



Brčko District Green City Action Plan

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LIST OF ABBREVIATIONS

BDBiH	Brcko District of Bosnia and Herzegovina
BiH	Bosnia and Herzegovina
CaPex	Capital Expenditure
CEI	Central European Initiative
EBRD	European Bank for Reconstruction and Development
EE	Energy Efficiency
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EMIS	Energy Management Information System
EPC	Energy Performance Certificate
ESCO	Energy Service Company
EU	European Union
EV	Electric vehicle
GCAP	Green City Action Plan
GCO	Green City Officer
GHG	Green House Gasses
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
GPP	Green Public Procurement
JP	Public Enterprise
ICLEI	Local Government for Sustainability
ICT	Information and Communication Technology
IMP	Impact Monitoring Plan
KfW	Kreditanstalt für Wiederaufbau

KM	Convertible mark
KPC	Kommunalkredit Public Consulting
NGO	Non-Governmental Organization
nZEB	Nearly-zero energy buildings
OECD	Organisation for Economic Co-operation and Development
OpEx	Operational Expenditure
PE	Population equivalent
PMP	Progress Monitoring Plan
PSR	Pressure-State-Response
PUF	Policy and Urban Framework
PV	Photovoltaic
RES	Renewable Energy Sources
RJ	Working Unit
SC	Steering Committee
SCADA	Supervisory Control and Data Acquisition
SEA	Strategic Environmental Assessment
SECAP	Energy and Climate Action Plan
SEP	Stakeholder Engagement Plan
SMA	Smart Maturity Assessment
SUMP	Sustainable Urban Mobility Plan
TEG	Technical Expert Group
ToR	Terms of Reference
UNDP	United Nations Development Program
WB	World Bank
WWTP	Wastewater Treatment Plant

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Executive summary

The GCAP for the BDBiH is a strategic document that, with a comprehensive approach, designed actions to deliver the “vision” of a green city and to guide the development of the city in the next 15 years. It was developed with the clear understanding that cities face many environmental challenges and that improvements in functioning and resilience can be achieved through an interdisciplinary and holistic approach encompassing all environmental topics and all urban sectors. The applied approach will help the administration to ensure investment in priority infrastructure projects in the area of the environment and to identify relevant policy activities that can implement in order to improve the quality of the environment in the BDBiH.

Based on the “vision”, the strategic objectives and priorities of the GCAP were determined, and for each priority, lists of projects and actions that will respond to priority environmental challenges were identified and developed. The set of projects consists of short-term actions (1-3 years) which are firstly incentive policies needed to support the afterwards following implementation of “investment” projects, ensuring the BDBiH’s progress towards becoming a green city. The investment projects (medium-term and long-term) will ensure specific and broader changes within the sector, which are aligned with the strategic goals of the existing strategies of BDBiH. Accordingly, the duration of certain actions starts only from 2030, and the estimated implementation lasts for 10 years, which depends on the readiness of financing and the capacity for longer-term investment.

For the GCAP development, BDBiH and Consultant followed EBRD’s Green Cities

Action Plan methodology¹ which includes four main steps: (I) Green Cities Baseline; (II) Green City Action Plan; (III) Green City Implementation, and (IV) Green City Reporting.

The Administration of BDBiH took the lead in preparing and coordinating the GCAP, demonstrating a commitment to collaborative decision-making. At the project’s outset, the Government of BDBiH established two working teams, the Steering Committee (SC) and the Technical Expert Group (TEG), directly responsible for the GCAP’s development. In addition, a larger group of stakeholders’ input has been an essential feature of the BDBiH GCAP process.





Priority challenges



Given the available data on District and BiH level and time series trends for the indicators, including the input from the stakeholders during the Workshop, the following priority environmental challenges have been identified:

- 1. Water resources**
- 2. Air quality**
- 3. Soil quality**
- 4. Climate change and GHG emissions**
- 5. Green areas**

After linking the condition and pressure indicators, which clearly explain what sectors contribute to the environmental assets, priority challenges for each of the urban sectors were determined together with stakeholders.

