





TRENDS AND REQUIREMENTS OF THE GREEN TRANSITION

OF SMES IN METAL AND WOOD PROCESSING SECTOR IN BOSNIA AND HERZEGOVINA

Baseline study

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LIST OF ABBREVIATIONS

BAT	Best Available Techniques
BiH	Bosnia and Herzegovina
CBAM	Carbon Border Adjustment Mechanism
CEAP	Circular Economy Action Plan
CFM	Carbon Footprint Management
CLP	Classification, labelling and packaging o
DDS	Due Diligence System
EMS	Environmental Management System
EMAS	European Union's Eco-Managemer
EnMS	Energy Management System
EOTA	European Organisation for Technical Ass
EPD	Environmental Product Declaration
ESPR	Ecodesign for Sustainable Products Reg
ETA	European Technical Assessment
EU	European Union
EU ETS	EU Emission Trading Scheme
EUTR	EU Timber Regulation
FAO	UN Food Agricultural Organisation
FBiH	Federation of Bosnia and Herzegovina
FSC	Forest Stewardship Council
GAWB	Green Agenda for the Western Balkans
GHG	Greenhouse Gas
GIZ	German Development Corporation
GSCM	Global Supply Chain Management
GVA	Gross Value Added
IED	Industrial Emissions Directive
IGE	Inclusive Green Economy
ILO	International Labour Organisation
ISO	International Standard Organisation
LCA	Life Cycle Assessment
LCM	Lifecycle Management
NDC	Nationally Determined Contributions
NECP	National Energy and Climate Plans
OECD	Organisation for Economic Co-operation
OEM	Original Equipment Manufacturers
PEFC	Program for the Endorsement of Forest
R&D	Research and Development
RDF	Residue Derived Fuel
RE	Renewable Energies
REACH	Registration, Evaluation, Authorization, a
RS	República Srpska
SDG UN	Sustainable Development Goals
SME	Small and medium-sized enterprises
SRF	Solid Recovery Fuels

substances and mixtures

t and Audit Scheme

essment

ulation

and Development

Certification Schemes

nd restriction of chemicals

1 INTRODUCTION

Objective and perspective of this paper¹

The need for the transformation towards greener and more inclusive and innovative industrial production is high on the agenda worldwide, especially so in the Western Balkans and the European Union. The UN Sustainable Development Goals (SDGs), the EU Green Deal as well as the Green Agenda for the Western Balkans (GAWB) emphasises the importance of changing production patterns and economic progress in such a way that the future development of humankind is not placed under risk. In Kate Raworth's words, the challenge is to "ensure that no one falls short on life's essentials while ensuring that collectively we do not overshoot our pressure on Earth's life-supporting systems".²

This baseline study is entitled "Trends and requirements of the green transition of SMEs in Metal and Wood processing sector in Bosnia and Herzegovina" Its objective is to analyse the green topic in the two sectors and related value chains from different angles to emphasise the complexity of the greening issue complexity and show that the successful implementation of greening efforts in SMEs and value chains depends on a multitude of different efforts.

The objective of the baseline study is to approach the topic of greening industrial production trends and its influence on BiH (Bosnia and Herzegovina) and their SMEs from different perspectives:

- a) The perspective of SMEs from BiH in the two sectors and their requirement to integrate greening aspects within their buyer-driven value chains and their market relations with EU customers.
- b) The perspective of EU buyers and their greening strategies partly driven by internal value-driven systems and partly driven by increasing regulative obligations and customer demands.
- c) The perspective of the EU and their Green Deal strategy that involves the reconsideration of all directives.
- d) The perspective of the BiH national government requirements and its role of guiding and supporting this process in the context of EU accession pressure and interest.
- e) The perspective of support organisation in BiH to support their businesses in the transformation process.

To get an impression of these different perspectives, several methodologies were used. Interviews were conducted with leading businesses in BiH in the metal processing and wood processing sectors. From the EU buyer perspective, a literature review was done as was an analysis of news

To provide an overview, the paper is structured according to the following chapters:

- This first introductory chapter concludes with some of the hypotheses on which the paper is based, and this is taken up again in the final recommendation chapter.
- The second chapter provides a brief overview of the export structure of the wood and metal processing sectors in BiH and its strong orientation towards the EU market.
- The third chapter focuses on EU governance trends regarding the reconsideration of EU metal processing in BiH.
- The fourth chapter provides an overview of EU buyers' greening trends and their impact on suppliers, e.g. from BiH.
- The fifth chapter investigates national regulative measures promoted by the BiH government to support the greening efforts of SMEs in the country.
- The sixth chapter provides an overview of the business greening efforts of leading companies in BiH in the two sectors and their perspectives on future trends and requirements.
- The seventh chapter provides a summary of the efforts of support organisations to provide new greening and innovation services for the respective SMEs in BiH
- The final chapter summarises the findings and provides recommendations from a systemic perspective.

1.2 Hypotheses of this baseline study

This paper makes use of the Inclusive Green Economy (IGE) transformation agenda in the European Union (EU). It asks for the transformation of the future development of whole societies and industries. Will this transformation really happen? Will the trend that is set by the EU last? How fundamentally and deeply will it affect whole value chains and over what timeline? Are shifts of behaviour within buyers and policies visible that are now already influencing or will soon influence the market opportunities for suppliers, e.g. in BiH? Can countries outside the EU benefit from this transformation? Can they prepare themselves for the upcoming transformation through early political and innovative measures, or is it a risk to jump on the IGE bandwagon too early?

6

directives and regulations in the context of the EU Green Deal. It differentiates between generic trends and trends with a specific influence on the two specific sectors (i.e. wood and



¹ The preparation of this study was financed by the German Federal Ministry for Economic Cooperation and Development (BMZ) in the context of the Green Recovery Component of "COVID-19 Investment Response/EU4BusinessRecoevry" project. 2 Raworth (2013)

Many answers are still open as to the depth of future trends regarding the EU Green Deal and the GAWB, and what impact they will have in the coming decades. This paper assumes that green and digital transformation is set in the EU and that countries and companies with an interest in further EU integration should actively shape the transformation approach to preserve and even increase their future innovation capacity and competitiveness. EU countries with their different abilities and efforts to promote the transformation also show that these new transformation challenges can only be tackled with a systemic approach. Policies, support and knowledge organisations and businesses must create synergies to promote the new search process and to find the right and innovative answers.

We have formulated four hypotheses from which this baseline study starts its search process:

- 1. The EU's IGE (Inclusive Green Economy) and Green Deal trend already demonstrate clear signs of a long-term paradigm shift that is irreversible and which shapes future EU market relations and whole supply chains.
- 2. EU policies and national policies, as well as future buyer strategies from EU member countries with strong supplier and market relations with BiH, have already started to redefine not only policy directives but also whole applied research efforts and innovation directions that will put countries outside the EU, such as BiH under pressure to follow suit.
- 3. The future competitiveness and innovation capabilities of exporting sectors in BiH such as wood and metal processing will highly depend on eco-innovation trends and efforts towards footprint reduction in their own companies and supply chains.
- 4. In countries such as BiH, the most competitive businesses are already making strong efforts in eco-innovations³. What is missing is the systemic effort in BiH to scale them and to build up an eco-innovation system.

The final chapter of this paper will come back to these hypotheses and provide summarising answers on the paper content, its findings, and final considerations.

2 METAL AND WOOD SECTORS IN BIH

2.1 The basic export structure of the metal and wood sectors

This baseline study does not intend to explore the detailed trade relationship between BiH and the EU in BiH's two dominant export sectors. It is the objective to give a glimpse of the deep integration of the two processing sectors into EU value chains. According to innovation strategies that were designed for the different entities in BiH in 2021 as well as a paper on BiH industry pressure to promote a systemic approach to greening and innovation in dominant export sectors (Wältring, 2022, Waeltring/EDA, 2021), it becomes evident that businesses involved in the export of higher added value products can also be seen as the most innovative ones in BiH. But still, most businesses exporting to the EU are involved in hierarchical value chain relations controlled by buyers and firms, especially from the EU.

According to interviews with support organisations, businesses and the analysis of several research papers, core clusters and value chains that can be mentioned in BiH related to the two sectors are the ones mentioned in the table 1.

Table 1: Dominant value chains in the two sectors

DOMINANT WOOD PROCESSING **CLUSTERS/VALUE CHAINS**

Forest trees	
Solid cut wood	
Furniture and designed wood products	
Construction and prefabricated houses	

Source: Interviews with BiH Foreign Trade Chamber

Not much data is available on more detailed value chain linkages in the two sectors. This baseline study uses two research papers recently published in 2021 supported by the GIZ to delve a bit deeper into the export structure of the two sectors and their integration into the respective value chains. The studies provide a solid basis on the export structure of the wood and metal processing sectors in BiH⁴. Instead of presenting a summary of these studies, here we will focus on some essential insights and extract the most relevant aspects that are important to consider when looking at future opportunities and challenges for promoting value added and greener production in BiH.

DOMINANT METAL PROCESSING **CLUSTERS/VALUE CHAINS**

Iron and steel

Aluminium

Electrical industry (especially isolated wire)

Automotive parts industry



³ The term eco-innovation is being substituted in the EU and the OECD by the term sustainable innovations and refers not only to focusing on technical innovations but also on social and resource-related aspects. See EC (2023)

2.1.1 The wood processing and export structure

From the resource base in the wood sector, FAO studies mention that BiH is the country with the highest forest share and the highest diversity of forest types in the Western Balkans⁵. Forest production and the export of primary material in the form of raw logs is the strongest export value. 71,2% of raw logs are shipped to the EU market where they are further processed⁶. Most of the forests are in public hands and certified according to Forrest Stewardship Council (FSC) standards, which makes it attractive to European processing companies that must present FSC certificates for the material source.

Figure 1: Export by the business sector in 2020 and 2019 (in EUR)



Source: M. Šipragić (2021)

The dilemma of the generation of large export incomes from few value-added wood products becomes obvious in Figure 1 and Figure 2. The amount of export revenues is dominated by less knowledge-intensive and complex products like sawmilled and planed wood (Figure 1). Figure 2 certifies that the largest numbers of businesses in the wood processing sector overall are active in this business field (587 businesses), while there are only 64 companies with a higher gross value added (GVA) in the sector producing more complex, value-added and competitive value-added products (with higher wage and profit margins per employee (see left column in figure 2). This means that there is a strong need to extract higher value from existing wood resources and to support the upgrading towards higher value-added supply chain options.

Figure 2: Average GVA per employee in EUR vs. number of companies by the business sector in 2020



2.1.2 The metal processing and export structure

The metal processing sector is differently structured but faces similar challenges. Figure 3 and Figure 4 demonstrate crucial information. According to the research by Burks (2021), around 73% of metal companies (906 companies) in BiH are active in "fabricated metal products". These companies generate 46% of the total turnover in the metal processing sector. "Most of them produce metal structures and parts of structures (276 or 30%), provide machining services (213 or 24%), produce metal doors and windows (112 or 12%), produce other fabricated metal products (82 or 9%)" (Burks, 2021, p. 18).

Figure 3: Number of companies – BiH metal industry



OF THE GREEN TRANSITION

⁵ See FAO (2015) 6 See PROFOR (2019)

Figure 4 also shows that manufacturing fabricated metal products dominates exports in the metal sector. Fabricated metal products are a key industry with large backward and forward linkages. Supplier and buyer relations are highly relevant in EU markets and national supply relations. Burks mentions the importance of this production area: "Main inputs are sourced from the basic metals industry. It sells its product to a wide range of other industries from the motor vehicles industry, other transport equipment, machinery, or electrical equipment to the repair sector. The value-added multiplier is large and ranges in the middle field. It has a pronounced domestic value-added component" (Burks 2021, p.18).

Figure 4: Value of exported fabricated metal products, except machinery and equipment, 2018-2019



Source: J. Burks (2021)

According to the study, main similar challenges to the wood sector in the dominant areas of metal processing are the need for the modernisation of technology, material efficiency, the digitisation of production processes, and the greening of production. This includes integrating environmental management practices, increasing waste management and recycling, and reusing aspects in the production process. At the same time, the metal processing sector in BiH can still profit from low energy costs, which might change soon including increasing pressure from the EU to reduce Co₂ emissions as soon as BiH enters the energy trading system or

falls under the CBAM (see next chapter). According to interviews with leading businesses in the metal processing sector in BiH, footprint considerations are becoming more relevant, especially for the exporting companies which then puts the iron and steel production sector as input providers for metal products under pressure. Currently, metal processing companies in BiH cannot source nationally from so-called "green" or "hydrogen-based" steel.

Overall, the metal processing sector is already focused on fabricated metal products and more oriented towards value addition than the wood sector. But both require modernisation if they want to retain their competitiveness. Both sectors are at risk to focus mainly on comparative advantages such as labour costs, lower energy costs, fewer environmental regulations and weaker Co₂ emission standards, which will not be enough in the long run.

2.2 Dominant buyer and supplier relations according to available data in the two sectors

It is challenging to gather more detailed data on supplier and buyer relations in the EU market. It would be a good research project to analyse these relations in more detail, but this cannot be the focus of this baseline study. This baseline study is based on qualitative research through interviews with a few leading and innovative businesses that can rather be interpreted as exceptional role models or outliers (companies that behave differently than most of the businesses in the sector). Overall, it can be stated from the interviews that businesses in the two sectors still have their economic advantages due to the proximity to the EU market as well as the traditional comparative advantages, including low energy prices, a comparable welleducated labour force, low labour costs and low enforcement of environmental standards. The Smile Curve model (see Figure 5) helps to visualise the hierarchical integration of most wood and metal processing businesses in their EU supply chains.

Typically, the part of a value chain that generates higher value proposition is controlled by buyers and firms in the EU, while subcontracted firms are often stuck with, or mainly focus on, manufacturing with lower value added. Hierarchical subcontracting relationships or outsourcing results in less flexibility for the subcontracting companies in BiH to enter new market channels. Many SMEs in the respective sectors in BiH are in a Catch 22 position (Waeltring/EDA, 2021):

- On the one hand they are involved in hierarchically organised value chains, which is the attain higher added value and more resilient business models.
- design, research and development (R&D discoveries, or new market opportunities).

basis of their contracts. To survive and to stay competitive in the longer run, they need to start to upgrade their business within their current chain or to create own products to

They are innovating partly through investments in new technology and some product and process innovation to stay competitive in the fierce production market. But this does not provide them with the chance to really move into new, higher value-added areas, including



With a closer integration of BiH into the EU and with increasing EU directive requirements as well as EU buyer innovation and greening requirements, the majority of the wood and metal processing companies integrated into EU value chains will be asked not to base their competitiveness mainly on the respective comparative advantages, but on innovation and upgrading, the production and design of own products and the identification of market relations, and depend less on the hierarchical relationships with their buyers and consumers.

In both sectors, leading importers and buyers of products are based in the European market with a focus on countries like Germany, Italy, Slovenia and other EU countries depending on certain product ranges. This means that EU trends and EU buyers' future innovation strategies will play a key role in shaping the future orientation and future competitiveness of the businesses in these two value chains in BiH. During the interviews with leading businesses in BiH in these two value chains, it became apparent that they source their main knowledge on new trends and buyer demands from their buyers. Many leading businesses are trying to follow a dual strategy of production. On the one hand, they are still involved in subcontracting business relations with original equipment manufacturers (OEMs) or intermediaries in the respective value chains. On the other hand, they are starting to promote their own product lines based on their own designs and upgrading into new supply chains and markets (see Figure 5). Nonetheless, this trend can be observed in leading businesses, of which there are still a few in the BiH market.





