, shows that in 2023 thermal power plants provided 45.66 of the total electricity production in FBiH (Regulatory Commission for Energy in FBiH, 2024, p. 62) and 62.81% in RS (RS Government, 2024, p. 4). In the RES structure, hydropower plants provide 88.53% of the total electricity produced in the RES facility (Regulatory Commission for Energy in FBiH, 2024, p. 61). The official statistical data at the BiH level indicates that, according to the latest available data from 2020, the RE share in the total final energy consumption was 37.7%, representing a 2.4% increase compared to 2019 (BHAS, 2024b, p. 34). Regarding fuel mix in the primary production of energy, decarbonization in BiH requires an absolute change in the economic paradigm based on a potential reduction in electricity production, since solid fossil fuels include approximately 63.04% in primary production of energy based on the data provided by BHAS (BHAS, 2024c). This inherently implies an increase in electricity prices and thus an increase in the general price level. The coal mining sector records low levels of investment and productivity. A particular problem is also the insufficient gas infrastructure. Under the auspices of regional and European geopolitics, significant diplomatic efforts are directed toward reaching internal compromises to address the problem of insufficient gas infrastructure. Until recently, the construction of a new thermal power plant in BiH was under consideration. However, recent political developments suggest that this idea has been abandoned. This approach is important as it illustrates the ambiguous signals sent by the domestic political sphere regarding the shift in the energy paradigm. Despite the international legal obligations BiH has undertaken, the signals from stakeholders remain unclear; the coal and thermal power plant paradigm still exists, while at the same time significant efforts are being made to establish a legal framework that would lead BiH toward decarbonization. With the beginning of CBAM application in 2026, the new reality facing BiH indicates that maintaining fiscal stability will become a significant challenge due to the necessity of increased investments in the energy sector. The paper also presents off-budget revenues (EU programs) that could support BiH in the decarbonization process; however, these cannot fully cover the increased expenditures associated with energy transition.

4. Results and Discussion

4.1 Economic Analysis of the CBAM Burden

It is unquestionable that the beginning of CBAM implementation will produce indirect effects on the markets of the EU's most significant trading partners. The actual impact will depend on the private and public response to the start of CBAM application, which becomes an administrative-fiscal barrier for imports of goods from these countries. This is achieved by applying CBAM to specific products imported into the EU. In its functional meaning, CBAM represents an import duty in the broadest sense, contributing to equalizing the carbon price for imported and domestic products in the EU. The CBAM Regulation stipulates that an entity holding the status of an authorized CBAM declarant must submit declarations of embedded emissions in imported products into the EU and, consequently, must purchase and surrender CBAM certificates corresponding to the declared emissions. Since CBAM is a climate policy instrument, and the carbon price within it is predominantly motivated by non-fiscal objectives, the value of CBAM certificates can be reduced by the carbon price already paid in the country of origin. An additional cost appears within the production chain unless it is avoided through the use of clean energy in the production process, which is the doctrinal goal of CBAM. This will result either in a higher final product price on the EU market or a reduced margin for exporters from the EU's trading partners.

The question of "who bears the cost of carbon" is very hard to answer, since different products and competition in international markets will decide whether final consumer in the EU or exporter bear the CBAM burden. The legal regulation determines the EU importer of goods affected by CBAM as the entity that pays CBAM; however, in market logic, this entity will attempt to pass on the burden of CBAM either to the exporter (the supplier of the given goods

from a non-EU country) or to the end user - the consumer/buyer of the given goods in the EU. CBAM has certain characteristics of fiscal revenues, primarily customs duties and taxes. Firstly, CBAM represents a sui generis environmental customs duty, which as a legal obligation arises upon the import of certain goods into the EU market. This means that market price mechanisms of goods imported enable "bypassing" the legal determination of the taxpayer. The economic strength of the importer and the laws of supply and demand of the given product influence the possibility of passing on CBAM, either to the exporter, or to the final consumer in the EU.

The interplay between private and public initiatives is analyzed in the context of CBAM through the legal effects of the regulation introducing CBAM, particularly regarding the incentives it creates for behavioral alignment among market actors and the economic policies of trading partners. Even though markets quickly react to production cost changes and determine who bears the increased cost, the starting premise is the historical significance of mutual trade relations of the EU and the affected trade partner's economy. CBAM, as an administrative-fiscal barrier, affects all trading partners, since its primary intention is to prevent carbon leakage. Therefore, it is expected that the signals within the main trading partners will focus on mitigating the effects of CBAM rather than bypassing the EU market. In such a constellation, the significance of existing trade exchange, specifically exports to the EU market, differs from country to country, so the strength of incentives to influence the economic policy of EU trading partners may vary.

This is significant for two reasons: first, from a doctrinal standpoint, the EU legislator's intention is to allow trading partners to implement their own systems for determining the carbon price; moreover, the Regulation acts as an economic incentive for establishing a domestic carbon pricing system. The economic incentive lies in the allocation of revenues generated through CBAM and the domestic ETS. Second, such a system assumes the existence of accredited national verifiers of embedded emissions, potentially resulting in a twofold increase in the cost of embedded emissions in products: first, by raising the final product price through the pass-through of the CBAM cost, and second, through compliance costs related to emissions verification.