¹ EBRD Green City Action Plan Methodology: <https://www.ebrdgreencities.com/assets/Uploads/PDF/Green-City-Action-Plan-Methodology.pdf>

Sector	Challenges
 <p>Water supply and wastewater</p>	<p>Water resources zones: Insufficient planning and protection of water supply zones could affect drinking water quality.</p> <p>Lack of policies and technical documentation: The absence of Water Law as the overarching legislation for water management and accompanying by-laws could endanger water resources and their unsustainable use.</p> <p>Wastewater collection and treatment provision: A lack of a wastewater treatment system will require the construction of wastewater treatment plants. In addition, reconstruction of wastewater and storm sewers and constructing and expanding sewerage systems in the city zones and local communities are also needed.</p> <p>Water supply network: Leaks and unauthorised consumers have led to substantial water losses and uncertainty in the water supply. The water supply network must be extended and improved to reduce non-revenue water.</p>
 <p>Transport</p>	<p>Monitoring data: The lack of data on the transport sector in BDBiH is evident. For the analysis and planning of traffic and transportation systems, there is a lack of data that can be obtained through comprehensive research.</p> <p>Pollution from the ageing vehicle fleet: Use of older cars and more polluting car fleets (highly polluted vehicles) are still in traffic and are not regulated by the policies or incentives. New public transport policy should establish a regulatory framework requiring operators to replace their existing diesel bus fleets with more fuel-efficient, low-emission vehicles.</p> <p>Public transport: Public city transport and non-motorised movements need to be adequately included in the project planning and implementation systems; thus, the regulatory framework currently needs to be developed.</p> <p>Non-motorised transport: BDBiH lacks sufficiently developed infrastructure for cycling and walking. Poor safety conditions and road designs focusing on motorised transport contribute to an unfavourable environment for walking and cycling.</p>
 <p>Building</p>	<p>Green buildings: District policies currently neglect investment in green buildings, and implementing by-laws that will regulate and subsidise the introduction of green buildings is lacking.</p> <p>Electricity consumption: Currently, there is no mid or long-term planning for supporting building renovation within the Government but rather ad-hoc year to year, depending on donor-supported projects and initiatives (and their co-financing). Household stoves were identified as the primary contributor to poor air quality. Huge heating demand (low energy efficiency) and low income of some households are the underlying causes of excessive contribution to the pollution from household stoves. High electricity consumption and low energy efficiency in the building sector are a ubiquitous problem, but long-term solutions have yet to be conducted</p> <p>Energy performance in buildings: The information system for energy management as an essential tool for overseeing and analysing energy and water consumption in all public buildings does not exist. In addition, the energy performance of the buildings could be empowered by the introduction of energy performance monitoring and energy audits that will point to specific activities required for each facility to achieve maximum energy savings and implement energy efficiency and renewable energy measures in residential buildings.</p>
 <p>Energy</p>	<p>Lack of implementing by-laws: According to the so-called “Energy package”, most of the essential issues in the energy management process are predicted but require quick adoption of secondary legislation. The prerequisite for any planning in the energy sector is the collection of data concerning the production and consumption of electricity and thermal energy in the territory of BDBiH. Also, implementing by-laws is necessary for the full applicability of the provisions of the entire energy law package.</p> <p>District Heating System: Currently, space heating in BDBiH is conducted through many small individual heating devices, while local central heating systems are present in very few residential and most public buildings. Fossil fuels and electricity are used for heating in most public buildings; the same is true in the housing sector.</p>

Sector	Challenges
 <p>Solid waste</p>	<p>Inadequate waste management: In 2004, responsible Brčko institutions started harmonising the legal framework with EU waste management requirements, but this has yet to be achieved. The household waste collection system needs to be improved; the same type of containers is used for both commercial and industrial producers, and a separation system needs to be established at the source of origin.</p> <p>The landfill is not sanitary: The current landfill needs to be remediated. Its remaining life is a matter of concern, and currently, all municipal waste is collected and transported to the regional landfill Zvornik.</p>
 <p>Land use</p>	<p>Strategic documents outdated: Spatial planning documents generally represent the primary instrument of policy implementation in the field of land use in the BDBiH. Unfortunately, the situation in this area is not satisfactory. The most important strategic spatial planning documents (spatial and urban plans) are outdated (adopted in 2007), and new documents based on modern principles and methodology are urgently needed.</p> <p>Monitoring data: Data on population density, movements, spatial and urban planning, and all urban sectors are not integrated and digitised. Collecting and integrating all data and ensuring easy reading and analysis is necessary for further planning development.</p> <p>Lack of urban green areas: BDBiH, despite having green areas outside the city centre, still needs green areas in the form of parks for daily use. The lack of park planning within residential areas was identified as a challenge for the BDBiH. Residential and commercial construction, as well as traffic infrastructure, should be planned together with green parks.</p>






GCAP BDBiH Vision

The vision statement for Brčko took into account the identified challenges of the green city and the overall aspiration of the city regarding its future development.

”Brčko District - a green urban community on the water (Sava River) with a healthy environment for all its inhabitants and future generations, with sustainable planning and efficient investment in green buildings. Brčko will become an innovative and sustainable community of preserved water resources, clean and healthy air and preserved soil, resistant to climate change and weather disasters.”