These leading businesses have a solid cross-border relationship with their buyers in the EU and source their knowledge from business partners and even research partners in the EU. In the interviews, they also mentioned the need to overcome the comparative cost advantages in the medium term. It becomes obvious that these early mover businesses in the BiH market have already invested in new technology, digitisation processes and greener energy sources. They are also aware of future innovation and greening trends in the EU market and ask for a more progressive orientation by the BiH government which supports modernisation and value addition in the sectors as well as investments for a more environmentally friendly production process. Nonetheless, these forerunner businesses are still exceptional role models. This baseline study will later look deeper into the environmental trends that can be observed in these model companies.

Figure 6: The basic ladder of eco-innovation and value addition orientation and the chance to decrease chain dependency





In summary, the wood processing and metal processing sectors in BiH are highly integrated into value chain relations with EU buyers and consumers, are challenged to increase value addition and eco-innovation within their position in the chains, and are already experiencing increasing pressure to comply with greening production standards due to the expectation of increasing energy costs as well as increasing requests from EU buyers, consumers and EU legislation to consider specific environmental production and circular economy considerations in the near future.



⁷ See Yang/Jack (2015)

2.3 The requirement to strengthen higher value-added and innovative SME development

The metal and wood sector exports have, until the present, been very much based on lowadded-value products. The respective studies that were taken as reference points focus on the innovation requirements of the sector and the requirements of value addition, digitalisation, and process and product innovation needs. Nonetheless, what becomes obvious, based on interviews with dominant businesses and support organisations in the sector, is the requirement to combine innovation and value-added efforts with eco-innovation (Figure 6). Currently, the number of companies in BiH already reacting to this new trend is low when compared to all the businesses in the chains. However, according to the statements of the businesses during the interviews, in the long run all the businesses in the two sectors and in the different value addition steps will be forced to increase their energy and resource efficiency. This is already affecting the first input steps of the wood and metal-processing industries. In the metal sector, from steel and iron production to aluminium production upwards are being affected. In the wood sector, energy efficiency and the use of renewables is starting to become more important as a relevant aspect in the forestry and basic solid wood processing areas (e.g. especially wood drying procedures). The following chapters further explore the relevant aspects of increasing greening standard requirements.

Soon it will be relevant to focus the development of SMEs on higher knowledge-intensive production fields in which more value is generated from the existing resources and ecoinnovation plays an increasing role. This is the market where the future of innovation and sustainable employment generation lies.

Before looking into the existing business models and green innovation aspects and considerations, it is necessary to gain insight into the trends regarding EU regulations as well as their influence on EU buyer strategies.

3 SECTOR-RELEVANT GREEN REGULATIONS AT THE EU LEVEL

The chapter focuses on analysing the governance aspects related to greening requirements in production processes and value chain relations. It investigates EU directives and standards and norm trends, private standardisation trends and national legal aspects in BiH.

3.1 Considerations of generic and cross-over trends in the EU

The EU Commission's December 2019 announcement of the "European Green Deal" has led to binding legislative changes and legislative revisions within only three years with far-reaching legally binding consequences for both member states and potential EU countries. In July 2021 the Commission adopted a series of legislative proposals to cut greenhouse gas emissions by at least 55% by 2030 and to become climate neutral by 2050 (see Figure 7 and Figure 8). This objective is carved into the EU climate law. This objective is carved into the EU climate law. It is also in line with the Paris Agreement objective to keep the global temperature increase to well below 2°C and pursue efforts to keep it to 1.5°C to avoid the most severe consequences of climate change⁸.

Figure 7: The EU Green Deal target

5000



⁸ The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 and entered into force on 4 November 2016. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. See UNFCCC (2023).



Figure 8: Main legislative revisions and new Directives within the EU Green Deal



Source: ECN⁹

All member countries of the EU, countries that want to join the EU, as well as those that are exporting products into the EU, will have to comply with certain regulative frameworks that support the climate targets of the EU overall and that undermine unfair competition. Each member country will have to adjust their national legal targets and set their own regulative rules to ensure compliance with the respective targets. Thus, the EU climate law sets the minimum legal standards for EU countries with which they must comply through their national climate laws and respective regulations. These national climate regulations affect and influence decisions by industries, businesses, and citizens, leading to democratic turmoil and societal divides regarding expected future development directions.¹⁰

The EU has several means to enforce climate law and its by-laws. Several legislative instruments will play an important future role also for value chains from BiH (see Figure 9):

- The EU emissions trading system (ETS)
- Carbon Border Adjustment Mechanism (CBAM)
- Directives, regulations and initiatives related to the enforcement of the Green Deal targets

9 See ECN (2019)

10 The rise of extreme right-wing parties in EU member states demonstrates this. These parties use the EU as a major bogeyman and argue in a populist style against climate regulations and the respective restrictions.



Figure 9: EU legislative aspects and BiH situation



3.1.1 The EU Emission Trading Scheme (EU ETS)

The EU ETS was the first emissions trading system worldwide to be established in 2005 and is still regarded as the EU's central climate protection instrument. It covers around 45% of the EUs greenhouse gas emissions and is designed to reduce emissions from the energy sector and energy-intensive industries11. The fourth phase of the trading scheme is currently running (2021-2030) and involves further tightening of the annual cap reduction of emissions allowed to be used.

Box 1: EU ETS in Germany

Example Germany: In 2021, the 1,732 German plants included in the EU ETS emitted around 355 million metric tons of carbon dioxide equivalent. Two-thirds of the emissions came from energy plants, in particular power plants. One third of the emissions come from German industrial plants, in particular the iron and steel industry as well as the mineral processing industry (30%), refineries (19%) and the chemical industry (14%). The industries have been given a clear guideline in the form of the 2030 climate targets, but these still require implementation plans in the respective industries. The discussion on "green steel" in Germany and the debate on decarbonisation of the steel industry within the EU are generally discussed in private-public networks and flanked by funding approaches and research priorities.

What is relevant in relation to the baseline study is that BiH as a signed member of the UN internally binding Paris Agreement on Climate Change must harmonise its development with the Acquis Communautaire and to base its climate targets on those of the EU. But it also has the possibility to set its target with an adequate explanation of the ambitiousness of such a target12. Until now BiH has no equivalent system for CO₂ pricing and trading in place and no functioning monitoring for GHG emission data collection and processing, quality assurance and control of input data13. This also means that there is not yet a system in place that provides pressure for the design of reduction strategies in industries and countrywide. According to press releases, BiH plans to put together a system for CO₂ pricing and trading by January



¹¹ The EU ETS covers emissions from around 10,000 plants in the energy sector and energy-intensive industry across Europe. Together, these facilities account for around 36% of greenhouse gas emissions in Europe. See UBA (2022) 12 See UNFCCC (2019.)

¹³ See Energy Community (2023)

2026, especially because of applying the Carbon Border Adjustment Mechanism (CBAM) for the countries of the Western Balkan region14. The next abstract will explore the CBAM and the further challenges for BiH and national legislation in the later respective chapter.

3.1.2 The Carbon Border Adjustment Mechanism (CBAM)

CBAM is an essential tool for the EU to meet its targets while avoiding risks of carbon leakage. The European Commission states: "Should diverging targets continue to apply globally while the EU increases its climate ambitions, the Commission will propose a carbon cap and trade system for selected sectors to mitigate the risk of carbon leakage."¹⁵ It implies that for countries outside the EU without a national carbon pricing and control scheme, the EU will apply a CBAM from 2026 onwards. This CBAM is also often referred to as a "carbon tariff" for energy-intensive products (such as iron, steel, aluminium, cement, fertiliser and electricity) from countries without a national carbon pricing scheme. With this perspective, countries such as BiH and their import products are being pressured to be monitored on their energy intensity. It is likely to take effect in 2026 with reporting starting in 2023. During interviews BiH companies saw in this respect 2026 as a decisive date that already provides for some leading export businesses to prepare themselves for increasing monitoring requirements for CO₂ emissions as well as the need to make more use of alternative energy sources.

3.1.3 Regulations, directives, and initiatives related to the enforcement of the Green Deal targets

To understand how EU rules are implemented and how they influence regulations for industries as well as possibly importing countries and businesses, it is relevant to understand which EU regulations, directives and initiatives are defined.

Box 2: IED Directive as an example

It is not possible to describe all the relevant directives in this paper. Some of them are mentioned in the following chapters. One example is Directive 2010/75/EU as the Industrial Emissions Directive (IED) as the main EU instrument regulating pollutant emissions from industrial installations. It aims to achieve a high level of protection of human health and the environment by reducing harmful industrial emissions across the EU through better application of Best Available Techniques (BAT). Member states are asked to set up a system or regular environmental inspections in their industries to ensure continuous improvement and reduction of emissions. With the Green Deal the IED is also under revision. In the future it will extend the installations under supervision and the reporting requirements, including further companies active in the processing of ferrous metals, battery production and landfills. One additional instrument is the European Pollutant Release and Transfer Register (E-PRTR), which provides easily accessible key environmental data from industrial facilities in EU member countries. Jointly with environmental inspections it provides one way of pollution transparency in the EU business world.

14 See BGEN (2022.) 15 See EUR-Lex (2021.) According to the European Commission:

Regulations are legal acts that apply automatically and uniformly to all EU countries as soon as they enter into force, without needing to be transposed into national law. They are binding in their entirety on all EU countries." In distinction to this, directives" require EU countries to achieve a certain result but leave them free to choose how to do so." EU countries must adopt measures to incorporate them into national law (transpose) in order to achieve the objectives, set by the directive. National authorities must communicate these measures to the European Commission. Transposition into national law must take place by the deadline set when the directive is adopted (generally within 2 years). When a country does not transpose a directive, the Commission may initiate infringement proceedings."¹⁶

EU initiatives are often defined within action plans as a set of interrelated initiatives to test and establish new policy frameworks in more detail.

In the following chapters, it will become obvious that regulations, directives and initiatives also play an important role in influencing value chain relations, e.g. in countries such as BiH. This is related to EU rules and directives in relation to, for example, energy use, wood resources, chemicals, circular product requirements, industrial emissions, plastics, waste and recycling, water, etc. It is important to understand these governing efforts because they also pressure large buyers in the EU markets to rethink and redefine their own company and decarbonisation targets, which also influences their supply chain management and sourcing strategies. Finally, it directly influences the requirements of suppliers as well as non-EU member governments to increase their national regulation efforts and also to be able to create compliance assurance and overall industry regulations. With the Green Deal many directives and initiatives have been revisited or are in the process of revision and extension. This includes directives on chemical use, air quality as well as the industrial emission directive (IED, see example below).

Box 3: Initiatives such as the Circular Economy Plan

The European Commission adopted the new Circular Economy Action Plan (CEAP) in March 2020 as one of the main building blocks of the European Green Deal. The plan presents a set of interrelated initiatives to establish a strong and coherent product policy framework that should make sustainable products, services, and business models the norm and transform consumption patterns so that no waste is produced in the first place. Value chains as priority are electronics and IT, packaging, plastics, textiles, construction and buildings, and food and water. One initiative for example requires companies to substantiate claims they make about the environmental footprint of their products/services by using standard methods for quantifying them. Others focus on the insurance of less waste, the increase of recycled content in products remanufacturing and high-quality recycling, or rewarding products based on their different sustainability performance.





Examples of prominent EU initiatives are e.g. the newly defined Circular Economy Action Plan to establish a strong and coherent product policy framework. It will strongly influence value chain relations beyond the EU member states (see box 3).

The following chapters will provide more information on directives and regulations relevant to the specific value chains under consideration.

3.2 Main regulatory public trends relevant to the wood and metal sectors in the EU

With the European Green Deal agenda, most directives are under reconsideration and there will be continuous pressure to adjust them continuously to reach the 2030 and 2050 targets. Most of the regulative frameworks are related not only to the exported end product, e.g. of furniture or metal products produced in BiH, but are already looking at the whole value chain including inputs, e.g. wood and steel produced. It is evident that energy sources and certification or transparency in the origin of the resources are becoming increasingly relevant. For the EU, the above-mentioned regulatory tools like the emission trading system for large energy and industry input providers, and directives and initiatives like the circular action plan demonstrate the approach of considering whole production cycles to finally reach the energy and climate targets.

Within the metal and furniture processing sectors, the whole chain must be taken as a reference point when looking at their greening considerations, starting from inputs towards the various further value addition steps. All the steps in the chains of EU regulations, directives and initiatives determine the requirement of assured documentation and transparency already within the EU. Examples are the following:

- Increasing due diligence requirements for businesses ask for responsible sourcing of mining resources.
- Steel production must demonstrate the use of energy intensity and energy sources. In the EU the emission trading system provides a way of attaining transparency in this respect.
- Chemicals used in further processing and waste disposal imply regulations and standard requirements.
- The source of wood and sustainable forest management are required as well as the traceability of the origin of the wood.
- In the further processing steps of metal and wood products, the sources of energy and the way it is used must be documented.

In the following, some of these standard requirements, along with specific redefined directives by the EU legislation, are pointed out (see Figure 10).

Figure 10: Redefined directives by the EU with relevance for the wood and metal sectors in BiH



3.2.1 The EU Timber Regulation (EUTR)

The EU Timber Regulation is part of the new EU forest strategy for 2030. It recognises the central role of entire forest-based value chains and their responsibility in achieving the EU's biodiversity objectives as well as greenhouse gas emission reduction targets.¹⁷

The EUTR aims to counter illegal logging and associated trade in timber and timber products in EU member states. It aims to contribute towards sustainable management of forests beyond EU borders and establishes documentation obligations on companies that place timber and timber products on the market and on traders who buy or sell timber or timber products.¹⁸ Due diligence system (DDS) requirements must be in place to make sure that timber and timber products are legal. Standards such as the Forest Stewardship Council (FSC) system or other certification schemes such as the Program for the Endorsement of Forest Certification Schemes (PEFC) are accepted as DDS if the certificates are provided by a legal authority accepted by the EU authority.

For importers and exporters of wood products, it does not matter if it is just solid wood, furniture or whole wood houses which they sell or buy. Both sides have to make sure that a DDS is in place which can be traced back.¹⁹ In 2021 the European Commission made a fitness check of the EUTR and adopted a Proposal for a Regulation to curb EU-driven deforestation and forest degradation. The regulation aims to guarantee that EU citizens' products on the EU market do not contribute to deforestation and forest degradation within the EU and globally. This is an add-on to the Timber Regulation from 2010 and will continue to increase the pressure on the legislative frameworks of countries and on DDS requirements for companies integrated into global and EU-relevant wood value chains.

For the wood processing sector in BiH, FSC or other similar standards such as DDS might be

19 See EU Timber regulation, https://environment.ec.europa.eu/topics/forests/deforestation/illegal-logging/timber-



¹⁷ See EC (2023a)

¹⁸ See EUR-Lex (2021)

¹⁹ See EU Timber regulation, https://environment.ec.euro regulation_en

monitored according to higher biodiversity considerations and DDS requirements along the whole value chains.