Unlike the ETS, CBAM revenues are directed into decarbonization funds in the importing EU member states. With the introduction of CBAM, the carbon price becomes a reference for producers of affected products outside the EU. Such products become more expensive according to the carbon price in the European market, meaning that CBAM's introduction can have significant effects on competitiveness and established supply chains for these products. The CBAM incentive can be viewed from two perspectives: first, from the perspective of the producer whose product is covered by the CBAM Regulation; and second, from the perspective of the country of origin of those products. Producers face the alternative of reducing emissions through innovation or switching to RES to maintain competitiveness. Reducing emissions leads to a lower final price for imported products in the EU market, but at the same time, additional investments in RES or the use of clean energy, which is generally more expensive, will increase total production costs. For these reasons, CBAM encourages the introduction of the domestic ETS, because even without the domestic ETS, products will become more expensive. The difference, in the case of a national ETS, reflects the national budget of trading partners, where CBAM represents a loss of public revenues, while a national ETS generates significant public revenues. However, a national ETS burdens the entire national economy and domestic market, whereas CBAM impacts only specific industries, namely exporters within those sectors. The importance of those industries and the overall exposure of the economy to CBAM will determine whether the introduction of a national ETS and setting a domestic carbon price constitutes a reasonable action for economic and fiscal policymakers.

The producer's strategy will depend on the actions of direct competitors and their ability to offer the same product at a lower price. It is important to understand that CBAM imposes an equal "export barrier" to the EU market for competitors from different non-EU countries. In this equation, several aspects are crucial for

the competitiveness of producers whose products are subject to CBAM:

i. Existence of alternative markets for the product: If alternative markets exist where the product can be placed, then CBAM will not have a strong incentive effect on such producers. They will choose to export to alternative markets if the price they can achieve is better than the price achieved by exporting to the EU. However, other producers will also try to reallocate their exports, meaning that those markets would be "flooded" with the supply, thus affecting the price. This would lead to the scenario presented below.

ii. Absence of alternative markets for the product: If no alternative markets are available, the producer will strive to maintain the export price from the period before CBAM's introduction, transferring the CBAM tax burden to the final consumer in the EU. If other producers (competitors) can offer the same product at the same price but have generated fewer harmful emissions during production, they will have a price advantage on the EU market, as EU importers will choose such products to pay less CBAM tax. In this situation, a noncompetitive producer will be forced to lower the export price to ensure the final price on the EU market matches that of competitors who pay a lower CBAM amount. A smaller pre-tax margin will mean fewer funds for transitioning to RES and maintaining future competitiveness. Thus, incentives arise from competitiveness on both national and international levels.

In situation (2.), the economic policies of certain states can result in a better market position for their producers compared to their international competitors, thus protecting national production and exports. Strategic support for RES, incentives, and credit lines for energy systems can create comparative advantages. Introducing the domestic ETS ensures revenues for incentives, credit lines, grants, and other forms of state aid. Fiscal policy offers a range of measures and instruments that can address these problems, depending on national strategies for sectoral development. Here, the fiscal nature of CBAM and the national ETS in non-EU countries *shines brightly*. From a Pareto standpoint, a larger share of GDP will have to be directed toward RES, given that CBAM is legally structured to create long-term incentives for addressing the issue of competitiveness.

The following situation emphasizes the matter: two exporters from comparable countries export their products to the EU market. If both exporters are unable or unwilling to invest in RES because they operate in markets with a small amount of competition, CBAM included in the final product price may result in European consumer ultimately bearing the price increase. However, over the long term, due to the production structure in certain countries and prioritization of certain industries/sectors, the introduction of the domestic ETS could occur to achieve competitive international advantage and improve living standards by investing in environmental protection and RES. Thus, the combination of public and private incentives toward building a national ETS means that long-term neglect of such development is not a strategic option. For this reason, it is necessary to conduct studies and analysis that will identify the optimal course and pace of action under the new conditions of international trade with the EU.

It could be said that the short-term focus of expanding trading partner countries will be on preserving current fiscal stability, employment and export volume, while simultaneously increasing public spending on RES, energy efficiency, and the decarbonization of the economy in general. This can be achieved with lower domestic carbon prices. In the medium and long term, the focus should shift toward rising carbon price in the national ETS to the EU level, making significant investments in the energy sector and potentially even phasing out carbon-intensive industries as the economic prosperity of these countries increases.

Table 2. Carbon price incentive mechanisms

National Carbon price 0 or < than Carbon price in the EU	National Carbon price > or = than Carbon price in the EU
+ Cheaper electricity in the national market	- Expensive electricity in the national market and reduced potential for export of electricity
+ Lower product prices in national market	- Higher product prices in national market
- Lower public revenues from the national "carbon tax" - Less money for funding RES investments	+ Higher public revenues from the national "carbon tax" + More money for funding RES investments
- Lower promotion of decarbonization	+ Higher promotion of decarbonization
- Potential loss of corporate tax revenues due to a decrease in average margin in the subject product industry	- Potential loss of corporate tax revenues due to a decrease in average margin in the subject product industry
- High risk of losing capital investments and/or capital shifting	+ Lower risk of losing capital investments and/or capital shifting
- Lower possibility for integration and benefits from the EU electricity market, hence lower security of the national energy sector	+ Higher possibility for integration and benefits from the EU electricity market hence higher security of the national energy sector

Source: Own research

The current economic circumstances show that the beginning of CBAM implementation for BiH comes at an unfavorable moment, which may negatively affect economic activity, lead to a decrease in volume of exports, and potentially even increase unemployment. In the last few years, BiH has experienced significant inflation and an increase in the Consumer Price Index (CPI). Salaries in the public sector and the minimum wage in general have increased, in both FBiH and RS, affecting the overall tax burden, and the total volume of exports decreased in 2023.