GCAP Strategic Objectives and Priorities



The vision has been translated into strategic environmental goals, which are based on the key challenges identified in the starting point of the green city. Each strategic goal contains a set of corresponding priorities, which were determined as key fields and directions of actions/measures for achieving the strategic objective. They were formulated as per the pressure topics, achievable within the validity period of the GCAP document, and mutually harmonised according to the objectively verifiable indicators. Each priority is marked with a hierarchically lower ordinal number of the relevant strategic objective.


Environmental Assets	Strategic objectives	Priorities
 Water resources	1. Ensure water resources sustainability through planning and construction of water supply and wastewater infrastructure, supported by an operationally viable tariff system	1.1 Improvement of regulatory policy in the field of water management 1.2 Extend and modernise the water supply system 1.3 Establish wastewater treatment system 1.4 Empower water management
 Air quality	2. Improve air quality by applying energy resource-efficient technologies with reduced environmental impacts, introduction of low carbon emissions transport policies	2.1 Established energy supply system 2.2 Introduce low-emission transport
 Soil	3. Improve soil quality throughout the BDBiH by reducing solid waste and implementing land quality monitoring	3.1 Build a system for improving the quality of land 3.2 Strengthen waste management system 3.3 Improve nature protection
 Climate change and GHG	4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorised and non-motorised modes of transport	4.1 Integrate energy efficiency standards in buildings 4.2 Build a sustainable transport system and its infrastructure
 Green spaces	5. Improve the land use sector through appropriate strategic and legislative policies that will integrate all sectors considering the improvement of environmental assets and the reduction of urban development pressure	5.1 Improve land planning documentation 5.2 Improve of green buildings




GCAP Actions

The GCAP identifies 43 priority actions across six key sectors. These actions were prioritised using a process of technical assessment and stakeholder consultation involving international and local experts.

Sector	Action No.	Action Title	Action classification	Estimated Costs		
				Cost (consultancy/development) EUR/KM	CapEx	OpEx
 Water supply and wastewater	1.1.1	Preparation of a master plan for the area of water supply and wastewater drainage	Policy	600,000/ 1,176,000		
	1.1.2	Establishment of sanitary protection zones	Investment		100,000/ 196,000	9,000/ 18,000
	1.1.3	Water management legal framework development	Policy	150,000/ 294,000		

Sector	Action No.	Action Title	Action classification	Estimated Costs		
				Cost (consultancy/development) EUR/KM	CapEx	OpEx
 Water supply and wastewater	1.1.4	Improvement of drinking water treatment process	Investment		500,000/ 980,000	15,000/ 29,400
	1.1.5	Reconstruction and extension of the water supply network and the reduction of non-revenue water	Investment		10,000,000/ 19,600,000	200,000 / 392,000
	1.1.6	Feasibility Study about current and future waste water treatment	Policy	750,000/ 1,470,000		
	1.1.7	Construction of the sewage network: expansion, rehabilitation and construction of new sections	Investment		10,000,000/ 19,600,000	200,000/ 392,000
	1.1.8	Construction of a wastewater treatment plant - WWTP	Investment		24,000,000/ 47,040,000	225,000/ 441,000
	1.1.9	Modernization and digitalization in water management	Investment		150,000/ 294,000	20,000/ 39,200
 Transport	2.2.1	Development of a data collection program for the entire city and a multimodal transport model	Policy	800,000/ 1,568,000		
	2.2.2	Develop low-emission transport policies	Policy	100,000/ 196,000		
	2.2.3	Prepare a feasibility study of the rapid (fast) public transport system corridor	Policy	150,000/ 294,000		
	2.2.4	Implementation of bus operation reform	Investment		15,000,000/ 29,400,000	300,000/ 588,000
	4.2.1	Sustainable Urban Mobility Plan (SUMP) for BDBiH	Policy		100,000/ 196,000	17,000/ 33,320
	4.2.2	Promotional campaigns for car sharing, walking and cycling	Policy	35,000/ 68,600		
	4.2.3	Expand and improve cycling infrastructure	Investment		1,000,000/ 1,960,000	110,000/ 215,600
	4.2.4	Implementation of the pedestrian priority infrastructure	Investment		1,000,000/ 1,960,000	50,000/ 98,000