3.2.2 Supply Chain Due Diligence Act

The Supply Chain Due Diligence Act builds on the UN's Guiding Principles on Business and Human Rights. After it became clear that voluntary due diligence on human rights in Germany was not successful, the Act was passed in June 2021 and has been in force since January 2023. It is also seen as a precursor to a European regulation. In March 2021, the European Parliament presented a legislative proposal for a European Supply Chain Due Diligence Act and called on the European Commission to act. In December 2022, the EU countries agreed on a Europe-wide supply chain law from 2025. The next step is for the EU Parliament to position itself. The European supply chain law would then go significantly beyond the German supply chain act which has been applied since January 2023. It would also include certain environmental aspects.

The German Act obliges German-based companies with more than 3,000 employees (from 2024 onwards for companies with 1,000 employees) to ensure that human rights are respected throughout their supply chains. It focuses explicitly on human rights aspects. The proposed European law would apply to companies with more than 500 employees and more than €150 million in global turnover. It also emphasises the private sector's central importance for compliance with the Paris Climate Agreement. Companies should ensure through their own climate protection plans that their business model and corporate goals are in line with the Paris- 1.5 degrees Celsius goal (see footnote 8). For companies in resource-intensive fields of production, the European Act should include companies with more than 250 employees.²⁰

In both laws, companies must assess how their business activities adversely affect human rights, take appropriate preventive and remedial measures, and regularly report on these activities. To do so, they must conduct annual risk assessments and regularly monitor their supply chains. They must publish an annual sustainability report that an auditor can audit. Regulatory monitoring with fines for non-compliance has already been introduced for the German Act.

Large EU buyers like IKEA and more than 100 companies with headquarters in Germany are promoting the EU regulation to ensure compliance requirements in other competing companies and countries outside Germany.²¹ What does this mean for BiH suppliers? It demonstrates a shift in compliance with human rights standards. At the same time, it can also be interpreted as an EU trend in which human rights and social standard compliance along the value chain and possibly also green supply chain risk management will become obligatory in the long run. Employer associations have criticised the Act for its intensive documentation requirements. It asks for data from direct suppliers. Thus it is expected that suppliers from

20 See EC (2022) **21** See Schwab (2022) BiH as well will be asked to present human rights and social responsibility documentation within their own companies and supply chains. If this is extended to green risk management indicators, it will require more pressure for compliance within the respective chains.

3.2.3 Renewable Energies Directive II from 2018

The Directive emphasises the need to reach 32% of the energy supply from renewables (RE) by 2030. Starting in 2021, member states must ensure that this EU-wide RE expansion target is achieved jointly. To this end, they must define national contributions within their respective climate and energy plans (NECP) framework. Within the EU member states, this pressure has led to the discussion of "green steel production" and the reduction of fossil-fuel-based energy consumption because steel production and coal-based energy supply are two of the most intensive CO2 emission factors in most countries.

The pressure on the EU member states to reach this 32% objective jointly will also increase the pressure on leading buyers in the EU to ensure increasing renewable energy targets within their companies and supply chains. Interviews with businesses in the wood and metal processing sectors in BiH emphasised that their EU buyers are not yet demanding higher use of renewable energy sources, but they like to see these investments.

3.2.4 Chemical-related regulations and directives

In the production of metals and furniture, many chemicals are used that are considered in some of the EU regulations and are relevant to wood and metal products as well as to waste management requirements.

REACH is a European Union regulation (1907/2006/EC) restricting the levels of specific chemical substances in all imported goods. It stands for Registration, Evaluation, Authorization, and Restriction of Chemicals. It places responsibility on the industry to manage the risks from chemicals and to provide safety information on the substances. Manufacturers and importers are required to gather information on the properties of their chemical substances, which should allow their safe handling, and to register the information in a central database.²² Also the CLP regulation (1272/2008 on classification, labelling and packaging of substances and mixtures) has required since 2008 companies to appropriately classify, label and package their hazardous chemicals before placing them on the market. The regulation aims to protect workers, consumers and the environment by means of labelling which reflects possible hazardous effects of dangerous substances. The new EU chemicals strategy for sustainability announced in 2020 is part of the EU's zero pollution ambition and increases the demands from national regulations and buyers to ban the most harmful chemicals in consumer products and to increase the standards in this respect.²³ It should be revised in 2023 and be linked to tighter



monitoring standards and include the promotion of green chemistries. Green chemistry promotion is on the EU agenda due to the objective of promoting a bio-based economy. Green chemistry involves using renewable resources such as crops, forests and microorganisms to produce materials and energy. Bio-based products include bioplastics, biodegradable clothing and bio-based fertilisers and chemicals. This will also strongly influence waste management and disposal criteria in the future.²⁴

3.2.5 Modernisation of the EU's Industrial Emission Directive

The Industrial Emission Directive (IED) already came into force in 2011. The IED aims to reduce harmful industrial emissions into air, water and soil across the EU through better application of Best Available Techniques (BAT).²⁵ The IED covers around 50,000 larger industrial businesses that are required to operate in accordance with a relevant permit. With the objective of the EU to reach a zero-pollution level by 2050, the Directive is now under revision. It will in the future promote a more effective permit system for industrial installations. Instead of settling for the least demanding limits of the best available techniques (as some 80% of businesses currently do),²⁶ permitting should be oriented towards achieving the best performance, including also securing a more regular review of derogations granted. It should also include circular economy investments related to industrial activities, waste management and intensive livestock rearing.

3.2.6 Revision of the Eco-design Directive

The Eco-design Directive (2009/125/EC) is under revision with the objective of promoting more environmentally sustainable and circular products. The directive established a framework to set mandatory ecological requirements for around 12 energy-using and energy-related product groups sold in all 27 member states. Consumers want to know the energy efficiency of, for example, light bulbs, boilers, washing machines, vacuum cleaners, TVs, windows, insulation materials, air conditioners and ventilation systems, electric and fossil-fuelled heating equipment, etc.²⁷ The revised version wants to go beyond energy-related products and their energy efficiency requirements. It sets requirements for product durability, reusability, reparability, the presence of substances that inhibit circularity, remanufacturing and recycling, carbon and environmental footprints and traceability, and information requirements including a digital product password.²⁸ The digital product password and the whole revision plan of the directive show a clear shift towards consumer transparency on circular economy aspects. If it is finally applied, it will also include products from the metal and wood sectors and their ability to be dismantled and reused, repaired or recycled. It would affect a much wider range of products and require a clearer understanding and assurance of

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sustainability for industrially produced products within the production chains.

For the revision of the Directive, several initiatives were begun, including the sustainable products initiative which looks especially at the extension of the Directive to other products, including furniture and steel products. The first proposal for an Eco-design for Sustainable Products Regulation (ESPR) was also formulated. During the interviews, experts mentioned that such a new regulation would strongly influence business models in different resourcebased sectors. It is yet not clear what a final ESPR would look like beyond the proposal, to what extent it would be weakened and finally, how it would find acceptance in EU countries. Nonetheless, it is obvious that if the sustainable product aspect beyond the energy efficiency criteria is implemented in the eco-design directives, it could also be interpreted as a small revolution towards a circular economy directive.

3.2.7 The waste framework directive

There is one final directive under reconsideration that should be mentioned here because it will also impact on BiH producers: the Waste Framework Directive, planned for adoption in the second quarter of 2023.

The Waste Framework Directive of the EU sets the basic concepts and definitions related to waste management, including definitions of waste, recycling and recovery. The foundation of EU waste management is the five-step "waste hierarchy" (see Figure 11), established in the Waste Framework Directive. It establishes an order of preference for managing and disposing of waste. In general it asks to make use of waste, reusing or recycling it before dumping it. The revision of the Directive includes policy options to bring about a more circular and sustainable management of waste. It intends to improve waste management by reducing waste generation through re-use of product, reducing mixed waste, and increasing preparation for re-use or recycling by improving separate collection systems.

Figure 11: Waste hierarchy to reduce waste mix



The waste in BiH will soon have to show a stronger reusability and recyclability.



²³ See EC (2023e)

²⁴ See EC (2023f) 25 See EC (2023g) 26 See EC (2022) 27 See list of products at EC (2023h) 28 See EC (2023h)

3.2.8 Summary of relevant greening policy aspects

It is challenging to identify some specific sector or value chain-related greening requirements within the EU directives. The argument here is that the renewed directives and regulations will rather influence all the relevant production sectors due to increasing CO2 emission measurement requirements, increasing chemical use restrictions and the way of dealing with hazardous waste. The Renewable Energy Directive and the energy Eco-Design Directive require (beyond the CO2 emission trading system and the CBAM requirements) increasing investments from energy-intensive industries into the use of alternative and renewable energies and into energy efficiency in general. For the furniture sector and the revision of the timber regulation as well as the extension of the Eco-Design Directive towards sustainable product requirements, waste and circular economy considerations will influence the whole structure of the value chains and how different businesses will reconsider their way of production.

It becomes obvious that cross-cutting regulations in the EU will influence companies, buyers and suppliers in all production fields.

The rules mentioned in the above chapters are asking national policy makers, inter alia in BiH, to anticipate and to adjust to the EU requirements not only to possibly become an EU member in the future, but also to ensure continuous innovation and adjustment in the business sector and to provide a guideline for possible future investments. Most of the mentioned aspects of the emission trading system and the transparency of CO2 emissions, the impact on circular economy action plans and the respective initiatives to increase the carbon footprint documentation at the EU legislation level, increasing DDS requirements along whole value chains and increasing sustainable or green chemistry and waste management requirements, are intensively affecting the wood and metal sectors. Companies and large buyers based in the EU are increasingly being asked to boost their own climate and energy strategies by the Green Deal targets as well as reflect on how to make use of first mover advantages to design innovative future products. Chapter 4.1 investigates the greening trends and targets of relevant EU buyers asking for supplier products from BiH.

4 MAIN PRIVATE REGULATORY TRENDS IN TARGET MARKETS IN THE EU

4.1 General trends in leading EU buyer strategies

The focus of the baseline study was not on the analysis of core EU buyers of BiH input products in the wood and metal processing sector. It included interviews with leading businesses in BiH and support organisations in BiH. These interviews provide the relevant insights. However, a deeper analysis of EU buyer strategies would be valuable because a lack of research in this direction became obvious during the analysis for this baseline study. This first section outlines some general findings that the author documented in another research paper (Waeltring, 2021). In the following sections findings from the interviews with businesses of the two respective value chains in BiH provide more concrete insights.

Apart from EU regulatory dynamics, leading EU companies and buyers with technology and market leadership and globalised value chain relations in metal and wood production are finding their role in the Green Deal Agenda. Their global competitiveness is shaped by the ability to identify new product and process innovations and to be forerunners in the positioning of their solutions to societal issues. They are pressured to react to new EU and national regulatory policies, to anticipate future demands and technological innovations to enable them to react to changing customer values and priorities. Thus many leading EU companies are on the one hand forced to react to EU and national climate and energy regulations, and on the other hand, they partly develop their own innovation and eco-oriented strategies to anticipate future trends and more sophisticated demands. Corporate culture and corporate responsibility are also playing an increasingly prominent role, either for reasons of marketing to consumers and/or for internal reasons to strengthen creativity- and value-driven team culture and to attract more and more value-driven gualified employees.

Leading original equipment manufacturers (OEMs)²⁹ and companies in the metal and manufacturing sector also often take the leadership in public-private dialogue fora and innovation networks in the EU. This can be observed in round tables with the public and the private sector to promote solutions, for example:

future mobility requirements (with leading companies in the automobile sector, such as for E-mobility)



²⁹ An original equipment manufacturer (OEM) provides components for the finished products of another company. They are in general the first-tier suppliers and powerful in the whole chain.

- for circular economy solutions (often with leading waste processing companies or companies that lead other production, service and consultancy sectors)
- national and regional industry dialogue fora, e.g. in Germany, including capacity building to combine Industry 4.0 and Work 4.0
- in the EU industries the promotion of green steel production with leading steel companies is playing a core role in this transition
- in the search for smart city solutions with leading companies in the digitalisation sector (e.g. IBM).

Further examples from existing Public-Private Policy Networks and working circles can be found in many EU countries. They are following the network governance approach that entails the logic that policymakers also require the involvement and support of leading businesses in the economy to identify required innovation priorities and programs for finding societal solutions. Leading businesses or representatives of SME organisations can thus also influence this agenda and position themselves as part of the solution.

Apart from playing an innovation role and being pressured by the EU Green Deal targets, many companies are also pressured by their customers to meet the changing demand and values involved. The first decade of the new millennium was shaped by the priority of quality of products which involved the increasing importance of quality management along whole supply chains. In the second decade of this millennium the rising importance of artificial intelligence, big and smart data, further digitalisation of production processes along value chains and green value chain management is starting to lead to the reorganisation and reconsideration of certain supplier relations. It leads to increasing pressure on suppliers in the lower parts of the value chain and also increasing innovation pressure for the leading tier suppliers to come up with new product-, process- and service solutions. In that respect, traditional value chain relations that focused mainly on guality assurance are now also starting to integrate environmental considerations to satisfy on-demand delivery and valuedriven considerations by their customers. Most SMEs interviewed in BiH are also experiencing this trend in their relationships with their buyers, although not yet in an intensive way. For the leading supplier businesses in BiH, it has already become clear that in the future these environmental requirements will become stronger. It already affects the future strategies and investment decisions of these SMEs.

Although the EU Green Deal has created a revision and initiated new regulative activities, the integration of environmental aspects into value chain relations is nothing new. Even in the past, the EU's awareness of the environmental consequences of the manufacturing industry worldwide has emphasised issues such as air emissions, scrap/waste regulations, the use of scarce resources at all stages of a product's life cycle from extraction to manufacturing, the reduction of fossil fuel energy use and increasing considerations of climate-related consequences of production. Overall, it can be stated that the leading buyers in different sectors first took different approaches to start considering environmental standards within their supplier relations.





The triangle in Figure 12 shows that new management priorities started to emerge, and it seems that they will more intensively shape this trend. Global Green Supply Chain Management (GSCM), Product Life Cycle Management (LCM) as well as Carbon Footprint Management (CFM) considerations have and will gain importance due to the renewal of EU Directives in different phases:

- The promotion of GSCM can be interpreted as an add-on to the quality management purchasing material, energy consumption, and waste treatment.
- approach but became automatically oriented towards whole supply chains.
- Carbon footprint management is often defined as a sub-area of LCM, especially considering efforts of large buyers to improve their carbon footprint along their whole supply chain.