4.2 Fiscal Stability and NECP Implementation

The NECP 2030 (Ministry of Foreign Trade and Economic Relations ofBiH, 2024b) advocates for avoiding CBAM obligations and establishing a domestic ETS model, making this strategic objective the starting point for the conducted analysis of CBAM/ETS effects on fiscal stability. At this stage, impact assessments of CBAM on the economy of BiH are not publicly available. The Ministry of Foreign Trade and Economic Relations of BiH assessed the CBAM effects on the national economy. However, aside from selected data points from this assessment, full analysis is not available to the wider public. "*Preliminary analyses indicate that (...), the best solution for BiH would be the gradual introduction of an ETS. (...) The analyses show that under the CBAM mechanism, BiH would pay approximately BAM 1.3 billion annually into the EU budget, losing about 800 jobs per year. In contrast, the full implementation of the domestic ETS today would generate around BAM 3 billion annually for the domestic budget, albeit with an estimated loss of 1,400 jobs per year. Projections show that, in the initial phase, a combination of CBAM and ETS would result in approximately BAM 290 million remaining in BiH annually, while around BAM 380 million would go to the EU budget*" (Softić, 2024, p. 4).

The NECP draft provides general references to financing sources for the implementation of strategic measures across different sectors, along with certain quantitative data regarding the estimated costs of individual measures aimed at achieving strategic goals. In the context of decarbonization, key measures include those aimed at both increasing the share of energy produced from RES and reducing the total final electricity consumption. Projection of costs is estimated to BAM 13,430,88 million, where approximately 55% of the total costs fall under the category of electric energy (Ministry of Foreign Trade and Economic Relations of BiH, 2024b, p. 278). Below is data selected on the necessary investments by individual sectors to meet and achieve the NECP objectives, as well as the total estimated monetary cost (investments and

costs). Generic investment costs per 1 MW of installed capacity are estimated as follows: hydro power plants (HPPs) BAM 5.4 million/MW, wind power plants (WPPs) BAM 2.3 million/MW, and solar power plants (SPPs) BAM 1.5 million/MW (Ministry of Foreign Trade and Economic Relations of BiH, 2024b, p. 278). In terms of horizontal distribution of the costs between entities and BDBiH, the total costs are divided as follows: FBiH in amount of BAM 7,526,98 million, RS in amount of BAM 5,068 million and BDBiH in amount of BAM 142.20 million (Ministry of Foreign Trade and Economic Relations of BiH, 2024b, p. 279). To put this into perspective, in the following Table 3, the consolidated financial data on public expenditure in BiH at all administrative levels is presented, which provides a more accurate insight into the actual fiscal position.

Table 3. Consolidated Public Expenditure 2023-2025, BiH, in mil BAM

Consolidated expenditure	2023	2024	2025
Total Consolidated expenditure – Institutions of BiH	1,299.0	1,351.4	1,566.5
Consolidated expenditure - FBiH	12,689.1	14,173.4	14,919.5
Consolidated expenditure - RS	6,890.2	7,536.8	8,083.7
Consolidated expenditure - BD	316.1	509.5	380.9
Total Consolidated expenditure in BiH at all levels	21,194.4	23,571.2	24,950.5

Source: Ministry of Finance and Treasury of BiH 2024

Based on the presented data, it is evident that the costs of implementing NECP, once adopted, will represent a significant burden that could potentially threaten financial stability in BiH. The total consolidated expenditure at all levels in BiH in 2025 exceeds the total funds required for NECP implementation by the end of 2030 by BAM 11,519,62 million. NECP implementation costs in the period 2026-2030 are around 53.83% of the total consolidated public expenditure in BiH. Based on the data and projections of the total consolidated expenditure in BiH made by the Fiscal Council of BiH, the analysis shows that the total consolidated expenditure in the period 2023-2027 increases by 5.38% on an annual basis. Considering the inflation and rise in general price levels, as well as the structure of fiscal revenues in BiH where revenues from indirect taxes are dominant and have a major role in public funding, the annual growth rate of the total consolidated expenditure will be followed by the rise in the costs of NECP implementation. Thus, an increase in the total consolidated expenditure will be compensated for by higher costs of NECP implementation. This makes the financial projections outlined in NECP unconvincing in terms of the realistic possibility of achieving the set targets, even under conditions of increased receipts from various EU financial assistance and support programs. The size of the public sector and the total share of employees in the public sector burden public budgets across all levels of government in BiH. Full NECP implementation would mean that around 10% of the total consolidated expenditure in BiH on a yearly basis in the period 2026-2030 are allocated towards NECP implementation. The only rational possibility to achieve full NECP implementation seems to be an increase in the total public debt. Furthermore, public funding for NECP implementation advocates for domestic ETS introduction.

The Ministry of Foreign Trade and Economic Relations estimated that, with full ETS implementation between 2026 and 2030 (aligning the domestic carbon price with that of the EU), BiH's economy would contribute approximately BAM 3 billion to the domestic budget. However, this scenario is unlikely to happen since it would bring chaotic consequences in national's economy, where energy sector could even collapse bringing severe social implications. In the initial phase, under a combination of CBAM and the national ETS (with a domestic carbon price lower than the EU price), which is a moderate solution between the extremes, around BAM 290 million annually would constitute public revenues for domestic budgets, while about BAM 380 million would be transferred to the EU (Softić, 2024, p. 4). However, these amounts