Sector	Action No.	Action Title	Action classification	Estimated Costs		
				Cost (consultancy/development) EUR/KM	CapEx	OpEx
 Building	4.1.1	Definition of nearly zero energy buildings (nZEB) through primary energy indicators (kWh/m ²) and the minimum share of RES use (%)	Policy	17,500/ 34,300		
	4.1.2	Introduction of energy management in public buildings	Policy	150,000/ 294,000		
	4.1.3	Rulebook on Energy Audits	Policy	10,000/ 19,600		
	4.1.4	Drafting of other secondary legislation in the field of building construction	Policy	50,000/ 98,000		
	4.1.5	Study on Renewable Energy Potential in BDBiH Buildings	Policy	70,000/ 137,200		
	4.1.6	Installation of solar systems (PV and for the preparation of domestic hot water) in public institutions	Investment		2,000,000/ 3,920,000	10,000/ 19,600
	4.1.7	Installation of thermostatic sets and their smart metering in all buildings owned by BDBiH	Investment		60,000/ 117,600	3,000/ 5,880
	4.1.8	Establishment of a legal framework for efficient energy management and the introduction of green public procurement criteria for the purchase of electrical appliances for buildings	Policy	25,000/ 49,000		
	4.1.9	Improvement of energy efficiency in buildings owned by BDBiH	Investment		13,000,000/ 25,480,000	50,000/ 98,000
	4.1.10	Improvement of energy efficiency in residential buildings and family houses	Investment		182,000,000/ 356,720,000	50,000/ 98,000
	4.1.11	Improvement energy efficiency in commercial and service buildings	Investment		71,000,000/ 139,160,000	50,000/ 98,000

Sector	Action No.	Action Title	Action classification	Estimated Costs		
				Cost (consultancy/development) EUR/KM	CapEx	OpEx
 Energy	2.1.1	Establish energy data collection	Policy	70,000/ 137,200		
	2.1.2	Development of by-laws related to energy sector	Policy	100,000 / 196,000		
	2.1.3	Development of a feasibility study for the construction of a cogeneration plant in BDBiH	Policy	250,000/ 490,000		
	2.1.4	Development of a feasibility study for the construction of a district heating system for the BDBiH	Policy	200,000 / 392,000		
	2.1.5	Construction of a cogeneration plant	Investment		95,000,000 / 186,200,000	19,250,000/ 37,730,000
 Solid waste	3.2.1	Improvement of the system of records and reporting on waste	Policy	55,000/ 107,800		
	3.2.2	Study on possibilities of waste prevention, treatment, and recycling	Policy	200,000/ 392,000		
	3.2.3	Collection infrastructure for mixed (residual) and recyclable waste	Investment		2,000,000/ 3,920,000	60,000/ 117,600
 Land use	5.1.1	Completion of the Spatial Plan of the BDBiH	Policy	75,000/ 147,000		
	5.1.2	Drafting and adoption of the new Urban Plan of the town of BDBiH	Policy	200,000 / 392,000		
	5.1.3	Strengthening the mechanism for adopting detailed spatial planning documents	Policy	15,000/ 29,400		
	5.1.4	Preparation of the Study of Protected Nature Areas in BDBiH	Policy	50,000/ 98,000		
	5.2.1	Establishment of new public parks and green infrastructure in the narrower urban area of BDBiH	Investment		1,500,000/ 2,940,000	37,500/ 75,000
	3.1.1	Establishment of soil quality monitoring in the BDBiH	Policy	22,000/ 43,120		
	3.1.2	Development of a GIS database of contaminated sites in the BDBiH	Policy	170,000/ 333,200		

Introduction

The GCAP for the BDBiH is a strategic document that, with a comprehensive approach, designed actions to deliver the “vision” of a green city and guide the development of the city in the next 15 years. It was developed with the clear understanding that cities face many environmental challenges and that improvements in functioning and resilience can be achieved through an interdisciplinary and holistic approach encompassing all environmental topics and all urban sectors. The approach applied will help the BDBiH administration secure **investment** into priority environmental infrastructure projects and identify relevant policy actions that Brčko can implement to improve the quality of the environment within the BDBiH.

Based on the “vision”, the strategic objectives and priorities of the GCAP were determined, and for each priority, lists of projects and actions that will respond to priority environmental challenges were identified and developed. The set of projects consists of short-term actions (1-3 years) which are mostly incentive policies needed to support the implementation of “investment” projects, ensuring the BDBiH's progress towards becoming a green city. Policy actions are followed by investment projects (medium-term and long-term) that will ensure specific and broader changes within the sector, which are aligned with the strategic goals of the existing strategies of BDBiH. Accordingly, the duration of certain actions starts only from 2030, and the estimated implementation lasts for 10 years, which depends on the readiness of financing and the capacity for longer-term investment.