All three trends place different emphases on the promotion of greening supply chains and increasing the pressure on subcontractors to comply with buyer requirements related to environmental impact in their production processes. Based on the interviews with BiH businesses, it seems that these standards will increase in importance. A trend that is mentioned in several sustainability reports of large buyers in the EU, including the auto, furniture and metal industries, is that leading companies and first-tier suppliers express their aim of eliminating carbon emissions from their entire value chains (including their suppliers)

focus that started in the 1990s. In its beginning, GSCM was strongly related to the need to strengthen resource and energy efficiency in production processes. Criteria for the GSCM integrate pollution control initiatives, environmentally friendly technology, NGO partnerships in monitoring procedures, and the use of renewable energy sources for production. These environmentally oriented criteria are at the same time interpreted as having positive economic performance effects, including a decrease in the costs of

Life Cycle Management (LCM) is also a business and value chain approach that focuses on managing the total life cycle performance of goods and services to promote more sustainable production and consumption. It started strongly as an internal company

the carbon emissions (carbon dioxide emissions and other greenhouse gases) evolving in the production process along a respective supply chain. Especially the footprint perspective has gained increasing public attention during the last few years. It has led to increasing



and taking on a full life cycle perspective. This is often manifested in carbon dioxide reduction targets that these buyers publish in their reports and strategic intents. The following examples of some leading companies stand for this trend.

- The VW Group emphasises its sustainability-driven strategy to "act proactively beyond fulfilling legal requirements". According to its publicly accessible strategy, it increased green value chain management requirements and environmental footprint considerations in contracts. They detect sustainability risks in their supply chains and rate suppliers' sustainability performance.³⁰ VW's decarbonisation approach aims to eliminate carbon emissions from their entire value chains (including their suppliers') by 2050 (see Figure 13). By 2030 they want to reach 30% (VW 2022).
- The Swedish company IKEA, as the largest ready-to-assemble furniture company, wants to reduce greenhouse gas emissions by 80% in 2030 compared to 2016 (see Figure 14).³¹

To achieve these objectives, especially leading buyers must increase the requirements from their suppliers. As VW states it in its sustainability report:

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"Our suppliers become our assurance to reduce our footprint. Without them, we will stay vulnerable" (VW, 2020). Gonzalo Salem, Procurement Manager of Volkswagen Group Australia also expresses this: "Corporations develop sustainability policies where the scope goes beyond the organisation to business partners, suppliers, consumers and even competitors," he says. "Sustainability is now considered amongst valuation criteria, and this is evidenced by companies issuing their sustainability reports annually. On top of that, this increases transparency to the public as well as the confidence of company stakeholders which contributes to growth."32

Zooming into the examples of IKEA and the VW Group, the carbon footprint reduction requirements tackle, e.g. raw material extraction and component production that is mainly done in supplier countries such as BiH.

Figure 13: Life Cycle Assessment by the VW Group Cradle-to-Grave-"Life Cycle Assessment"



Source: VW, 2022

30 See VW (2022) **31** See Eco-Chain (2022) 32 See VW (2022)

Figure 14: Climate footprint from IKEA in the different production stages

CLIMATE FOOTPRINT AT EACH STAGE OF IKEA VALUE CHAIN (% OF CO2e EMISSIONS)



Source: Ecochain 2022

4.2 Specific private sector standard trends that were identified in the process of research

Specific private sector trends were mentioned in the analysis and several interviews with businesses and support organisations. We have summarised them in the following paragraphs with some explanations (see Figure 15). There are more standards, but they were not mentioned as relevant during interviews and research. The standards stated are especially standards related to CO2 emission measuring, life cycle assessment, product footprint certification and labelling of resources used for processing of products, energy management standards and health and safety certifications.

The ISO 14000 family and 14001 as a basic standard

The ISO 14000 standard family is related to the set-up of an environmental management system (EMS) in organisations. There are several standards in the family with different additional environmental requirements (see examples below). In BiH there are now attempts to strengthen the certification of companies in ISO 14001. It is an integral part of the European Union's Eco-Management and Audit Scheme (EMAS). It does not state requirements for environmental performance but maps out a documentation process to set up an effective EMS. It can be used by any organisation that wants to improve resource efficiency, reduce waste, and reduce costs.

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ISO 14040 and 14044 on life cycle assessment

Both ISO standards go beyond the 14001 standard and are leading international standards on life cycle assessment (LCA). They document the product's impact from cradle to grave. The life cycle inventory includes the quantification of all input and output flows relevant to the product system including energy, products, waste, emissions, discharges to water and soil contamination.³³ ISO 14040 describes the "principles and framework for LCA", while ISO 14044 "specifies requirements and provides guidelines" for LCA.³⁵

BiH companies involved in the further processing of aluminium have increasingly been asking for this standard with the challenge of often not being able to trace back the core input providers of aluminium.



Environmental Product Declaration (EPD)

This is an environmental declaration that involves Life Cycle Inventory Analysis, a Life Cycle Impact Assessment as well as the quantity of waste produced. It is in line with ISO 14040.

European Technical Assessment (ETA) and CE marking

The European Organisation for Technical Assessment (EOTA) provides the framework for the European Technical Assessment (ETA) of construction products to ensure consistent product performance information throughout Europe. It allows European manufacturers of innovative or non-standard construction products to bring their products to the European market with CE marking based on a variety of documentation procedures. This standard was mentioned in wood house construction companies.

ISO 14064 for quantification and reporting of greenhouse gas emissions

ISO 14064 is a three-part series of standards and provides companies with a suitable basis for determining, accounting for, and verifying greenhouse gas emissions. First published in

33 See VDI (2023) 34 See Pallas (2021) 2006, it promotes the translation of current scientific knowledge into emission reduction measures and thus supports organisations in meeting climate targets. The primary objective of the 14064 series of standards is to promote climate protection by supporting companies in identifying and reducing emissions in their production process.

ISO 14067 - Carbon footprint standard of products

ISO 14067 does not focus on the greenhouse gas emissions of a company but takes the product as a reference point. This entails consideration of the whole production chain and the CO2 emissions that were used for producing the product not only at the level of the company but along the whole production cycle. Thus ISO 14067 is the basis for the development of the Product Carbon Footprint and provides companies with a suitable basis for determining, balancing, and verifying greenhouse gas emissions that arise along the value chain of a product or service.

ISO 50001 - Energy management standard

ISO 50001 is an energy management standard. It is oriented towards improving the energyrelated performance of an organisation or a company by setting up the necessary systems and processes. The aim is to tap unused energy efficiency potential and reduce energy costs. It defines an energy policy with concrete energy targets that should be reached in a certain period of time and where the progress is documented.

ISO 45001 on occupational health and safety

Several businesses with export relations are often asked to provide evidence that their production processes are safe and healthy for their employees. The occupational health and safety standard of the 45001 family builds on various national standards and the ILO's international labour standards and conventions. It tracks improvements in the provision of safer and healthier workplaces to prevent work-related injury and ill health, including certain hazards.

Standards such as FSC and PEFC as forest and labelling certification systems

The globally operating forest certification systems FSC (Forest Stewardship Council) and PEFC (Program for the Endorsement of Forest Certification) are oriented towards ensuring the supply of sustainable raw materials in the wood processing sector. They also include labelling of products produced from sustainably managed forests. The central message of the FSC and PEFC eco-label is the sustainable management of forests to obtain the raw wood material. In addition to various social and environmental requirements, the focus is on the conservation of wood as a resource by means of management that is intended to ensure its use for future generations. According to the labels, wood processing companies exporting to the EU have to present certifications to be able to import and label the products according to the standards.³⁵ There is increasing pressure on the due diligence of companies in the wood processing sector to ensure their raw material supply sourcing procedures when exporting products due to illegal use of wood sources internationally.



5 MAIN RELEVANT REGULATORY PUBLIC TRENDS IN BIH

The identified greening requirements of EU regulations and through related adjustments of large EU companies and buyers demonstrate the importance of legislative framework conditions also to provide respective guard rails for the future development of businesses and development directions.

From interviews and research, the legislative framework in BiH is still very weakly oriented towards promoting the wood and metal sectors to move towards meeting EU requirements. A few steps demonstrate the interest in coming closer to EU regulative standards. However, there are still many bottlenecks.

In the following, certain bottlenecks are mentioned and further described:

- 1. Energy basis of BiH and first efforts to set up a national emission traceability system
- 2. Challenges in providing RE feed in opportunities
- 3. Poor implementation of existing regulation and landfilling as a prevailing treatment option.
- 4. Certain system solutions are available, however poor implementation of legal obligations and poor inspection are the bottleneck

5.1 Fossil fuel energy basis in BiH and CO₂ emission pricing

Over 60% of BiH's energy is based on fossil fuels, primarily coal. The country intends to increase its share of energy from renewable energy sources to over 40% by 2030.³⁶ According to government announcements, plans exist to put together a CO2 pricing and trading system by January 2026 to avoid paying the EU's carbon tax planned in the CBAM regulations (see above).³⁷ According to news articles and interviews, the biggest challenge is the state's complicated distribution of competencies between the entity and state levels but also between the canton levels in the Federation of BiH.

Once a CO2 trading system is implemented, this would put much price and investment pressure on many of the steel, aluminium and core processing companies in all sectors. At the same time, a strategic policy approach in BiH with consideration of concrete environmental

36 See Maksimovic (2022.)

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and green industrial development targets would enable businesses to predict investment requirements. Overall, the businesses and support organisations that were interviewed ask for stronger government leadership in promoting investments in renewable energy and providing a clear direction.

5.2 Risks for renewable energy investments due to lack of feed-in regulations

The two entities of BiH, Republika Srpska (RS) and the Federation of BiH (FBiH) announced that they want to invest intensively in renewable energy in the next five years.³⁸ However, in both entities feed-in opportunities have for a long time not been possible for households and companies, which led to a high risk of companies investing in renewable energy solutions for their company energy supply. In March 2022, a new Law on Renewable Energy Sources of Republika Srpska came into force in RS. According to government information sources, it is aligned with the EU Renewable Energy Directive (see above).³⁹ It accordingly "allows an end user to acquire the status of a prosumer by building and connecting a power plant that uses renewable energy sources to the end user's internal electrical installations for self-consumption, and then to obtain a certificate for serving as a power production plant."

In July 2022, the Government of the FBiH announced the new law (replacing the law from 2013) on the use of renewable energy sources and efficient cogeneration was submitted to the Parliament of the Federation of BiH. It has not been implemented yet.⁴⁰ Overall, this means that for larger companies or for households there were no incentives to invest in renewables due to the lack of opportunities to feed into the electricity network and to get compensation for the investment. It will be important to incentivise this process for companies and households soon, so as to encourage the energy transformation process in the country.

5.3 Waste management and compliance with EU Directives

The waste framework directive mentioned above will pressure BiH to improve its way of handling waste. BiH has defined waste management plans. Also, the regulation is quite well developed, but technical capacities, infrastructure, and political will in some segments impair its full implementation. This leads to the situation that waste management only partly complies with the EU Directives. Several documents state that only a limited number of initiatives exist for separating waste and a limited amount of industrial and hazardous waste recovery or reuse. Estimations from 2018 stated that only 10% or less of the total volume of industrial

38 See ENERDATA (2022) 39 See LoC (2022) 40 See BGEN (2022b)



³⁷ See BGEN (2022b)

waste is used as secondary raw material.⁴¹ According to this information basis, no separate collection system for hazardous materials exists, and nearly all waste is dumped in registered and informal landfills.

According to the European Environment Agency's BiH Waste Prevention Country Profile from 2021, BiH has managed some improvements in waste management aspects during the last few years. This includes increasing the amount of treated waste, improving the coverage of waste disposal, and closing municipal landfills and gradually transferring them.⁴² Despite this documented progress, key challenges are insufficient waste collection, very low waste separation, waste disposal at illegal landfills, and low recycling levels and circular economy considerations.⁴³ No separation of organic waste is promoted before 2025.

5.4 Energy efficiency targets and process challenges

According to the Energy Community Secretariat, which takes stock of the progress of the national climate targets of countries that signed the Paris Agreement Declaration, BiH has yet to make much progress in reaching its climate targets. BiH submitted its second nationally determined contributions (NDCs) in April 2021. The annual NDC is at the heart of the Paris Agreement and provides an overview of each country's progress on reducing national emissions in line with national set targets. The document states increased investments in coal capacity, with an unconditional GHG emissions reduction target for 2030 of 12,8% compared to 2014, or 33,2% compared to 1990. Until 2021, the Government had not yet established the legal basis needed for the National Energy and Climate Plan. Overall, the Energy Community Secretariat states in their annual BiH energy sector reform progress report from November 2022 that the country

66

"has achieved limited progress during this reporting period: the energy legal framework remained fragmented along entity lines, thus blocking much needed reforms. The non-compliant gas sector legislation continued to paralyze the country's gas infrastructure ambitious. ... The Secretariat had to initiate infringement actions to address the country's breach of the Large Combustion Plants Directive ... Environmental standards remained low with levels of sulphur dioxide, nitrogen oxides and dust from large combustion plants above the ceiling. Transposition of the Governance Regulation and the 2021 electricity legislation is yet to begin, while the transposition of the new Renewables and Energy Efficiency Directives is moderately advanced."44

5.5 Lack of systemic solutions for greening efforts

Overall, it becomes obvious that for the promotion of green economic development trends, there is a need for systemic efforts to be established that provide synergies and cross-fertilisation. Looking at the EU green deal now, it becomes obvious that policies and regulations play a key role to flank further greening efforts in the business world and society. In the following, some aspects will be mentioned that demonstrate the lack of a systemic approach towards green economic development in BiH (see Figure 16).

Figure 16: Areas lacking systemic solutions in BiH



Recycling and circular economy business infrastructure: Businesses in processing sectors and especially in metal processing create much hazardous waste. The latter becomes a cost factor for businesses. Waste, which in other places is collected, recycled or reused for the design of other products is not used in BiH due to a lack of recycling and reusing business infrastructure. BiH as a small country also lacks a critical mass of certain waste to make it attractive for private businesses to invest in such value-added activities. It would require a system of incentives and political pressure to manage waste more sustainably. These system aspects are not in place.

Renewable energy system promotion: Renewable energy efforts of businesses can be observed, but they are instead left on their own regarding investment costs, search costs for available information and service costs. Although the feed-in regulations are in the process of becoming approved in BiH, there was for a long time no opportunity for businesses to feed their produced energy into the national grid and to get compensation for this. In interviews, a few leading businesses stated that they could invest in renewable energy because the high energy consumption in the production process made it economically viable. However, without a system regarding the provision of information, specific incentives for investments and installation and maintenance services, it will not be possible to reach the renewable targets BiH has stated in their NDCs.

Energy efficiency increase and CO, emission reduction: Without CO, pricing in BiH many businesses will not start to invest in further energy efficiency and innovation. The leading

Weak recycling and reusing of existing infrastucture

Low renewable energy promotion

Low efforts in reducing Co₂ emissions



⁴¹ See EEA (2021) 42 See EEA (2021) 43 See SEI (2021)

businesses in the two sectors interviewed can be regarded as outliers in their environment; most businesses are still building their business advantages on comparative factors such as very low energy costs compared to the EU.⁴⁵

Trust in institutions and political structures: Private sector and support organisational representatives expressed, again and again, the lack of a reliable and forward-looking political system structure as well as the lack of a supporting ecosystem with support organisations that can provide reliable research and innovation knowledge regarding the greening of production processes. "For a systemic development approach, real leadership in the governance of a Green Agenda is missing at the political level", was the statement of most of those interviewed.