should be viewed from a Pareto standpoint; increase in domestic ETS revenues does not *per se* mean an absolute increase in the total public revenues, as other sources of fiscal revenues would slightly decrease. Nevertheless, with rational legislative provisions that would ensure earmarking of ETS revenues for NECP implementation, significant funds would be designated for major capital projects under NECP, easing the process of adoption of *sensitive* political decisions on expensive *ventures* directed towards the modernization of existing thermal power plants. A particularly important issue in the analysis is the treatment of the funds accounted for from the implementation of a national ETS. Two key problems arise: the first concerns BiH inability to timely implement a national ETS and the second relates to the analysis overlooking potentially higher expenditures for mitigating negative effects and market adjustments. Given that BiH will not be able to implement the national ETS soon due to a lack of sufficient regulation, any projection regarding the transposition of EU legal frameworks is precarious. It must be borne in mind that BiH has not yet fully transposed even the Third Energy Package of 2009. At the same time, the pressure to accelerate the transposition process has never been greater, particularly due to the start of CBAM application. To ensure the collection of additional funds needed for NECP implementation, BiH will require a temporary alternative to an explicit national carbon price and the ETS. The second problem mentioned in the analysis concerns the assumption that the conservative estimate of public revenue growth would offset future social expenditures related to mitigating the negative impacts of introducing the national ETS. The reference study by the Ministry of Foreign Trade and Economic Relations indicates that there will be annual reductions in employment in the sectors most exposed to ETS introduction. The analysis estimates the loss of direct jobs while disregarding indirect effects resulting from changes in supply chains and market interconnections, meaning that the actual loss of jobs could be higher. Without concrete empirical research, it is not possible to draw definitive conclusions on this matter. Particularly important are the age structure of the workforce in the affected sectors, the geographic distribution of impacted sectors, and similar factors such as dependence of local economies *tightly built around* the affected industries. It is very important to emphasize that NECP allocated BAM 586.9 mil. for "Just Transition" (Ministry of Foreign Trade and Economic Relations of BiH, 2024b, p. 278). Just Transition includes the development of appropriate social programs and education, as well as retraining programs for personnel whose employment is linked to coal exploitation as a resource. These funds, due to sheer amounts planned, could potentially offset negative social and economic consequences. However, without further empirical analysis, drawing an assessment becomes speculative at best since no supporting analysis are provided in NECP. According to the IMF estimates, the negative effects of ETS on GDP growth can be mitigated through revenue recycling measures, whereby 20 percent of collected revenues are recycled through cash transfers, 50 percent through labor tax reductions, and the remaining 30 percent through public investment. In such a case, the negative impact on GDP would be compensated (IMF, 2024, p. 32). Allocation of funds and financial sources is a very important part of maintaining fiscal stability and fiscal coordination at the state level of BiH. It could become a major issue due to needs and "wishes" made by entities which are represented in the Fiscal Council of BiH.

Understanding the social implications of ETS introduction raises the issue of how the burden is distributed under ETS implementation effects. If the burden is equally distributed among all, social justice cannot be achieved since negative effects will not be equally distributed among sectors and regions. For instance, low-income households in coal-mining regions, which primarily use coal for heating, must be supported in transitioning to alternative heating systems as coal prices rise. Moreover, since the ETS is likely to cause increases in prices of other energy sources (primarily due to supply and demand mechanisms), these households must not be left to bear the burden alone. Local economies in the regions in which coal mines are located will have to bear the full economic impact of ETS implementation. Even at the cost of increased indebtedness and public debt growth during the decarbonization process, the state

and entities must ensure the protection of the economically most vulnerable groups.

It is necessary to consider additional sources of financing for the energy transition and decarbonization processes, with the moderate level of BiH's total public debt potentially being a decisive factor. Additional sources of the remaining required funds could include various EU programs aimed at supporting climate change mitigation, decarbonization, energy security, and investments in RES. Numerous programs and funds are accessible to BiH, offering opportunities for favorable credit lines or even non-repayable grants. Before presenting potential funding sources, it is necessary to analyze the current state of BiH's public debt (Ministry of Finance and Treasury of BiH, 2025, p. 8).

Table 4. Public debt, Q4 2024, BiH, in mil. BAM

Internal debt	9,234.57
External debt	4,504.08
Consolidated internal debt	4,112.34
Consolidated external debt	8,933.14
Consolidated total debt	13,045.48
GDP	53,519.00
Consolidated total debt as share of GDP	25.67%

Source: Ministry of Finance and Treasury of BiH 2025

The presented data indicates that BiH has a possibility to increase its overall external debt with the purpose of financing the implementation of NECP, without pushing the total level of indebtedness to a critical point. However, certain aspects of the current public debt situation should be considered. First, the entities are not in the same position, since RS has a larger public debt compared to FBiH. Second, due to the complex administrative structure in BiH and various constitutional mechanisms present in Annex IV, political decisions could be hard to achieve in the present political situation in BiH. The decarbonization process is a striking example of why it is necessary to restrain the long-term growth of public debt to maintain the ability to borrow in times of major market transitions, such as the upcoming implementation of the ETS in BiH. The logic is the following: the higher the price of coal, the higher the public revenues collected within the ETS framework, as well as the expenditure required to mitigate social and economic consequences. Given that the analysis herein uses moderate coal price projections, the expected negative effects are also moderate.

According to the IMF estimates, "*the ETS may be a valuable source of short to medium-term revenues, raising over 3 percent of GDP in 2030*" (IMF, 2024, p. 31). The domestic ETS may also stimulate near-shoring, and in the event of increased FDIs, the resulting employment growth could compensate for job losses in the affected sectors. While the ETS will have a short- to medium-term negative impact on GDP growth rates, the long-term effect is expected to be positive for two reasons. First, the introduction of the ETS will significantly liberalize the market, making substantial FDI in the energy sector highly attractive. From the perspective of BiH's energy security, this consequence does not pose a risk; rather, it enhances energy security and reduces dependence on Russian gas at a time when coal is declining in significance. Second, the introduction of the ETS will raise the price of electricity and potentially other energy sources. This outcome will encourage economically rational behavior among the BiH population in two ways: first, it will incentivize private investment in RES for personal consumption. This incentive will be directed at the installation of solar panels for individual needs, as well as the creation of citizen energy communities. Second, higher coal and electricity prices will reduce the population's inertia regarding investments in energy efficiency, particularly in multi-residential buildings in larger urban areas. Reducing the total electricity consumption will help alleviate negative implications and budgetary pressures. The state must provide financial and technical

support, remove administrative barriers, and facilitate legal procedures. However, it is irrational to expect that public budgets alone can bear the burden of energy transition. Liberalization of the electricity market sends positive signals to private investors, which will have a long-term positive effect on RES investments. In such a scenario, the state should primarily undertake major investments in energy infrastructure and the grid, as well as mitigate the effects on the incomes of the most vulnerable households and SMEs. When seeking sources of financing for significant public investments in energy infrastructure, the state may justifiably resort to additional external borrowing, considering that long-term GDP growth will provide the economic basis for future debt repayment. Some of the potential sources of financing for NECP implementation include Instrument for Pre-accession Assistance (IPA), United Nations Development Programme (UNDP) and Green Economic Development, Green Climate Fund (GCF), and similar sources.