The GCAP aims to improve the ecological situation in the BDBiH and is based on the principles of sustainability, with the maximum increase of benefits for the economy and society. The GCAP presents a **comprehensive**

assessment of BDBiH, focusing on six urban sectors: **water and wastewater, energy, transport, buildings, solid waste, and land use.**

The Central European Initiative finances the GCAP, which was prepared with support from the European Bank for Reconstruction and Development (EBRD). The GCAP follows the methodology developed by the EBRD, including input from the Organisation for Economic Co-operation and Development (OECD) and Local Governments for Sustainability (ICLEI). It is also in line with the relevant strategic documents at the national (Federal) and District levels, and it complies with the various international agreements and conventions aimed at contributing to and improving the environment and its resources.

This document was prepared based on data collected according to the EBRD methodology—the availability of environmental data limited data collection results during the initial phase of the GCAP project. For example, certain data are not collected at all at the BDBiH and national level, more recent data is not available, or the data requested from the relevant entities were not submitted or submitted at the time of the creation of the GCAP.

The financial assessment of the actions represents only indicative costs and is based on the information available at the time of its preparation.

The **GCAP is structured** into five chapters, as briefly described below:

Chapter 1: Methodology and Process of GCAP development – briefly describe the methodology development process of the GCAP that includes discussion and consultation with stakeholders

Chapter 2: BDBiH Profile and Environmental Baseline - Highlights key results from the findings of the technical report and the urban and policy report, outlines main Brčko Environmental challenges

Chapter 3: Vision, Strategic Objectives and Priorities –, Green City Vision, long-term strategic objectives, and mid-term Priorities, set out based on the findings of the baseline

Chapter 4: Green City Actions - it presents the Green City Actions developed based on the findings in Environmental Baseline and during the process of stakeholder engagement

Chapter 5: GCAP Implementation and Monitoring - Details of the monitoring and evaluation plan that will track the implementation and impact of the GCAP

Methodology and process of GCAP development

1.1 Overview of approach

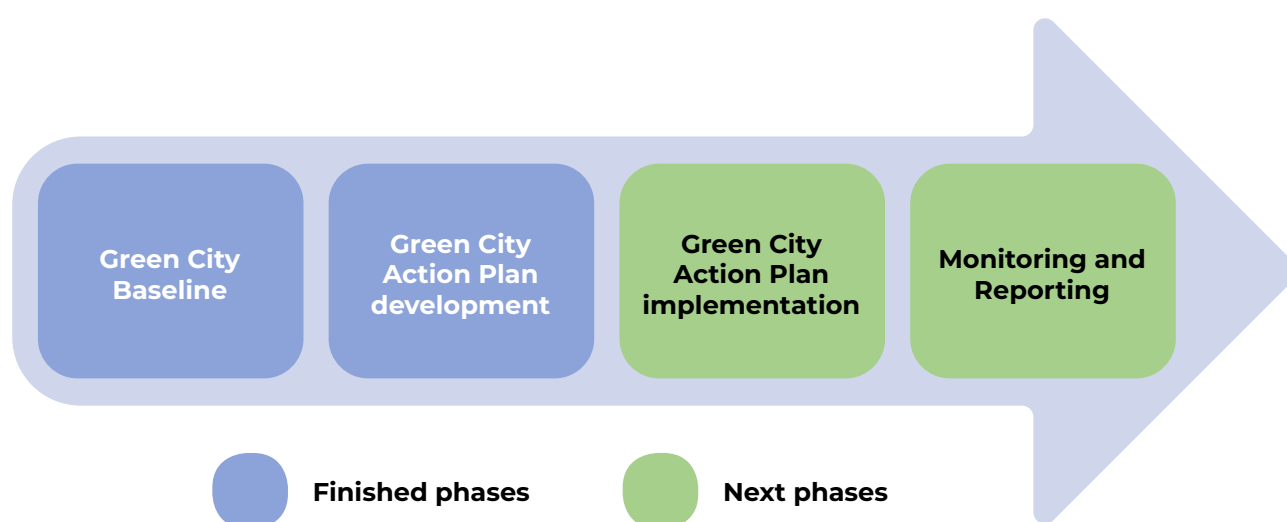
The Brčko GCAP was developed with the clear understanding that cities face many environmental challenges and that improvements in functioning and resilience can be achieved through an interdisciplinary and holistic approach encompassing all environmental topics and all urban sectors.

For the GCAP development, BDBiH and Consultant followed EBRD's Green Cities Action Plan methodology² which includes four main steps: (I) Green Cities Baseline; (II) Green City Action Plan; (III) Green City Implementation, and (IV) Green City Reporting.

1.2 Stakeholders involvement

The Administration of BDBiH took the lead in preparing and coordinating the GCAP, demonstrating a commitment to collaborative decision-making. At the outset of the project, the Government of BDBiH established two working teams, the Steering Committee (SC) and the Technical Expert Group (TEG), which were directly responsible for the GCAP's development. These teams, officially nominated on the 12th of October 2022, by the Decision of the BDBiH Government, were coordinated by a Green City Officer (GCO) who facilitated communication between the BDBiH Administration, local actors, and the consulting team. The members of both working groups are listed in Annex 1.