5.6 Lack of a green innovation system in BiH

One core observation during all the interviews for the baseline study was the very different political and support organisational reality in countries such as BiH compared to progressive countries in the EU. It leads to a need for a real political greening agenda and subsequently a loss of the promotion of a synergetic innovation system that supports businesses and BiH in increasing its green competitive advantages. BiH is mainly building its future on cost advantages, "and that will not last long" was the statement of one strong support organisational representative in an interview.

Figure 17: Innovation system reality in the EU and BiH



Source: Mesopartner

To make the point, interviewees compared the innovation system of EU countries with the one in BiH. The same argument is valid for many other Western Balkan countries (see Figure 17):

In the EU countries, the green agenda is driven by well-researched strategies that lead to policies and relevant support programs to promote economic transformation of the economic structures within different sectors.

- Targeted support programs to promote innovation and transformation as well as relevant. research and business transformation.
- Supporting service providers and knowledge organisations are creating an innovative ecosystem to access funds and support businesses with respective services.
- Businesses and EU buyers obtaining products from companies e.g. in BiH are on the process.

Although the reality is not very ideal in practice, it is true that specific cascading synergies are in place in EU countries that EU accession countries also need to be built up.

According to interview findings, in BiH the system functions very much the other way around:

- Leading businesses in the main exporting sectors such as wood and metal processing. production processes and future business requirements.
- Service providers and **knowledge organisations are asking these leading businesses** less oriented towards identifying new sectoral and locally applicable practical solutions.
- The dependence on external funding and impact challenges exists due to lack of national the supporting institutional surroundings and within the business sector.
- A lack of strategies and policy regulations goes back to the lack of a visionary policy green development.

This perspective and impression of most stakeholders in BiH shows a clear lack of political leadership in governing the future economic development in BiH and also the EU integration process.

research capabilities are set up at the federal, national and EU level to support applied

one hand being pressured to change and innovate their way of former production and reconsider their business and marketing strategies. On the other hand, they have access to knowledge services and funding streams for managing their internal transformation

are the leading knowledge carriers when it comes to the greening requirements of

about trends and support requirements. Although service providers started to develop the first greening services and applied research activities, they still need the fundamental knowledge to become core drivers in this field. At the same time, these support organisations rarely cooperate. An innovation ecosystem of horizontal and vertical cooperation is not in place. At the same time, the existing support organisations are highly dependent on donor funding or international research funding. The donor funding is mainly based on project logic (short-term projects vs. long-term projects). Often these donor projects are also not coordinated with each other in their efforts and intervention approaches. International research support programs are often oriented towards international research topics and

and local support programs that initiate new network and transformation efforts within

approach and a reactive instead of proactive political approach to drive economic and



⁴⁵ In March 2022 the price per kWh in US dollars was 0,109 in BiH, in Germany 0,339 and in Italy 0,372. It is less than one-third of the price in core exporting countries. See GBP (2023)

6 SME EFFORTS TOWARDS GREEN PRODUCTION PROCESSES IN THE METAL AND WOOD PROCESSING SECTORS IN BIH

After analysing generic policy and buyer trends, it will be relevant to understand the existing greening business models in BiH. It will also provide a better understanding of how leading SMEs in BiH are affected by green market requirements in their respective EU chains and how they react.

6.1 The methodology and the focus of the interviews

The baseline study was not based on a large survey, but many interviews were conducted with businesses in the wood and metal processing sectors in BiH. Six interviews were conducted with companies that could also be defined as very innovative in their field of production. They have had long-standing production and export experiences with European buyers. Thus the interviews and even the companies selected for interviews do not provide a holistic picture of the sectors. However, this was not the objective. The core focus of the interviews was to reach out to leading businesses in the sector that have a different vision of their own business model in the future and were already actively involved in greening efforts in their production processes. They all had their own opinions about the importance of greening aspects regarding the EU and the future opportunity to integrate into the EU as well as regarding the orientation of their large EU buyers and their future orientation and strategies.

6.2 The variety of companies and their different ways of integration into the EU market

The companies interviewed for the baseline study had different profiles and development paths. They are integrated into very different market and product segments and thus also in different value chain relations. Interviews in the wood processing sector were held with two furniture producers and one wood house producer. In the metal sector, the focus was on companies active in the galvanisation of metal products and in the value addition of aluminium products (see further details below).

All the businesses interviewed in the wood processing sector must be interpreted as outliers in their field with quite innovative and diverse strategies in their product portfolio. We observed different patterns in these companies, which are summarised as follows:

One company was involved in hierarchical supply chain relations in respect of chairs with

IKEA. There are several companies in BiH that are in these subcontracting relationships with one buyer and are producing certain products for the furniture sector. But this company opened two different market channels. Based on learnings with IKEA it opened a second and third line of production, producing products in the high-value furniture rubric. One of the latter two involves high-end products with their designs and own market channels. At the same time, the other high-end line of furniture is produced on a subcontracting basis that gives the opportunity to specialise and to produce their own independent product line. This company was thus successful in upgrading into three different value chains with increasing independence from larger buyers.

- set-up of a whole new distribution network.
- The third company interviewed also has a long heritage of more than 100 years. It produces

In the metal processing sector, all the companies interviewed also produced very different products or provided different services in very different market segments:

- One of the companies interviewed is active in the galvanisation of metal products and production processes and labour and environmental cost advantages.
- Another company is a market leader in producing aluminium-based building systems such products to the EU and has voracious suppliers to whom they export their products.
- sources.

All the companies interviewed are well established in the EU market, have close and continuous

The business model of the other furniture company is a very different one. The company always connected furniture production with hand carving and its long historical heritage. This company also went through a total transformation process. It moved away from traditional self-designed furniture towards cooperation with specialised furniture designers. This led to new and high-end wood products, including furniture and other wood art products. This shift catapulted the company into a very different value chain, which is now selling 95% high-end products to the export market, while in former times 95% of the production was focused on the local market. This new orientation required the

complete wood houses, including the supporting and bearing structure, , the roof, doors and windows from laminated timber. Exports of complete houses and large roofs also amount to 95%, mainly to the UK, Luxembourg, Austria and Croatia. The company had to continuously comply with increasing energy efficiency standards for the housing sector. The company is involved in completely different supply chain relations, receiving most of the solid wood from BiH, while all wooden boards like MDF, MDP and OSB for interior fittings are imported from EU countries due to a lack of wooden board production in BiH.

provides 27 technologies of surface preparations, including nickel, zinc and other products. According to them, their competitive advantage in BiH is still their high quality and efficient

as doors, sliding systems and aluminium profiles. The company mainly exports high-quality

Both companies mentioned above have a variety of business relations and source their knowledge mainly from customers in the EU. They see their future market mainly in the EU, but also see increasing EU market requirements regarding waste management, use of hazardous materials, energy costs and increasing requirements for green certified energy



relationships with their buyers and have been able to diversify their business models in the past few years. They also plan further investments in new product lines or new business fields. This means that the companies interviewed are all on a growth path track judging from the data and information available from the interviews. Looking at the chapter on the basic export structure of the metal and wood sectors, it becomes apparent that they are exceptional, higher value-adding businesses.

6.3 Priority areas of SMEs in BiH to invest in regarding green business models

6.3.1 Main areas of greening investments

One of the core objectives of the baseline study was to find out about the greening activities BiH companies have started within their sectors.

There are various activities in which leading companies are starting with green investments in their production processes:

Companies have integrated sustainability values into their core business strategy: These companies can be seen as clearly value-driven companies that have integrated social and environmental standards in their business model. They even go beyond carbon footprint considerations, and also incorporate in their business strategy local social responsibility factors like support to local culture and local development efforts in the locations where they are based. These companies have a long business history, a strong identity, and a relationship with the place where they are based. The companies that were interviewed were also family based.

Companies preparing for future consumer shifts and marketing reasons: These companies do not yet feel strong market and buyer pressure to become greener but want to prepare themselves for the future. In the future, they expect increasing sustainability demand from their EU buyers and their final customers in their chains. They have also started investments to market themselves as companies with ecological awareness and to be ready once the future demand changes.

Companies investing in energy cost reduction and being independent of fossil-based energy supply: Energy prices in BiH are still low compared to most EU countries.⁴⁶ However, looking at the CBAM requirements and the current energy crisis in Europe and its fluctuations, all the businesses interviewed expect increasing energy prices in the future. For many companies, energy costs are an important cost factor in their production processes. They started to invest in solar panels and other activities, including waste management, to reduce longer-term manufacturing costs.

6.3.2 Main areas of investment in greening production processes in the two sectors

There are different stages of investment of companies into green technology and green production process efforts (see Box 3). In BiH leading businesses are currently starting to invest intensively into energy efficiency and energy cost reduction.

Box 4: Different stages of investment of companies into green technology

Energy efficiency and energy cost investments: Energy efficiency is the use of less energy and energy costs to perform the same task or produce the same result. It involves investments that reduce the use and costs of energy in the production process. It can entail more efficient technology, more efficient production processes that reduce the use of energy, more effective use of the energy itself through increasing savings and reduce energy use in the production process. To reduce energy costs investments into renewable energy sources are often one way. This can entail the reuse of waste (e.g. wood waste for the production of pellets and heating or the installation of solar panels to produce own energy.

Environmental resource and material efficiency investments: They revolve around an organisation's business efforts to maximise their performance while minimising their waste and environmental impact. Investments are made that increase the efficiency of all input products and resources that are used in the production process. This often involves energy efficiency and cost reduction aspects but goes further and looks at innovative ways on how to better use the materials or to use more environmentally friendly materials to reduce the carbon footprint of production.

Circular economy investments: The circular economy perspective entails redesigning products to be more durable, reusable, repairable and recyclable. It often entails a reconfiguration of traditional ways of producing the product and to look at all the components of the product and the opportunity to declutter it and to re-use all of its components. This also means that it involves not only the company level but also the whole chain, including all input products.

Source: Mesopartner and interviews with meso organisations in BiH

When looking at the requirements from an innovation perspective it can be stated that the three greening efforts also require increasing knowledge capabilities as well as innovation support requirements. While investments in energy efficiency and renewable energy are easier to promote and manage, with the efforts placed on resource and material efficiency, and even more so with circular economy investments, additional knowledge is required, implementation becomes more complex and depends not only on the company itself but also on their suppliers and knowledge sources available outside the individual company level (see Figure 18).

According to the results of the interviews, core green investments were made in the following areas (see Figure 19):

Investments in new technology: In the wood and metal processing industries, technological investments were made during the past few years involving e.g. the latest CNC-based technology to improve efficiency in the production process.



⁴⁶ See comparison of energy prices of BiH with EU countries in: GBP (2023)

Figure 18: Different kinds of innovation strategies



COMPLEXITY AND COMPLICATEDNESS OF INNOVATION PROCESS REQUIRED Source: Mesopartner and Dodgson (2008)

Process optimisation investments: Efforts were made to shorten lead times, increase capacity utilisation, shorten routes, reduce communication barriers and improve production logistic aspects. These processes often go hand-in- hand with further digitalisation processes and the use of process management software (e.g. ERP) to better monitor the process efficiency continuously.

Investments in renewable energy: Most production processes in the wood and metal processing sectors are energy intensive. It involves, for example, the drying of wood, the use of heavy machinery, and the use of heating and chemical procedures to process and shape the materials. In the interviews, nearly all the companies stated that they had started to invest in their own solar panels to reduce their dependence on mainly fossil-fuel-based energy sources. The expectation is that the low energy prices in BiH will increase in the near future and the country will need to comply with CBAM and emission trading requirements, including the monitoring of CO2 emissions. In both sectors buyers from the EU also encourage companies to invest in renewable energy sources.

Figure 19: Main green investment areas of businesses interviewed



Better use and processing of waste: Most companies are starting to look at the existing waste and how to use it in a cost-reductive manner. This includes, for example, the production of pellets in the wood processing sector to make use of waste wood and sawdust for heating, first investments into combined heat and power generation, research on the reuse of hazardous materials and chemicals in the metal sector and in galvanisation processes, the use of water-based paints, greener chemicals, and more recycled input products.

Investments into environmental standards, energy management systems (EMS) and Environmental Management Systems (EnMS): These include compliance with certain standard procedures (including ISO 50001, ISO 14001, ISO 14040, ISO 14064) to reduce the consumption of electricity and thermal energy in production as well as management of industrial waste to improve the recycling process.

In summary, most investments mainly focus on energy efficiency and renewable energy efforts. Nonetheless, there is an increasing awareness and a clear expectation in leading BiH businesses from the wood and metal processing sectors that the demand from buyers and customers will soon move towards increasing resource and circular economy requirements.

6.4 Areas of perceived pressure of SMEs to comply with new standards

The businesses interviewed for the baseline study do not yet feel pressure from their customers to become greener. However, they expect this pressure to increase within the next five years. They are starting to prepare themselves for this expected shift. And they already perceive that customers and buyers react positively to their efforts in promoting greener production processes or greener energy supply. The reason for the expected shift is also related to the increasing EU Green Deal requirements as well as changing customer values that are increasingly asking for more environmental production processes and products.

The expressed observable trends by BiH companies are summarised in the following by the use of short citations of the business owners. This summary provides good insight into expected core future investment requirements.

In the wood processing sectors specific issues were mentioned:

"IKEA does not pressure us for our investments in solar panels but is encouraging us to

47 See IKEA (2021.)

do so." IKEA even offers its own credit lines to their suppliers for such investments. Large buyers such as IKEA have defined in their sustainability business strategy the target of accelerating IKEA suppliers' transition to 100% renewable electricity.⁴⁷ BiH suppliers and the annual sustainability report from IKEA expressed that these targets were not followed



up during the COVID-19 pandemic as a priority. But the company has already reached 100% renewable use in their IKEA factories. It is expected that the demand from their suppliers will increase in the coming years so that they can also show progress regarding their supplier indicators.

- "We are observing well the strategies of our suppliers. IKEA wants to move away from plastics and increase organic and recycled input products. Examples are changing from foam-based textile input products towards organic ones. We also started to think about sourcing opportunities for our chair production involving particular textiles." Again, in the case of IKEA as one dominant buyer of further processed furniture products in BiH, considering more recyclable input products is on the agenda of supplying companies.
- "In our high-end products, we mainly have a traditional and richer class of customers who look rather at design and taste factors than ecological criteria. This is now shifting with the increasing number of younger clients who look for the combination of design and sustainability requirements." This shift is also encouraging furniture producers in higher end markets to search for environmentally friendly products, using mainly waterbased paints, linseed or flax-based oils and investing into organic textiles.
- "The wood industry in BiH is certified with FSC. Nonetheless we do not add value to *most of the wood resources."* This comment is especially related to the large amount of raw material exports of wood from BiH to the EU. To increase the environmental use of these resources companies mentioned a strong need to strengthen support policies and support programs for value addition and where the raw material is seen as an asset in favour of BiH.
- "Our production process is quite circular. We make use of all our wood waste for producing pellets or wood chips, and we reuse it for heating. Also, our furniture (or wood houses) can be completely dismantled." This understanding of circular reuse of all by-products is very much focused on the reuse of materials inside the companies and less so along the whole supply chain. Also, the quality of reusing it (e.g. by burning the material for heating) is of rather low value. In some companies, the involvement of more organic instead of fossil-based plastic and foam products can be interpreted as the first attempts to look at more circular and sustainable input products. Also, efforts not to use chemical-based paints and other chemicals in the production process demonstrate an increasing interest in strengthening the circular perspective within the production process.