The Draft Roadmap and Action Plan for the implementation of BiH's Nationally Determined Contributions (2020–2030) lists the following institutions and funds as potential sources of financing for decarbonization efforts: EU Cohesion Funds; Adaptation Fund; Horizon; LIFE Programme; Global Energy Efficiency and Renewable Energy Fund; Global Climate Partnership Fund (GCPF); Structural Funds; European Social Fund (ESF); European Union Solidarity Fund (EUSF); European Territorial Cooperation (ETC); European Maritime and Fisheries Fund (EMFF); European Globalization and Adjustment Fund (EGF); Common Agricultural Policy (CAP); and European Solidarity Fund (Ministry of Foreign Trade and Economic Relations of BiH, 2024c, p. 30).

Credit lines from international financial institutions (WB, KfW, EIB, EBRD) will serve as key funding sources for RES investments. The EU could also provide additional support through the program of Coal Regions in Transition for the Western Balkans and Ukraine. The program is based on cooperation between the European Commission, World Bank, EC Secretariat, EBRD, EIB, Poland's National Fund for Environmental Protection and Water Management, and the College of Europe in Natolin. The Western Balkans is a region heavily dependent on coal. While BiH participates in the program through visits and experience-sharing, it still lacks access to financial resources despite itsinvolvement of several financial institutions. The introduction of the ETS in BiH should be accompanied by the establishment of domestic funds and the designation of revenue sources to feed into such funds. One possibility is the establishment of a fund modeled after the Modernization Fund (Ciuta et al., 2022, p. 32). Another major asset lies in public-private partnerships. State-owned land could be used for the construction of solar power plants and wind farms. In the case of wind farms, the return on investment is not short-term and land for wind park construction could be an attractive component for private investors ensuring lower cost of initial investments. In the long run, such a policy could help attract investors while simultaneously ensuring the state has stable and long-term revenue sources urgently needed for grid infrastructure investment, while meeting RES goals. The ESCO model in terms of energy efficiency in the public sector could also positively affect the total lower consumption of energy, thus increasing further decarbonization.

4.3 Tax Revenues and NECP Implementation

BiH is characterized by a complex state structure, which is reflected in a similarly complex fiscal system. Indirect taxes (VAT, excises, customs duties, and others) are established at the state level, while direct taxes (personal income tax, corporate income tax, and others) are legislated and collected at the entity and BD levels. A notable feature of BiH's tax system is the predominance of revenue from indirect taxation.

Customs duties represent revenues at the state level. Pursuant to the Law on Customs Policy, Article 207 provides for exemption from import duties on production equipment not manufactured in BiH (Law on Customs Policy in BiH, 2015). This provision facilitates the import of equipment necessary for implementing energy transition, particularly RES equipment. BiH does not currently impose anti-dumping measures on the import of solar

panels from the People's Republic of China. However, it is important to note that certain equipment components, such as different iron/steel frames, batteries and similar items, are still subject to import duties in accordance with the applicable customs tariff. Since domestic industry exports iron and steel frames and constructions, the latter presents effective protective measures for domestic production.

VAT represents the most significant fiscal revenue source in BiH in terms of collected revenues. As VAT revenues significantly exceed the budgetary needs of the state-level government (Institutions of BiH), the "surplus" is distributed between the entities and BD according to a predetermined coefficient. Since electricity supply is subject to VAT under the provisions of the Law on Value-Added Tax, the introduction of the ETS in BiH leading to a rise in electricity prices would result in higher VAT revenues (Law on Value-Added Tax, 2005). In a high carbon price scenario and consequently higher electricity prices on the domestic market, due to the VAT elasticity, the resulting increased revenues could be directed toward accelerating RES investments and offsetting negative social implications. A challenge, however, lies in the fact that VAT is a non-earmarked tax and the most important tax revenue in BiH. Thus, higher revenues accruing to the entities and BD could potentially be used for expenditures unrelated to the consequences of carbon pricing. At the same time, the non-earmarked nature of VAT revenues provides broad fiscal maneuverability, meaning they could also be used for revenue funding[1]. VAT is also levied on the import of goods into BiH, meaning that imported RES equipment is subject to VAT at the point of entry, where paid customs duties are included in the VAT tax basis. The Fiscal Council of BiH plays a central role in coordinating and harmonizing fiscal policies across entities. Since it is rational to introduce the ETS at the state level, the mechanism for distributing revenues between the entities and BD should not pose a significant challenge, particularly given the potential for accurate and straightforward monitoring of revenue origin and distribution dynamics. The existing model of VAT revenue distribution could be used as a role model for domestic ETS revenue distribution. At the same time, the existing VAT revenue distribution model is currently unjust since the coefficients for the distribution of the funds between FBIH and RS do not reflect the territorial origin of collected VAT revenues, hence, the same could occur in case of ETS revenues.