Figure 1. Green City Action Plan (GCAP) process overview



² EBRD Green City Action Plan Methodology: <https://www.ebrdgreencities.com/assets/Uploads/PDF/Green-City-Action-Plan-Methodology.pdf>

In addition, a larger group of stakeholders' input has been an essential feature of the BDBiH process. The GCO and District Administration identified stakeholders at the beginning of the GCAP development, and different sectors representing different interests and social groups were considered during the mapping exercise. A Stakeholder Engagement Plan was developed to ensure their involvement in all phases of GCAP development. Institutions and organizations that expressed interest in participating in the process are presented in Annex II.

A **Stakeholder Engagement Plan** outlining stakeholder engagement activities and communication protocols was developed to ensure the production of an integrated and effective GCAP and ultimate ownership of and commitment to the GCAP. The key objectives

of the Stakeholder Engagement Plan were as follows:

- Defining stakeholder's roles and responsibilities throughout the Project development and implementation
- Stakeholder engagement methods for each stakeholder group
- Methods to record the engagement events and their outcomes
- Information sharing and feedback collection mechanisms

At each GCAP development step, stakeholders were engaged through workshops, and/or online surveys. During the GCAP development, more than 100 individuals from around 40 institutions, organisations and companies took part in 4 GCAP workshops.

Figure 2 – Stakeholder Engagement participants per workshops



* F - females, M - males

1.3 GCAP process steps

The process of GCAP creation was initiated at the Kick-Off meeting with the SC member and following the Launch Event, where 62 stakeholders participated.



Picture 1 – Kick-Off meeting

The launch event and 1st Stakeholder session event announced the BDBiH's intent to develop a GCAP, demonstrate its commitment to environmental and resilience goals and introduce the GCAP development process and expected results to the broader public. In addition, this event initiated the engagement of stakeholders in the preparation and development of the GCAP for Brčko District.

The following sub-sections outline each of the two GCAP process steps presented in Figure 1 in more detail.



Picture 2 – Launch Event

1.3.1 Green City Baseline development

The Green City Environmental Baseline serves as the foundation, establishing the underlying conditions in BDBiH that influence environmental performance. It was developed using a systematic methodology that is based on the **Pressure-State-Response (PSR)** assessment framework.

“The GCAP process is built on the pressure-state-response (PSR) framework developed by the OECD. The PSR framework provides a useful structure to understand the linkages between activities that place pressure on the environment, the resulting state of the environment and associated responses by the government, residents, and the private sector to address the pressures.”³

The Environmental Baseline's aim is to develop and analyse the evidence bases to identify the most urgent environmental challenges that Brčko is facing and their causes. Within this step, three outputs were produced:

Policy and Urban Framework - assessment of the environmental, economic, social, and demographic context, along with current plans and policies (strategies) relevant to the GCAP development

Environmental Indicator Data - review using a 'Pressure-State-Response' (PSR) framework of 71 core and 61 optional indicators, assessing the data set and benchmarking state and pressure indicators to international standards.

Technical Assessment Report – Identification of Priority Environmental Challenges in the BDBiH based on the figures in the indicator database and using the method of “problem tree”. The technical assessment included a review of existing “Smart” solutions and an analysis of “risk and vulnerabilities” of action in the area of climate change adaptation and resilience in all sectors.

³ <https://www.ebrdgreencities.com/assets/Uploads/PDF/Green-City-Action-Plan-Methodology.pdf>

Policy and Urban Framework Report (PUF) summarises the BDBiH of Brčko’s environmental, economic, social, and demographic context, as well as current plans and policies. This document was the first assessment of the policy documents, and it was consulted throughout the development of the GCAP. PUF covered policy and institutional aspects of BDBiH and included:

- The BDBiH’s jurisdiction and responsible authorities
- Summary context of the environmental and climatic conditions in the City
- Policy mapping to challenges facing the City
- Challenges and identified policies across the City’s infrastructure
- Municipal budget
- Gender and social context of the BDBiH

All publicly available strategic documents and plans, as well as existing laws and by-laws, were analyzed. This assessment aimed to identify, review, and evaluate existing instruments and plans that can inform and influence the GCAP’s direction across all the sectors covered.

The second step in analyzing the current baseline state was collecting environmental data to fill **the GCAP indicator database**.

Data used to populate a standard set of indicators covering:

- a) quality and availability of environmental assets and climate change risks (**state indicators**);
- b) the sources of pressure and adverse impacts on the environment from human activity and the environmental performance of the city (**pressure indicators**);
- c) actions to reduce pollution or resource consumption or investment in environmental protection (**response indicators**). EBRD developed the standard set of indicators in the Indicators Database for use on all GCAP projects.