In the metal industry in BiH other comments entail environmental trends in the sector:

"The use of hazardous chemicals will become an issue for us." Companies certified with the REACH standard realise that the requirements for chemical use and the documentation of managing the hazardous waste after using the chemicals becomes an issue for the auditing companies. Accordingly, increasing traceability of the waste use is demanded.

- emissions in their own premises.
- intensity of their input products.
- find ways of transforming their waste into new products.

"We lack a critical mass of waste in the country that makes recycling solutions attractive for businesses. Thus, we lack opportunities for value addition in this respect." Companies in the metal sector are exploring opportunities to use their waste, e.g. from the galvanisation process, for insulation materials. However, there is no added value chain in BiH that can recycle products in the country. Also, a critical mass of waste production does not exist that could make it attractive for companies to move into the recycling of products. The result is that waste must be transferred to specific waste disposal companies.

Figure 20 provides an overview of core investment and core increasing pressure areas that companies feel at present.

In summary, first chain patterns on environmental issues emerge in chain and customer relations. They are mainly related to energy efficiency and cost reduction (renewable energy investments, energy efficiency and product logistics improvements, digitalisation of production processes). Also, first activities in the direction of resource efficiency improvements become an issue like the integration of more sustainable input products, the use of green chemicals in

"We are increasingly asked to reduce our CO2 emissions through investments in renewable energies. And we do this also because we expect increasing energy prices with CBAM." Metal sector companies see that the mission trading system and the CBAM system effective from 2026 onwards will provide them with the need also to reduce energy

"We see increasing pressure to provide carbon footprint and certificates of CO2 emissions from our suppliers to our buyers in the EU. Nonetheless, our suppliers in aluminium production come from different places around the world and have no CO2 monitoring system in place. What can we do?" Especially in further processing, companies that are based on energy-intensive input products (e.g. from producers of steel or aluminium), have challenges certifying within the supplier chain detailed CO2 emissions and thus to fulfil carbon footprint requirements. Although the documentation requirements of the carbon footprint are not yet required by the customers, they are already asked by their buyers that this will soon become an increasing requirement. The companies interviewed in the metal sector welcome the CBAM requirements and the CO2 emission pressure on their input providers. It would provide them with a better data base on the emission

"Waste management is costly in the metal sector. We are increasingly working on how to ensure a responsible base of recycling" Many metal companies must deal with hazardous materials and chemicals that are used in metal processing, galvanisation procedures including water cleaning and recycling requirements and the disposal of remainder materials. Recycling is often not an option due to lack of knowledge of how to use the waste as a recyclable as well as the lack of an existing recycling industry in the country. One company started to cooperate with research institutes in Germany and Austria to



processing procedures, the investments in water cleaning systems and energy management systems, resource and material efficiency considerations as well as first attempts to make use of existing hazardous waste. Circular economy considerations are less of an issue. Knowledge of opportunities to increase this way of production and specialised recycling companies to support the transformation of waste into innovative products are lacking. When asking businesses about their impression of future requirements most of them expect that circular economy considerations as well as increasing CO_2 considerations along the value chain will increase in importance in their sector.

Figure 20: Greening requirements from EU buyers



6.5 Solutions suggested and challenges mentioned by SMEs for next steps forward

During the interviews the author of the baseline study asked the businesses about their expectation and wishes for supporting their and the industry's transformation process. Challenges and suggestions for solutions in different areas and fields were mentioned. They are structured according to the following headings:

- Overall sector requirements
- Company or business level requirements
- Services and targeted support program requirements
- Policy and socio-cultural requirements

6.5.1 Overall sector requirements

Leading businesses in the sector have already started to promote green transformation processes and have a vision for their sector. Some of the core considerations from their perspective for the development of the sector are the following (see also Figure 21):

Adding value creation to the sector ("We cannot export our valuable resources and not make for ourselves something out of it."): Both the metal as well as the wood processing sectors export to a large extent products of low value, or even, in the case of wood processing, most of the wood as raw material. From a legislative point of view there is a need to give preference to access by the metal and wood processing companies that are adding higher value to the product. This needs to be accompanied by support and training programs for higher value addition efforts of companies in both sectors. It will not only increase the use of raw materials and thus also resource and energy efficiency in production, but also provide employment and knowledge creation inside the country.

Figure 21: Overall sector requirements



Source: Mesopartner

Developing competitive and sustainable advantages instead of building on comparative advantages ("We need to become the green place where you can produce with cost advantages and a highly educated labour force."): Most businesses emphasised the comparative advantage of BiH as a low labour cost location which is located close to the EU market and even has lower environmental standards and costs. Many large buyers are cooperating with BiH suppliers due to these lower cost and distance advantages. The importance of these factors increased even during the COVID-19 pandemic and the break-down of certain supply chains with countries in Asia and other more distant regions. Even the relocation of companies, e.g. from Germany to BiH seems to be a trend. Also, according to interview statements, more environmentally unfriendly process steps are outsourced from the EU to BiH (e.g. galvanisation processes in the metal sector) due to environmental legislative obligations in EU countries. Despite observing these cost and lower regulation advantages in BiH, leading businesses in the sector interviewed



emphasise the need to overcome this focus on comparative advantages. If the country wants to make full use of the advantages of distance to the EU market and wants to follow EU integration to have access to the relevant EU funds as well, it needs to catch up with EU standards, regulations, skills and innovation requirements. Otherwise BiH will be outcompeted by even cheaper and less regulated production locations in the medium term.

Shortening of value chains ("We have to develop forward and backward industrial linkages."): Many companies such as those in the wood processing sector have incorporated a large part of the value chain (sawmilling, production, finishing) into their own operations. This is the case because they can assure quality and resource efficiency standards and the use of appropriate and assured technology and production standards. But this also shows a lack of backward linkages to other reliable industrial input providers. The need for increasing value addition and keeping value chain parts inside the country has already been addressed above.

Promoting recycling chains inside the country ("It is still cheaper to dump waste in our country than to recycle it to something valuable."): BiH lacks recycling and reuse technology and the knowledge to make better use of waste resources. For example, the use of residue-derived fuel (RDF) or solid recovery fuels (SRF) is possible, but sufficient waste material and company investment incentives are lacking. Some companies have started research to refabricate used plastic and even hazardous waste into insulation materials for housing. However, according to the company owners, the knowledge and support of experiments in that direction is lacking inside the country.

Greening value chains: While the wood processing sector can build on FSC-certified wood, the metal processing sector cannot build on low CO₂-produced steel and aluminium production inside or outside the country. Strengthening the greening of the whole value chain with specific consideration for the production of raw material is an essential factor for many companies.

6.5.2 Company or micro-level requirements

Many leading companies need support from government or donor projects. At the same time, they are aware of the support structure and the innovation systems from which their EU partners benefit. They emphasise the need to create an innovation system around their sector to be able to compete in the long run. Core requirements mentioned by the businesses are summarised as follows:

Digitisation of production processes ("We are planning to invest in digitisation of our processes"): Most leading companies have started to invest in digitisation and digital monitoring of their production steps to better understand where energy inefficiencies and resource inefficiencies are located. Most of the businesses in their sectors lack the move towards these digitisation processes as a prerequisite for effective and efficient environmental management procedures.

Lack of access to expertise ("Inside the country, we are the ones to which universities come to see our production process."): This aspect will be further explored in the next chapter. Most of the knowledge that the companies are gaining comes from their buyers and from contact with research organisations and colleagues in EU countries or from their own engineering staff (in larger companies).

High search costs for right solutions: Most of the investment solutions on greening production processes are developed by the management departments themselves. This often involves high search costs and skills development costs apart from the task managing the company.

6.5.3 Supporting network and service requirements at the meso level

There is a great gap between service demand of the business and its availability at the national level.

Lack of access to the required expertise and specialised knowledge ("We cooperate with mechanical faculties in the country, but often it seems that they can learn more from us than we from them."): Access to an innovative ecosystem by companies is weak overall. It would require much more support efforts for the applied orientation of the existing knowledge institutions.

Integration of green expertise and higher quality of vocational schools: The greening of production processes should already start in vocational schools, sensitising future workers and already building in an early career qualification in looking at energy efficiency and energy system considerations.

Strengthening and supporting learning exchanges with buyers, peer-to-peer learning and joint research projects with other knowledge organisations ("We would like to know how other EU buyers see the future in greening requirements."): One business expressed the need for stronger cooperation with buyers and becoming aware of future greening and innovation demands. Often the contact mainly focuses on the direct buyers with whom the businesses have contact but not with a wider range of buyers and their future demand. Promoting exchange in that direction would be interesting for them. The same peer-to-peerlearning approach between applied knowledge and research organisations as well as service providers and support organisations in specialised fields such as energy systems in companies, energy efficiency aspects, recycling and reusing waste, etc. would be appreciated.

Access to targeted support programs ("We need targeted support especially on greening our production processes in the whole sector."): Companies interviewed expressed the view that many support organisations and service providers lack support opportunities or services beyond energy efficiency training. Targeted support programs that enable a push towards greening the industries will be necessary.

Access to funds: Most of the greening requirements are related to high investments. Access to funding opportunities is an important consideration to provide incentives and the chance, especially for more traditionally oriented SMEs in the two sectors, to start thinking about changing their production processes.

Expected increase of energy costs: Businesses in the two sectors in general have high energy



Networking inside the business sector, e.g. energy efficiency networks: One company also mentioned the need for stronger networking between companies within the private sector to strengthen their awareness and learning. More advanced company owners are already more open to sharing their knowledge. But in general, cooperation, including sharing experiences with others, is still low. Instruments such as energy efficiency networks between businesses, supported largely in EU countries and initiated by donors in BiH, are seen as an opportunity by companies. There are many other instruments to promote group learning in that respect.

6.5.4 Policy and socio-cultural or meta requirements

The baseline study also asked in the interviews about the government's role in promoting the green transition in the two sectors. At all levels of the interviews with support organisations and businesses, comments mainly expressed frustration about the political system, the lack of coordination efforts, the different rules applied in different cantons and entities, the lack of political will, the lack of hope that this will change, and the lack of government's expertise regarding upcoming EU pressure in that respect (see also Figure 1).

Overall, there is the impression among the companies interviewed that the mentality of policy representatives is rather not oriented towards finding real solutions. The economic climate is interpreted rather as corrupt and highly politicised, lacking a real vision and proactive behaviour.

Businesses expressed their political requirements:

The need to develop local regulations in line with EU requirements ("The more the legislation is in line with EU requirements, the more businesses know what they can expect!") Leading businesses require stronger guidance from the government to integrate legislative measures, i.e. to move into the energy trading system, which also provides clearer guidance of future requirements for businesses.

Promotion of grant schemes for the sectors to become greener: One of the advantages of EU integration from a business perspective is the hope to have access to funding streams for innovation and infrastructure investment. With EU integration, businesses expect to see opportunities for obtaining access to funding sources.

Quicker application of existing law proposals: The businesses interviewed hoped that EU greening pressure will also force the passive government to play a stronger role in the future. The process of further integration into the EU will also provide more flanked policy and strategic political steps to strengthen strategic development support for the further development of the core exporting sectors.

Required leadership and guidance: There is an expressed need for a government that also regards the greening of the economy as a serious issue, expressing the view in public and upholding it through the application of relevant strategies and support programs.

7 SERVICE SUPPLY OF MESO ORGANISA-TIONS: CHALLENGES AND OPPORTUNITIES

This chapter focuses on the meso-level support for developing new business models in SMEs. By meso level we mean support programs and support organisations oriented towards providing green services and knowledge for businesses. This includes programs from donors, national funds and possibly also from EU accession funds on the one hand and the respective support organisations and their services on the other. The latter involve private business associations, research organisations and institutes, capacity building and training organisations as well as development agencies and specialised NGOs active in the promotion of businesses and economic development. Most of them depend to a certain extent on funding streams to provide their services. Consultancy services are a special form of meso organisations. They are businesses on the one hand and provide their services only if they can make profit from doing so. Meso organisations are generally oriented towards providing public good through services that enable businesses to gain access to knowledge, expertise and innovation.

The information in the following sections is mainly based on interviews with several support organisations including chambers, agencies and a private consultancy company. The author has worked together with several support organisations and donors in BiH and integrated his own experience with existing services in this review.

The following sections will provide an insight into

- the general situation of green service provision in BiH
- efforts made so far to strengthen green services by donors and support organisations
- the ongoing search by support organisations to develop new services
- future requirements to strengthen green services in BiH.

7.1 The general situation of green service provision in BiH

Taking into consideration the opinion of businesses from interviews, they all stated that access to support programs and the knowledge support by organisations from BiH is very limited. Some of the businesses are cooperating with some university faculties on small research projects in BiH. But, as stated before, they gain most of their knowledge from their contact with their EU buyers as well as from some company-based research activities and to a certain extent also through involvement in applied research projects with EU institutes and EU university faculties.

For the baseline study, interviews with six active support organisations were conducted. Most of them see the demand for green services coming mainly from leading companies in dominant export sectors. According to the findings from these interviews, there are several reasons for this:



- The pressure to consider green investments happens especially in companies that are in closer contact with their EU buyers. The latter share knowledge of new trends and increase awareness of the need for investments in this respect.
- The energy cost issue has not been an issue in the past. But with the international energy crisis and the increase of energy prices, businesses have become aware of the relevant competitiveness factor of BiH in that respect.
- Pressure is coming from the accession process and the request to prepare for compliance with relevant directives and CO₂ emission targets
- Pressure of compliance with green requirements is coming mainly from the outside, not from inside the country. This means that national customers and buyers and not the national government are pressuring businesses to comply with green standards. All the pressure comes from the EU and its markets and buyers. This fact also demonstrates the weak enforcement of green production requirements on the part of the government. If national regulations and targets were enforced more rigorously, other companies would also start investing in greener production processes and would also request access to green services.

7.2 Existing service demand for and supply of green services

According to the support organisations that were interviewed, they are being increasingly asked for services not only by large companies but also by smaller ones involved in the export sector. Although there exists a certain supply of services, an intensive search process is going on among meso organisations to develop new services that go beyond traditional energy efficiency training.



Figure 22: Existing greening services in BiH

Most of the greening services that are provided for businesses are the following (see Figure 22):

Energy efficiency trainings have been provided for guite some years, but mainly depend on donor funding associated with certain donor project support. In the RS, a first fund was established to promote energy efficiency in businesses.

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- Funding schemes from donors provided some support for business investments in new or private sector organisations such as chambers.
- **Innovation assessments** in company production processes have been promoted by contribute to the increase of energy efficiency.
- digitalisation of data and data collection from production processes.
- Study tour organisation on new trends and services: This is mainly done by donors like copy-paste certain successful service tools.
- Promotion of renewable energy and energy efficiency business networks: The use of promoted during the last two years by the GIZ via the chamber system in BiH.
- **Energy audits and environmental impact assessments:** These services are available from private consultancy companies specialising in certain auditing processes.

These services are available and have been promoted by national support organisations as long as funding has been available. These are not services that are accessible to most businesses. They are also not available in the long term but only if funding streams of donor projects exist.