Regarding direct taxes, which are governed by the entity-level and BD legislation, it is worth highlighting the corporate income tax. The legal framework currently in place allows for relatively straightforward implementation of tax incentives that would reduce the tax base deducting RES related investments. Incentives for investment in terms of deductions from tax basis of corporate taxes (FBiH, RS and BD) already exist, however, due to the importance of rapid energy transition, further and greater incentives could be introduced particularly for RES investments. Greater use of such tax deductions would reduce the overall corporate tax basis. Given that dividend payments are not subject to personal income tax under entity laws, introducing taxation of dividends as personal income could meaningfully compensate for the loss in corporate tax revenues. Such a measure would contribute to just the tax system considering social justice. At the same time, a decline in employment would have a negative impact on revenues from mandatory social security contributions. In the fiscal systems of the entities, these contributions play a significant role, substantially exceeding the revenue generated from corporate income tax and personal income tax. Concurrently, the "Just Transition" component of NECP can serve to address the adverse fiscal effects of reduced revenues from social contributions. Reforming certain aspects of the social security system is imperative, given that current revenues from mandatory contributions are insufficient to fully cover pension expenditures. However, in the upcoming period of implementation of NECP, undertaking comprehensive reform of the social security system will be particularly challenging and politically *delicate.* The Energy, Gas, Steam and Air Conditiong Supply (EGSACS) sector in BiH is the sector with the largest turnover per employee in the entire economy of BiH with BAM 323,761 per employee (BHAS, 2024e). From a fiscal analysis perspective, this fact is highly relevant. In the

context of the impact on social contributions revenues, investing in RES has significant implications. In terms of production factors, this sector is characterized by a high capital-to-labor ratio. Thus, long-term RES investment means a relatively low impact on employment growth and, therefore, on contribution revenues but could lead to higher GDP in the future. Second, the gradual reduction of economic activities in the coal mining and electricity production sectors under decarbonization leads to a situation where employment growth in RES facilities cannot compensate for the employment loss resulting from decarbonization. However, in the long term BiH will become more attractive for near-shoring. Therefore, measures for ensuring fiscal stability in the medium term should be considered. More empirical studies are necessary to examine the age structure of employees in the mining and EGSACS sectors and the dynamics of their retirement, to determine the optimal pace for reducing electricity production from thermal power plants and coal mining. Due to many factors, it is highly unlikely that all coal mines will be shut in the foreseeable future. Decisions on the optimal phasing out of coal production should be made in accordance with economic, social. and political considerations. The pace will prevent or accelerate the fiscal burden caused by decreased revenues from social contributions. Quantitative understanding of deep political and social implications of the process of decarbonization in BiH is necessary to determine optimal fiscal policy to secure social welfare. The EGSACS sector had 17,658 employees in 2022. The total number of persons in paid employment in the subject period was 855,764 (BHAS, 2024e). The employment data should be taken *cum grano salis*, due to the geographical distribution of coal mines and thermal power plants and their roles in local economies. The decline in economic activity in the mining sector and EGSACS sectors further undermines the prospects for stable GDP growth. At the same time, intensive investment in RES makes BiH a more attractive location for foreign investment. However, major investments in this aspect are also highly needed due to the transmission and grid congestion. A domestic ETS would contribute to near-shoring in terms of investments in ESCAGS as well as in other sectors, driven by BiH's favorable geographic position (electricity exports to the EU).

5. Practical Policy Measures

The identified economic, fiscal and normative incentive mechanisms underlying the introduction of CBAM, clearly support the introduction of the national ETS in BiH. At present, there are numerous problems and unresolved questions regarding decarbonization, particularly concerning the implementation of the national ETS in the context of energy transition in BiH. The following policy measures do not address technical, more precisely mechanical-engineering issues of implementation or measurement in the ETS system; rather, the focus is on the fiscal system and budgeting issues.

The most important determinant of the entire ETS framework is the "pure" fiscal issue of the carbon pricing cost. There are no publicly available calculations or forecasts on how different pricing scenarios would affect the economy on macro level. Theoretic models show that moderate to low pricing in the initial phase would probably mean the optimal approach. However, detailed empirical studies need to be undertaken as soon as possible. Based on the existing meta-studies, which addressed effectiveness of various ETS across the globe, and the experience of the common "safe" approach when the ETS is initially introduced, early carbon pricing opts for a moderate one. Hence, fiscal stability will not be detrimentally affected. However, as time passes and carbon pricing increases, both social and economic consequences will arise. As NECP cost is extremely high as per NECP 2030 draft, its realization is unrealistic when compared to the consolidated public revenues and expenditures in BiH at all administrative levels. The key fiscal instrument to address the issue of fiscal stability already exists in the form of the Global Framework of the Fiscal Balance and Policies in BiH, which is drafted by the Fiscal Council of BiH, and adopted by the Council of Ministers of BiH. However, NECP is expected to become a new variable in future Global Framework of the Fiscal Balance and Policies in BiH.