Indicators were benchmarked with the “traffic light” system, using RED, YELLOW, and

GREEN (RYG) traffic light according to the benchmark values in the Indicator Database. Benchmarking indicator values according to this traffic light system allows systematic comparison of performance (in terms of environmental outcomes) across the indicator set, referenced to international benchmark values, where ‘green’ = high performance, ‘yellow’ = medium performance and ‘red’ = low performance.

In this context, the ‘state’ of the environment data is presented in relation to the following environmental topic areas:

- Water resources;
- Air quality;
- Green space;
- Mitigation of GHG emissions;
- Soils;
- Biodiversity and ecosystems; and
- Adaptation and resilience to natural disaster risk.

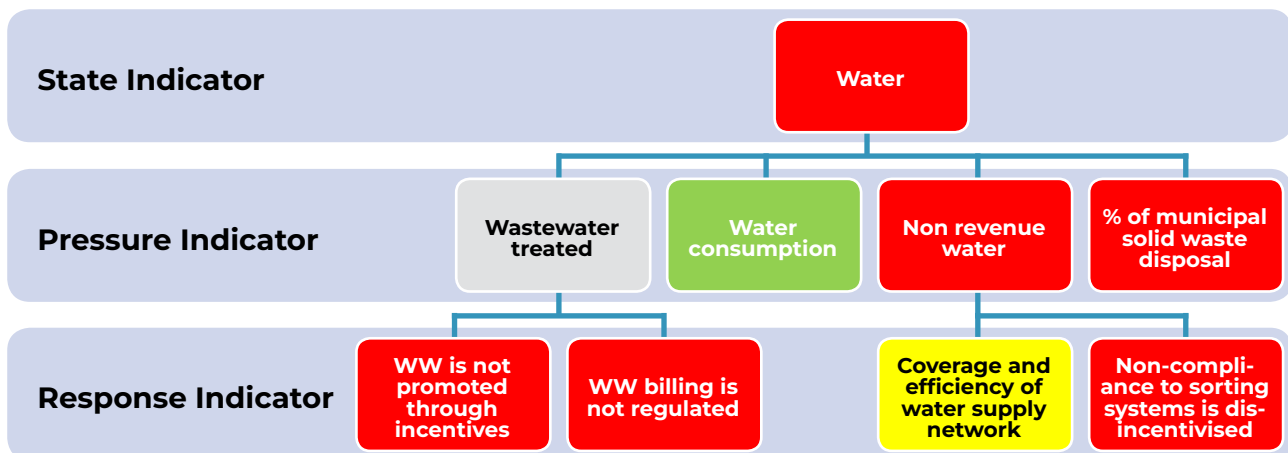
Activities that impact these ‘state’ indicators, so-called ‘pressures,’ are presented for the main urban sectors:

- Transport;
- Energy,
- Buildings;
- Industries;
- Water resources;
- Solid waste; and
- Land use.

For response indicators, the focus is on identifying both the presence or absence of policies and the quality of those policies, using the RYG categorizations are defined as follows:

GREEN	YELLOW	RED
Existing and well implemented, and there is no significant need to expand this type of response further.	Existing, but implementation challenges have been observed, and/or existing policies are not sufficient to solve the issue at stake.	Not existing

Figure 3 – Indicator benchmarking and problem tree approach example



Availability and reliability of data, as well as the harmonisation of data sets with diverse ownership covering different geographic scales of the urban area, are some of the challenges related to developing the indicator database. In Brčko, data were unavailable across a wide range of indicators, and this process faced some limitations and gaps. For example, no information on the current transport mode is shared within the city, making planning for future transport modes and options more difficult. Also, the industry analysis was complicated due to the lack of data; therefore, its impact on the state indicators was omitted.

The regulatory framework and indicator database were used to identify and prioritise Green City challenges, which were presented in a **Technical Assessment Report**.

Technical Assessment

The next step in the technical assessment was identifying key district environmental challenges using Indicator Database benchmarks and providing linkages between state, pressure and response indicators using the “problem tree” method. This method of presenting environmental challenges helped inform stakeholders about findings related to priority district challenges during the “stakeholder prioritisation” task, where an environmental problem is linked to several red or yellow pressure indicators that represent

deficiencies within urban sectors that are responsible for the environmental problem. “Problem tree” prepared for technical prioritisation of challenges is in Annex 3.