7.3 Awareness of meso organisations about future service requirements for SMEs

An intensive search process by leading support organisations for the design of new services is currently ongoing in BiH. They state that they are being increasingly asked by businesses to provide these green services. They are also interested positioning themselves in this field due to the expected increase of donor and EU funding in this field of expertise. Nearly all the meso organisations interviewed mentioned plans to offer green services in the future. Innovative services that they want to design soon are the following:

Moving from training on energy efficiency towards consulting: Support organisations renewable energy and waste management knowledge directly on the business premises.

technology and energy saving production processes often delivered by national agencies

several donors and mentor schemes. The logic here is to capacitate mentors and coaches who are able to do an innovation assessment in companies related to production processes, production lines and product and process innovations. These services can also

Digitalisation mentoring schemes: Digitalisation has been promoted during the last few years as an approach to increase the monitoring of production processes and efficiency losses. Apart from donors such as GIZ, who have supported digitalisation hubs and services via support organisations, the RS has established a digitalisation fund accessible by businesses in the entity. This also involves the use of management software for the

the GIZ with support organisations in BiH to promote the design of new services and to

this network and the group counselling approach with businesses has been successfully implemented in Germany and other EU countries. The set-up of these networks was also

mentioned their interest in going beyond traditional company trainings and rather educate mentors who are working closely with businesses and provide energy efficiency or



- Setting up energy audits and CO, emission monitoring systems: The expectation of **CO**, pricing also requires developing services to analyse energy consumption patterns in businesses and other organisations.
- Participation in fairs to better understand the circular economy and carbon footprint trends in the EU markets.
- First training efforts on ISO 14001 as the general environmental management standard and the interest of some organisations in promoting ISO 14044 and 14064 standards.
- **Renewable energy installation services:** Due to the expected increase in energy prices there is a need to provide information on the analysis of installation capacities as well as the maintenance of e.g. solar panels.
- Waste management services: Waste management knowledge is still very weak in BiH. A few meso organisations mentioned the strengthening of recycling awareness and promoting business opportunities in that direction and in the direction of green business models.

7.4 Solutions suggested and challenges mentioned by meso organisations for next steps forward

Three main challenges by meso organisations are undermining the opportunity to strengthen the supporting ecosystem in BiH. These are

- Access to knowledge about tools and services that can be offered to businesses in BiH
- Access to long-term funding for greening and other innovation services
- Pressure from legislation to enforce greening and CO2 emission reduction efforts of the BiH industries
- Lack of horizontal cooperation and the promotion of a green innovation ecosystem

First, efforts in awareness creation work on green services have been provided in BiH, such as through cooperation with external energy experts and mentors as well as through study tour and fair visits in Germany and other EU countries. Based on these visits new ideas for services were developed and are on the way towards implementation.

Continuous funding streams to promote access to new knowledge in that respect are not made available because the government needs to support this direction of funds and needs to gain knowledge of how and what to promote. At the same time, an increasing number of donors have taken up the topic of green industrial development. Also, regional EU accession programs such as INTERREG, Horizon and EU Green Deal regional cooperation projects (e.g. "From Farm to Fork") associate their funding to, for example, smart specialisation, greening industrial production in traditional sectors, sustainable production approaches, waste management, etc. It can be expected that an increasing number of funding programs within the next years will

The need for internal political and legislative pressure on businesses and civil society to reduce energy consumption and waste, and to increase energy efficiency, is also reducing the pressure on businesses and households to ask for additional services and additional learning. In interviews most of the meso organisational representatives mentioned that for a real shift towards greening production processes in the national economy, it will be necessary to increase the pressure from the EU in the national government to introduce dynamic regulations. Through the interest of BiH to become an EU member country and through the pressure of the CBAM and the integration directives into national law, this pressure is increasing. However, for quicker progress the government would have to shift its behaviour from reactive to proactive.

The lack of horizontal coordination between meso organisations can be traced back to the lack of a professional organisational service structure and the competition between some of the organisations for the same funding sources. It will be necessary to strengthen the coordination and joint learning between support organisations within BiH and with other service providers in the EU to increase peer-to-peer learning, the number of services offered as well as the increase of service capabilities oriented towards the demand of businesses. The next section will further explore this aspect.

7.5 Recommendations for the improvement of further service development requirements

The lack of the existence of a supporting innovation ecosystem is also goes back towards a lack of funding opportunities for networking and experimentation. Creating a laboratory for experiments through the initiation of mutual learning network incentives and the finance of innovation networks on green issues creates horizontal cooperation between business service providers, applied research organisations and businesses in many EU countries. Accordingly, support organisations as well as businesses have the chance to learn in the longer run through these experiments. It provides the chance to build up an entrepreneurial and societal ecosystem that is conducive to developing new solutions. In countries that lack this funding and that mainly depend on donors, in many cases competition for funding is created between the core players. These funding streams often do not ask for horizontal coordination but mainly for positioning one organisation against the other. Although this can create positive externalities regarding motivation of organisations to improve their services, it lacks a longer-term organisational stability with the chance to develop longer-term required services and a longer-term support security for businesses. Short-period project funding often does not creating the environment to develop an ecosystem but rather to follow the donor demand vs. the development of a supporting system around the business sector.

From that perspective it will be highly relevant in BiH and other WB countries to strengthen a more conducive and systemic approach to the promotion of green industrial development and EU integration efforts. This perspective will be further described in the next chapter.



8 PROMOTING GREEN INNOVATION WITH A SYSTEMIC LENS: SUMMARY AND OUTLOOK

This final chapter gives a summary of the main findings as well as a glimpse into the future, and provides initial recommendations. It starts with the summary of the main findings at the business level the organisational support level, the political level and the socio-cultural level.

8.1 Core summary of main findings of the analysis at the micro, meso, macro and meta level

In the process of analysis key observations were made that are summarised below. They summarise formerly expressed observations at the business level and the meso level, including targeted support and innovation policy aspects as well as the capacities of supporting organisations, the macro (or policy) level as well as the meta (or socio-cultural) level (see Figure 23).





Source: Mesopartner

The micro or business level

From interviews and it was obvious that the real drivers of greening trends in the two sectors are leading businesses integrated in intensive market relations with the EU and EU buyers producing higher-end products. It is not the policy sector that provides guidance to these businesses, but rather the leading businesses themselves are the most innovative forerunners. They have

to manage their own internal transition based on company-based innovation strategies and largely through knowledge exchange with their buyers and input providers (i.e. related to environmental technology, standard knowledge or other machinery investment information). Most businesses in lower production activities and with very low innovation orientation in the sector are not tackling these issues.

The focus on greening efforts focuses especially on energy efficiency aspects, including the increase of efficiency in the production process, investments in lighting and less energy-intensive machinery as well as through the investment in solar panels to prepare for expected rising energy costs.

Although leading businesses in the two chains do not yet feel pressured by their buyers, they expect increasing demands in that direction from end consumers and buyers. Therefore, they have also started to look at possible ways to increase material efficiency and circular economy opportunities due to the expectation that these aspects will become a possible competitive advantage in the future.

According to the leading businesses in the chains, this low eco-innovation orientation in the two sectors overall is also due to the lack of investment incentives, legislative framework conditions and visioning of the government, which makes it risky to invest in greener production processes and the use of eco-innovation services. Most of the businesses interviewed ask for more supporting efforts and legislative steps to overcome low-added-value production in the sector. They see the future competitiveness of the country rather in the ability of the two sectors to link the existing comparative advantages of BiH (low cost of labour, lower production costs, close proximity to the EU market, high production knowledge, attractiveness of future EU investments) with the increase of competitive advantages (higher value-added production, greener production process, learning from EU buyers and EU support programs for businesses, the spread of knowledge on eco-innovations, etc.). For them, a quicker path to EU integration also provides the right pressure on the national government to provide better support programs and legislative prerequisites.

Targeted support policies and efforts at the meso level

Systemic efforts for the promotion of support policies for greening the two respective value chains in BiH are very weak. It would be necessary for the government itself to initiate support programs, including specialised policy design based on a strategic orientation. This systemic understanding of designing policies and putting them into targeted support programs for clusters, value chains and businesses is very weak. So are the different ministries' capabilities defining the right targeted policy approaches.

Instead of coordinated strategies, donors and EU funds are the dominant providers of support programs in BiH. This is valuable but cannot substitute a self-governed approach. Donors are oriented towards a project-based vs. a systemic approach. Donor coordination is always a challenge due to the ratio of donors following their own project agenda. A clear coordinative function of the government to channel and influence these different funding streams and action plans would also be necessary to lead this development process. Due to this lack of self-governing support strategies, the situation will not change greatly, and only a few leading businesses will be able to adjust to the required circumstances.



Efforts of support organisations to promote eco-innovations in the two sectors at the meso level

Several organisations in BiH have started to provide services especially for energy efficiency and standardisation procedures. They are agile in developing new services also based on learning experiences from other EU countries and in their efforts to provide services to their businesses. This support is also initiated by certain donor projects and seems to have an impressive effect. However, it is very challenging for most of these supporting organisations to act on a large scale and to provide large amounts of the required services without stick and carrot policies. On the one hand the latter builds on legislative pressure on businesses to reduce environmental impact and add value to production (the stick), and on the other hand it provides incentives through support measures (the carrot). Most support services depend on donor funding and donor projects to promote new service delivery efforts. Within the interviewed support organisations there is the hope that a quicker EU integration will also provide access to EU funds and will also create stronger pressure on the government structure to design respective policies and legislative prerequisites.

Overall policy consideration (macro level)

The national government seems involved in several efforts to adjust, approve and define certain policies linked to EU requirements. This analysis does not focus intensively on the different required and ongoing EU policy adjustments. However, what was able to be observed from the literature analysis and the interviews with the relevant stakeholders is the frustration with the political system and the lack of vision and "walking the talk", meaning really promoting the implementation and improving the coordination between different ministries, cantons, entities in the whole country. The current political framework conditions also do not intensively support a shift in that respect. EU integration pressure can be a vehicle for influencing certain government structures. At present, the businesses interviewed and support organisations perceive a lack of political will and leadership in guiding the country into the future.

Socio-cultural considerations at the meta level

The lack of systemic efforts at the different levels also demonstrates socio-cultural aspects that become obvious. The following bullet points raise some of them:

- Greening production and greening efforts are rather a topic that comes from outside (EU, buyers). Although a few businesses active in EU markets and support organisations closely related to donors or integrated in international R&D networks are sensitised to its importance, most of the society have other priorities in managing their daily lives.
- Innovation in general and even fewer eco-innovations in low-value-added sectors is not the dominant orientation of many SMEs. Increasing entrepreneurship orientation and market and value-added knowledge are requirements that might be more economically important for many SMEs in the sector than greening their production line or reducing energy costs.
- A certain frustration in society with the lack of political leadership and competence leads not only to migration but also to increasing disillusion with a possible political transformation. This goes hand-in-hand with the increasing orientation of support organisations towards

Political entity issues as well as corruption are still influencing the overall relationships in the the stakeholders involved.

It would be interesting to expand the socio-cultural analysis with regard to greening trends, but this was not the core focus of this study.

8.2 Scenario design for the development of the green business model ecosystem

At the beginning of this baseline study some hypotheses were mentioned. In this chapter we will return to them and design scenarios on how tackling the future trends could look.

Several hypotheses were mentioned which will be commented on now:

1. The EU Green Deal trend as a long-term paradigm shift is irreversible and shapes future EU market relations and whole supply chains.

The current energy crisis demonstrates the drawbacks of the Green Agenda in general. This includes e.g. the prolongation of certain fossil-fuel based energy factories. However, it becomes at the same time obvious that the EU Commission is not reducing its orientation towards linking the crisis with perspectives of investments in renewable energy. At the same time the further development of the directives mentioned also demonstrates a sign that the paradigm shift is on its way to become flanked by several support programs. Thus, the trend in the future is clearly defined. It might become even more stringent because the realisation of the climate targets in many EU countries are lagging. Regarding the impact of the climate targets on value chain relations, it can be observed that EU buyers are starting to redesign their business strategies, also considering LCA and green supply chain aspects. However, especially the COVID-19 pandemic has shown that the environmental criteria of business strategies can be postponed when the supply of certain input products is at risk. Also, BiH businesses stated that there was not yet strong pressure from their buyers to comply with certain environmental production requirements, although the overall impression is that this will change in the years to come.

2. EU policies and national policies as well as future buyer strategies from EU member countries put countries outside the EU like BiH under pressure to follow.

The research intensity related to twin transition requirements (digitalisation and greening) for future competitiveness is a highly relevant topic in EU countries. Germany, for example, has oriented its national innovation strategy along the identification of future societal and environmental solutions. Most EU funding schemes link innovation and greening solutions with

donors based on project-based intervention logic that often do not have a systemic and

country. The EU also cites the lack of progress regarding political aspects as well as public sector reforms and the fight against corruption. These are factors that influence nearly all

with strong supplier and market relations with BiH have already started to redefine not only policy directives but also whole applied research efforts and innovation directions that will



each other. The intensity of decentralised applied research and business promotion approaches has led in many EU regions to smart specialisation efforts, including the promotion of concrete business and service development experiments. Countries such as BiH are far behind in developing these innovation and greening ecosystems. This means that also in the future new knowledge of greening industrial solutions might come from EU partners. But there are good chances to catch up and to relate to these meso organisations and to promote peer-to-peer learning networks with them.

3. The future competitiveness and innovation capabilities of exporting sectors like wood and metal processing in BiH will highly depend on eco-innovation trends and the reduction of footprint efforts in their own companies and supply chains.

It seems that footprint aspects have not been really a very strong issue yet despite the CO2 emissions from steel and aluminium producers in BiH. It seems also that most of the exporting BiH companies can still benefit from the existing comparative advantages such as lesser enforcement of regulations, and lower energy and labour costs. For leading companies in the exporting sectors, it becomes clear that without adding competitive and sustainability advantages to the comparative ones, BiH as a location with its volatile and unreliable political stability might lose its existing locational advantage once EU buyers are more pressured to consider green product requirements along their whole supply chain. Looking at directives like the one on eco-design, this might become an increasing issue in the EU market in the coming years.

4. In countries such as BiH the most competitive businesses are already making strong efforts in eco-innovations.⁴⁸ What is missing is the systemic effort in BiH to scale them and to build up an eco-innovation system.

The hypotheses have been clearly verified. Leading businesses are especially investing at present in energy efficiency and renewable energy due to the fear of an increasing energy crisis soon. Some of these businesses are value driven and want to become drivers of a more sustainable production agenda. However, most of these companies are following the investments to reduce future costs and to react to the increasing demand for more environmentally friendly products in the consumer market. They also have access to greening knowledge via their EU buyers and are preparing themselves for future market and regulatory shifts. They are not forced to think in a more eco-innovation-oriented way due to internal political pressure. Due to the lack of a real policy agenda in BiH to promote green economic development as a future competitiveness paradigm, the outreach to and awareness of businesses and civil society actors who are not involved in EU relationships are weak.

Based on these considerations, the paper would like to come up with some scenarios on how the development might look in the future. Figure 24 below shows two main success factors that might strongly influence the future efforts of processing companies and civil society in BiH to promote green development soon. There are certainly more critical success factors, but the two selected will play two roles among other relevant roles.