The existing constitutional framework of BiH creates a fragmented legal system, thus, ensuring fiscal stability at all administrative levels is a major concern due to the constitutional division of competences. As the NECP 2030 draft has not yet been adopted, the legal implementation of certain parts of the NECP remains unclear, first and foremost, the legal implementation of the ETS within a fragmented legal system. It is even more problematic that the NECP 2030 draft itself does not provide any information on the legal realization of a potential ETS in BiH. There are certain "hints", but the majority of the issues are completely unresolved. BiH, as a state, has assumed obligations based on its membership in the EC, and in the context of EU accession, under the Stabilization and Association Agreement. At the same time, ETS implementation represents an issue of economic, fiscal, energy, climate, and environmental protection policy, and, in view of negative social consequences of ETS introduction, and decarbonization in general, it also extends, to a certain extent, tosocial policy particularly considering a "just transition" as an integral part of NECP. Competences for conducting economic policy are divided between the institutions of BiH and the entities, which also includes aspects of fiscal policy. In FBiH, certain fiscal prerogatives are also held by the cantons. In the context of energy policy, the competent authorities are the entities. Environmental protection policy as well as social policy, fall under the competence of the entities, while in FBiH, they resemble joint competences of the entity and the cantons. Under conditions of such fragmentation of competent authorities for the implementation of relevant public policies, the main challenge is the lack of legal mechanisms to achieve an adequate level of necessary coordination among public bodies. As budgeting is an intersection of all public policies, vertical and horizontal fiscal stability is jeopardized. Therefore, the first and foremost question concerns the level of government to implement the ETS. A solution insisting on entity-level implementation could lead to uneven practices and the emergence of two different ETS models existing at the same time, which represents a purposeless and potentially problematic solution for two reasons. The first concerns the determination of the carbon price. If each entity independently determines the carbon price, the situation could be compared to the existence of two indirect tax systems in BiH. The entity that sets a lower carbon price would attract carbon-intensive industries into its legal (fiscal) framework and ETS, namely due to lower operating costs.[2] This would result in carbon leakage consequences within the borders of the same state. The second problem concerns the BDBiH, which in such a constellation, would have to align with one of the entities, given that establishing a third system for an extremely small territory is highly inefficient and ineffective. Leaving BDBiH outside the ETS scope is not a viable option, as this would also result in carbon leakage as a legal and economic consequence. Considering that energy transition is an international legal obligation of BiH, and ETS implementation is a part of the energy transition and decarbonization, it seems optimal to create a framework legal solution at the state level. The system for collecting and distributing ETS revenues could be modeled on the existing indirect tax system of BiH. The main drawback of this solution is the existing limitation of the indirect tax system in BiH: the constant need to reach political agreement regarding the determination of allocation coefficients between FBiH and RS, which could deviate from economic reality. As a result, FBiH may receive less ETS revenue than it is entitled to under the territorial attribution system, as is currently the case with VAT revenues. The greatest obstacle to achieving agreement at the state level is the potential unwillingness of RS to relinquish a part of its competences in implementing energy policy, which has been seen in the past. Completely new legal questions arise in the second phase of allocating ETS revenues. There are two issues: the first is fiscal, concerning the allocation of ETS revenues, precisely, the quantitative distribution of the revenues among entities, cantons, and local self-government units. The second issue concerns the structure of expenditure of collected revenues. Whether a solution is adopted to introduce the national ETS at the level of BiH institutions, or to create the entity-level ETS (sub)systems, it is necessary to determine the model of distribution of the collected revenues within the entities. Both entities are characterized by geographically unequal exposure to economic

and social consequences, reflected in higher levels of vulnerability of certain regions. In the more complex constitutional structure of FBiH, given the existence of cantons, this is an even greater problem. For example, Tuzla and Zenica-Doboj cantons are highly exposed to economic and social consequences of potential ETS introduction. Addressing this problem at the normative level would practically mean returning to the "privileged coefficient system of the cantons " which was abolished in case of FBiH in 2022, with the amendments on the *Law on the Allocation of Public Revenues in FBiH ("Official Gazette of FBiH", nos. 22/2006, 43/2008, 74/2008 - Decision of the Constitutional Court, 22/2009, 35/2014, 94/2015 and 17/2022).* The amendments effectively revoked Sarajevo Canton's "privileged" status in revenue distribution, resulting in significant political, social and financial implications. In case that "privileged coefficients" are reintroduced *de lege ferenda*, in order to potentially determine the coefficients, comprehensive economic analysis is needed to calculate different region's exposure to ETS introduction; otherwise, an *ad hoc* approach would undoubtedly result in extremely unjust legal solutions. On the contrary, if only "institutional mechanisms" for "compensating" the more affected cantons were insisted upon, the question arises as to how to ensure fairness within one-year budget cycles and avoid *ad hoc* approaches in budgeting (transfers to exposed cantons). The second issue, as noted, concerns the structure of public expenditures based on the revenues collected from the ETS. Since the ETS is a *sui generis* carbon tax, hence an environmentally related tax, the designated purpose of the collected revenues must be legally defined in advance. This implies the allocation of collected revenues among the state, affected industries and households (the question of revenue recycling). The issue of scope and extent of revenue recycling has both vertical and horizontal dimensions: the vertical dimension concerns which level of government would address specific public expenditure issues. For example, household budget transfers (targeted transfers, energy bill credits, etc.) should be at the entity level, following the model of the existing social transfers to lower administrative units. The same applies to potential revenue funding (subsidies) of the affected industries; it seems optimal that such incentives are distributed by the Federal Ministry of Entrepreneurship, Development and Crafts. At the same time, there is also a horizontal aspect: namely determining the share of the collected revenues to be allocated to industry and households, as well as the portion of revenues assigned to different levels of government. The qualitative structure of governments' expenditures concerns the question of the pre-defined use of the funds. Once that NECP document is finally adopted, as a key "strategy document", legal sources introducing the ETS should follow the NECP logic and structure. Since the issues described represent a striking example of the allocative, (re)distributive and stabilizing functions of the budget as an instrument of public finance, the only adequate approach lies in the formation of interministerial bodies at the level of national and entity governments, and, in the context of FBiH, potentially even at the level of cantons. Interministerial bodies would be tasked with developing proposals for a comprehensive strategy encompassing all relevant public policies and satisfying the premises of programmatic budgeting. Cantonal strategies would need to be legally aligned with FBiH's strategy, while entities' strategies would have to be harmonized with the national strategy (NECP plan). Such strategies, upon adoption, would establish "links" between budget and programmatic objectives (measures) of NECP. The greatest drawback of the existing budgetary systems is the inconsistent and incomplete application of program classification in public budgets, even though this represents a normative obligation in accordance with the *Law on Budgets in the Federation of BiH* (*"Official Gazette of the Federation of BiH", nos. 102/2013, 9/2014 – Corr., 13/2014, 8/2015, 91/2015, 102/2015, 104/2016, 5/2018, 11/2019, 99/2019, 25a/2022, 7/2025 and 6/2026)* and the *Law on the Budget System of Republika Srpska("Official Gazette of the Republika Srpska", nos. 121/2012, 52/2014, 103/2015, 15/2016, 110/2024 and 57/2025 – Decision of the Constitutional Court).* Program classification of the public budgets needs to be improved in the institutional practice, as this would ensure continuous monitoring and oversight of the effects of revenue allocation, address the problem of the one-year budget

cycle, and, lastly, ensure a constant framework for improving programmatic objectives. Finally, there is another pragmatic aspect that could contribute to a more efficient allocation of public expenditures. Environmental protection funds have been established in the entities, and they already collect other environmentally related taxes and charges (various polluter fees, etc.). If portions of ETS revenues were allocated to these funds, they could assume responsibility for the further distribution of those resources to final beneficiaries, within the framework of predefined and legally regulated purposes, as both funds conduct these activities at the moment.

6. Conclusion

The introduction of the ETS will raise the price of electricity and potentially other energy sources in BiH. This outcome will encourage economically rational behavior among the BiH population in two ways: first, it will incentivize private investment in RES for personal consumption. This incentive will be directed at the installation of solar panels for individual needs, as well as the creation of citizen energy communities. Second, higher coal and electricity prices will reduce the population's inertia regarding investments in energy efficiency, particularly in multi-residential buildings in larger urban areas. Reducing the total electricity consumption will help alleviate negative implications and budgetary pressures. The state must provide financial and technical support, remove administrative barriers for RES investments and facilitate legal procedures. It is irrational to expect that public budgets alone can bear the burden of energy transition. Liberalization of the electricity market sends positive signals to private investors, which will have a long-term positive effect on RES investments. In such a scenario, the state should primarily undertake major investments in energy infrastructure and the grid, as well as mitigate the effects on the incomes of the most vulnerable households and SMEs. When seeking sources of financing for public investments in energy infrastructure, the state may justifiably resort to additional external borrowing, considering that long-term GDP growth will provide the economic basis for future debt repayment. The moderate total public debt of BiH allows for external borrowing, whereas demand for rapid decarbonization emphasizes optimality of such fiscal policy. The increase in public spending on NECP implementation, which includes RES investments and modernization of the existing thermal power plants as well as offsetting negative social implications due to the decarbonization, will require a revision of the public expenditure structure and complex political agreements. In the scenario where BiH implements the domestic ETS, determining a higher coal price will result in higher national revenues. At the same time, higher coal prices will cause a general increase in prices due to reduced electricity production. This could increase unemployment, which would result in a decrease in certain public revenues (direct taxes such as corporate tax, income tax and social contributions). In this scenario, revenues from the ETS, which are intended for RES investments, cannot be used to compensate for the negative fiscal and social consequences. From the economic perspective, abandoning coal-based electricity production would lead to tectonic changes in the energy policy field, where BiH could ultimately shift from being an electricity exporter to an importer. In this scenario national security connected to the energy policy, due to the actual geopolitical situation, is seriously endangered. Although decarbonization is a global issue and BiH is a country aspiring to the EU membership and already is a member of the EC, decarbonization in BiH carries severe consequences. It is therefore unsurprising that BiH's political messaging remains ambiguous, expressing an intention to launch the decarbonization process while simultaneously signaling no full commitment to phasing out coal. In the existing geopolitical climate in Europe, the arising question is whether coal should be completely phased out, despite the potential negative consequences for the energy sector, or whether the optimal energy policy would advocate for gradual modernization of the existing thermal power plants while maintaining fiscal stability and security of the energy sector at all costs. Investing in RES to reduce dependence on coal implies allocation of a significant GDP share, where at the same time, GDP growth could stall in the short to medium term. It must not be overlooked that decarbonization will place an additional burden on low-income households

and lead to job losses in certain sectors, where geographical distribution of the impacts can be extremely uneven. When formulating fiscal policy, serious consideration must be given to social interventions aimed at mitigating these negative effects; rationality and efficiency in social (financial) intervention need to overcome potential populist decisions about the future of certain coal mines. Further empirical research and CBAs are needed to show optimal public policy in terms of prequalification, early retirement and additional measures to overcome an increase in unemployment of workers from non-efficient coal mines and connected industries at the local level. However, such interventions will have to compete for resources with public investments in energy infrastructure, renewables and energy efficiency improvements in the public sector. Hence, complex administrative layers could potentially affect coordination of different administrative levels, especially in terms of public expenditures for facilitating RES investments and compensating for negative social consequences upon ETS introduction. In conclusion, the introduction of the ETS in BiH requires a carefully designed, state-level legal and fiscal framework capable of ensuring coordination across fragmented competences and safeguarding vertical and horizontal fiscal stability. The favorable circumstance is the existing system of indirect taxation at the state level; hence it could be used as a model for the collection and distribution of ETS revenues. Clear rules on revenue allocation, revenue recycling and program-based budgeting must be established in advance and aligned with NECP, to avoid *ad hoc* solutions and decisions which could result in unjust and unintended distributive effects. Strengthening intergovernmental coordination mechanisms with the establishment of specific interministerial working and coordination bodies and fully implementing program classification in public budgets are essential preconditions for a fiscally sustainable and socially just energy transition.

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[1] Different grants to private sector, cities, municipalities, etc.

[2] Provided that the existing tax burden on labor and corporate profit remains the same.