According to these outlined BiH future scenarios, longer-term funding support as well as increasing public sector pressure for greener and lower CO₂-based industrial production will play an important role. The future scenarios are the following:

Scenario 2 is seen as the best scenario, but less realistic one: For a real push towards the promotion of green industrialisation in BiH it would be necessary to overcome the short-termoriented donor funding mechanisms and also to have defined longer-term funding mechanisms that enable businesses to invest in certain technology, in new business models as well as in the reorganisation of their production processes. But the funding alone will not be enough. The government needs to take a proactive role in implementing their regulations and in setting up mechanisms and support programs that also pressure and encourage businesses as well as households overall at the same time to strengthen green development efforts regarding waste production, CO₂ emissions, etc. Such an approach would also be able to create an innovative ecosystem with applied services and research efforts.

Figure 24: Future scenarios





Scenario 4 mirrors the current existing reality: Mainly leading exporting businesses with high value-added production facilities are informed about new future greening requirements. They are also the ones who start to make investments. However, they lack in general access to funds to expand their investments. They demand more regulative efforts from the government also to promote a conducive greening business environment as well as investments into the promotion of a more active innovative ecosystem. Nonetheless, the lack of clear support orientation of the public sector undermines the development and innovation potentials in the overall economy.



⁴⁸ The term "eco-innovations" is substituted in the EU and in the OECD the term sustainable innovations not only focus on technical innovations but also on social and resource-related aspects. See "Eco innovation at the heart of the European policies" and the Eco-innovation Index from EU member states. Further information see EC (2023)

Scenario 3 is rather open in its effectiveness: It can develop positively when the government plays a strong coordinating and strategy orientation role, co-designing and guiding donors in their efforts to promote the BiH Green Agenda. The reality shows that this knowledge does not yet exist in the policy sector but could be developed with the support of EU partners. The scenario could also lead to less positive consequences and even political unrest when the government would take a more proactive and regulative role, e.g. in promoting CO₂ emission reductions, but cannot provide enabling knowledge services for businesses and households to manage this shift in behaviour and production methods. Setting up a conducive and supportive green service ecosystem might require more funding than the current donor projects can provide.

Scenario 1 would mean a driving role of the leading export businesses and support organisations: This scenario can be linked to the impressions of an upside-down wrong innovation driver figure (see Figure 17) in which the leading export businesses are increasingly providing knowledge to service organisations about their knowledge requirements and in which the government takes a rather passive role. Due to the availability of more donor and EU funds, service organisations can also support businesses more intensively in becoming greener. Other businesses not directly informed about greening requirements will also start to have access to the larger number of SME and greening services available and create awareness of the innovation and cost-saving potentials through energy efficiency and greening efforts. The government will in the longer run also adopt to EU integration policies but rather in a reactive than in a proactive way.

Overall, the different scenarios can unfold differently. One of the core factors for the future development in BiH is how far the government will drive and promote the EU accession status and how far the BiH Green Agenda will become a societal as well as a political priority.

8.3 Identification of main relevant entry points

This analysis aimed to identify core trends, challenges and opportunities related to the greening of the two respective value chains in BiH from a systemic perspective. At the end of this analysis, the study provides some suggestions for possible entry points also to influence the different defined scenarios.

Entry points at the business level

- Networking with other businesses through energy efficiency and renewable energy networks and group counselling: There is much experience in EU countries for setting up business networks around the topic of energy efficiency and renewable energy as well as circular economy. In BiH, donors established an initial initiative to set up energy efficiency networks. It is a valuable instrument to promote exchange between businesses and to create sensitisation to this issue.
- Initiation of EU buyer-to-supplier talks on specific greening topics and relevant future requirements: This can also involve webinars and online peer-to-peer learning groups. In

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interviews with businesses, it was mentioned that some informal exchanges with buyers could also be extended. It would be a way for businesses to better become acquainted with upcoming and future requirements in relation to the greening strategies of leading buyers.

- Company visits to EU buyers and similar EU companies to get to know their future innovation market leaders combine digitalisation, innovation and green production
- respective sectors and even cross-sectoral.

At the supporting organisational level

- Promotion of peer-to-peer learning with other support organisations in the EU: What has e.g. at the Wuppertal Institute.
- Awareness creation of services and design of new services: What are the real demands other countries.
- Creation of cluster or smart specialisation networks: In the past different donors supported entities and the respective ministries suggest these networks.
- Promotion of inter-organisational applied knowledge hubs: Where can you find bundled the identification of eco-innovations.
- Moving from energy and RE audits towards life cycle assessment analyses: The demand

and greening strategies and how this might influence their supplier requirements, benchmark own company strategies with those of the buyers' and see how the buyers or

Experimenting and documenting pilot businesses in energy audits, energy and waste management activities and sharing these initial practices with other businesses in the

started already were study tours and visits to other service providers, e.g. in Germany. Apart from study tours, peer-to-peer learning networks with these service providers from EU countries could become a dynamic learning exchange. Experiences exist in Germany,

of services is the question that should be further elaborated in BiH. Based on a more comprehensive analysis of the service and knowledge demands of leading businesses, it would be necessary to develop additional services. Donors can also support in this respect capacity building and knowledge creation by linking certain knowledge organisations in the country and the Balkan region as well as involving service providers and experts from

sector boards, including the relevant stakeholders in the system from the different levels. Promoting these kinds of networks and their exchange of requirements and solutions with a stronger focus on smart specialisation and sustainable production requirements would enable the start of several joint initiatives. The innovation plans designed for the

knowledge and a platform to get answers to questions related to eco-innovation opportunities? In the EU, many knowledge hubs have been created, often with a. specific focus on a certain knowledge domain or sector perspective. These knowledge hubs often combine the promotion of new business models, product and process innovations and

for eco-services in BiH is especially related to renewable energy and energy efficiency.



However, there is also the opportunity to link the whole topic of innovation promotion to the topic of circular economy potentials and new market opportunities related to the use of circular economy opportunities. Increasing awareness of this topic and providing an overview of good examples in BiH and from outside could lead to the provision of new business ideas for potential investors and additional ideas for service products.

At the policy level

While the generic policy constraints will be difficult to tackle at present in an active way, the targeted meso policies for the promotion of eco-innovations can be promoted in different ways. Here we relate also to the suggestions that were provided in the innovation plans for FBiH, RS and Bricko District:

- Setting up funds for innovation and eco-innovations in the different entities. Experiences in other Balkan countries such as Serbia could be used to start the set-up of such funding schemes. While several donors provided certain grant funds for specific investments or training activities, there is a need for a more consolidated fund that is governed by the responsible ministries for innovation promotion in the different entities. Linking these funds with efforts of the smart (or green) specialisation networks and knowledge hubs would create important synergies.
- Promoting the smart (green) specialisation network mentioned above through a policy initiative. This would also promote the design of a smart (green) specialisation strategy in BiH.
- Promoting energy efficiency or renewable energy business networks through a policy initiative. Here intergovernmental exchange with policy initiatives in EU countries could be promoted. Since 2014 the German Federal Ministry for Economic Affairs and Climate Action (BMWi) has promoted more than 500 energy-efficiency business networks all over Germany.⁴⁹ Learning from similar experiences could be an important step forward.
- Promoting inter-organisational knowledge hubs on green innovation mentioned above through the policy sector: Here again, intergovernmental exchange with countries' policy designers in the EU could be of interest. For example, in Germany, the digital and knowledge hub program "Smart Energy Showcases - Digital Agenda for the Energy Transition (SINTEG)" was a project also supported by the Federal Ministry for Economic Affairs and Energy (BMWi).
- Local and sectoral living lab promotion as business and organisational networks implementing certain experiments for green innovation: Jointly with local and regional stakeholders, local and sectoral living labs could also be promoted. Here the focus could be especially on locations and regions where e.g. furniture or steel production plays a

dominant role. Living labs can be described as centres or local platforms in a kind of co-working space in which information is provided, applied research presented and knowledge exchange made possible. It sometimes also includes the provision of office space for businesses and start-ups that work on specific solutions. Here again there are existing experiences of support policies, e.g. in Germany (and from the Wuppertal Institute support programs around the world) to promote such living lab networks in different countries.

Publication of concrete strategies with milestones and concrete monitoring targets in support programs, networking and the creation of joint learning synergies.

8.4 Final recommendations for next steps in the EU4Business recovery focal area

The EU4 Business recovery project promoted by BMZ and the EU and implemented by the GIZ has started to realise several innovative greening activities. The promotion of study tours with businesses and support organisations have already contributed towards the development of further service and investment ideas. The support of green business model innovations and investments will contribute to more case studies of green investment activities, including waste recovery, renewable energy and energy efficiency investments as well as experiments to realise energy management systems within certain exporting companies. First public dialogue events were organized and studies, such as this baseline study, were prepared. In 2021, an energy efficiency network began to be promoted with a network of chambers in BiH.

In the future the GIZ wants to take up the issue of the twin transition driven by the EU. The twin transition puts emphasis on the digital and green transition that contribute towards the objective of sustainable competitiveness. It is possible to promote digitalisation on the one hand, and green transition on the other hand. The major challenge in the future will be to promote green transition using all digitalisation opportunities and even Artificial Intelligence (AI) efforts towards the assurance of a net zero growth approach within the EU.

Bill Sharpe's three horizon approach was used by Kate Raworth to answer three main future questions. They provide a good perspective about the future direction a twin transition approach should take (see Figure 26).

The model provides the perspective of three different horizons in which business as usual (horizon 1) is not an option, but traditional pollution-driven industries and non-sustainable business models need support to change their way of production or need to be supported to shift to more sustainable business approaches (through disruptive innovations in horizon 2).

following EU directives and CO₂ pricing efforts: This aspect is an important one and would also require information about designing a strategy that is based on bottom-up data and intelligent incentives. Many support strategies designed in EU countries ask in their application procedures the involvement of a consortium of different stakeholders (e.g. a group of businesses together with service providers) to promote with each strategies,



⁴⁹ See IEEKN (2022)

This also includes the support of businesses and sectors to shift towards more sustainable production opportunities. Digitalisation and technological innovations can play an essential role in supporting the greening of business models and sectors. To make use of these innovations to promote the longer business-as-usual development approaches it is necessary to promote new services, networks, business models and production procedures that use digitalisation and technology innovations towards an emerging future process.

Having emphasised this, for the German Development Corporation and for the GIZ specifically, there are a range of intervention fields that could be used in relation to a value chain or sectoral development approach. The following headings point out some possible areas.

Figure 25: The three-horizon model for visualising the direction needed for an interrelated "twin transition"



Source: Raworth (2019)

Promoting the design of smart specialisation strategies from a cross-sectoral perspective in BiH

The EU cohesion policy's dominant SME and innovation approach is the smart specialisation approach that also takes sustainability solutions at a cross-sectoral perspective into consideration.⁵⁰ BiH has just started to define a working group on the design of the S4 strategy and topics. Renewable energy innovations might become one specialisation area. Promoting the design of these strategies with groups of relevant stakeholders at the different levels provides a good chance to bring in the twin transition perspective and supporting the

promotion of specialisation initiatives and networks. The S4+ approach is directly linked to the EU Green Deal and provides the opportunity to shape the future sector and innovation policies taking a digitalisation and greening perspective.

Strengthen knowledge exchange and networking with relevant EU buyers about their future digitalisation and greening strategies

The analysis made it obvious that the greening and digitalisation pressure from EU buyers on their suppliers is not yet strongly present but is expected to increase soon. What are the strategies EU buyers are designing at present to increase their own company's "twin" transition? What more can be concretely expected? Promoting concrete exchange events on sustainability strategies from core EU buyers would provide more holistic information to service providers and businesses in BiH. Some of these strategies are very chain specific (dealing with specific hazardous materials), others could also be tackled on a cross-sectoral basis (e.g. use of alternative energy in production processes). The GIZ could build up contacts with German buyers as one of the core markets for BiH export products.

Intensive promotion of peer-to-peer learning initiatives for meso organisations with German and EU service organisational partners

The GIZ has started to promote study tours in Germany with businesses and meso organisations. This should be continued but also deepened. Peer-to-peer learning initiatives for meso organisations to apply and adjust already existing service tools could provide learnings that could go beyond visits. Also, German organisations are interested in getting involved in knowledge-sharing activities, and funding is even partly available for this. For example, the Wuppertal Institute as the German think tank for environmental system solutions could be an interesting partner in strengthening these peer-to-peer learning networks. They are already doing this in many developing countries, promoting sustainable city initiatives including bike lanes, e-mobility, and green spaces.

Promotion of Green Knowledge Hubs:

Initiatives could start with connecting German and EU knowledge hubs with interested stakeholders in BiH, sensitising via study visits, designing concepts and applying them. The GIZ is already supporting Digitalisation Hubs in BiH. Building upon this experience and reflecting about smart specialisation hubs required in certain regions could become a starting point.

Wide-scale promotion of energy efficiency business networks as well as renewable energy and waste reduction business networks

There have been initial experiences with the promotion of energy-efficiency business networks. GIZ could make sure that involved organisations in BiH (e.g. the chambers, R&D) learn from the approaches and networks existing in Germany. Again, an exchange approach and even the set-up of an internship program of some meso organisational representatives within German or EU experienced organisations could become an option.



⁵⁰ The Smart Specialization Strategy approach was called S3 and is now in the process of being extended to S4+ (Smart Specialization Strategies for Sustainable and Inclusive Growth). See https://www.interregeurope.eu/find-policy-solutions/stories/from-s3-to-s4-smart-specialisation-strategies-for-sustainable-and-inclusive-growth

Strengthening EU exchange and mutual learning visits along the realisation of concrete green development activities

Looking at the EU directives, it becomes obvious that there are future areas that will become a real challenge for EU businesses. The reflection on eco-labels, the increasing energy efficiency requirements in production processes, the handling of hazardous waste, etc. are all issues that directly impact EU companies, SMEs and service providers. What new trends are emerging? What twin solutions do the different EU stakeholders search for, find and apply? What are the next practices in that respect that are also insightful for stakeholders? Study tours on different topics could be an interesting approach but must be targeted well towards the demand. Identifying these focal specialisation fields and interests with the private sector and the meso organisations would be a good entry point.

Promoting the set-up of knowledge or green innovation networks

Based on the GIZ experience in working with sectoral boards in the metal and wood value chains in the past, it could be interesting to take up the same stakeholder consideration but to focus on the identification of solutions for greening requirements within the respective value chains and cross-cutting.

Promotion of living labs

The promotion of living labs in regions and places possibly jointly with local research and development organisations as well as city administrations is another area that could be promoted as experiments. It could perhaps be linked to the already existing partners related to the digitalisation hubs but considering more strongly the eco-innovation approach.

Further data and information provision on the EU Green Deal and its impact on BiH

This study started to take a deeper look into the EU Green Deal and its possible impact on the respective value chains. There is the need to dig even deeper. What does the Green Deal also require from the national Quality Infrastructure System in BiH? What are relevant technological innovations within certain value chains as well as cross-sectoral that might lead to certain disruptive challenges and opportunities for innovating certain businesses and their supplier-buyer relations? How is the twin transition in the EU countries managed from the perspective of businesses, service providers and targeted support policies and programs? These questions all involve the potential for further research that could also be promoted with local and international partners.

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