The figure above presents how interlinkages between State, Pressure and Response indicators are evaluated. A state indicator marked in red or yellow indicates an environmental problem in Brčko. The environmental problem is associated with several red or yellow pressure indicators that represent deficiencies in the urban sectors responsible for the environmental problem. Indicators for which no data were available are marked grey. In this general example, the water supply and wastewater sectors represent the main risk for the pollution of water resources. If there is no response or the response fails to solve the identified environmental problem (insufficient regulation or investment), the GCAP prioritises a related set of indicators as key Green City Challenges.

Prioritisation by the Technical Expert Group (TEG)

The initial set of key Green City Challenges identified using the Indicator Database and “Problem tree” was consulted with the Technical Expert Group online. The initial list of main Green City Challenges was distributed to the TEG members, and all comments and suggestions have been considered.

Stakeholder-based prioritisation

Presentation and discussion on priority challenges were held through a 2nd Stakeholder Workshop, which included representatives from the BDBiH administration and external stakeholders from public utilities, public companies and institutions, the business sector, and NGOs. In this workshop, held in May 2023, stakeholders had the opportunity to rank Green City Challenges in order of priority per sector and pressures identified for each challenge. Stakeholders were also invited to suggest additional challenges and linked pressures.



Picture 3 – Stakeholder challenges prioritisation

Stakeholders could provide comments and feedback during a “question and answer” session, as part of break-out group discussions that formed part of the workshop, and via written communications following the workshop.

The Technical Assessment Report, which accompanies the Indicator Database and contains prioritized Green City Challenges identified via technical assessment and stakeholder prioritization, was the finalization of Step I of the GCAP process.

In addition to the Technical Assessment Report, an assessment and report on Brčko’s existing prerequisite institutional capacity and capability of Brčko to fulfil the mission of Digital Transformation and Smart Integration were conducted.

Smart Maturity Assessment (SMA) provided context and assessed critical drivers for deploying smart technologies that will help District to manage their services more effectively to benefit their citizens, reduce pollution and improve the environment. The SMA of the BDBiH provided the basic overview of information on the current state of smart integration and digital transformation in the BDBiH, covering governmental and public institutions, businesses, academia, and civil society organizations and their projects and running initiatives. Besides that, the SMA covered essential information on the current state of the infrastructure required for deploying intelligent services and applications, including connectivity and sensor deployment for tracking communal services and identifying opportunities for future actions toward green and sustainable cities. Findings and recommendations from SMA have also been included in the process of GCAP action development.

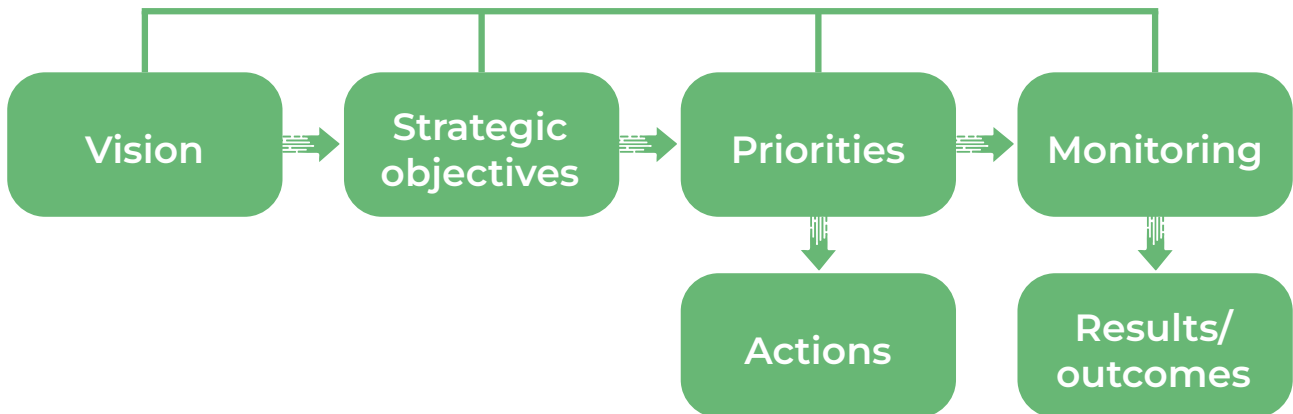
1.3.2 Green City Action Plan development

The production of the GCAP is the key step of the GCAP process. A key part of the GCAP document is the identification of actions which BDBiH will implement over the next 1-5 years (one to five years). The actions within this plan have been designed to address the challenges identified within the baselining phase.

The GCAP was designed in accordance with the EBRD methodology, and it considered District regulations. Therefore, the main output from this step was:

The Green City Action Plan is a strategic framework consisting of a vision, strategic objectives linked to priorities, and a set of prioritised short-term actions addressing the priority challenges outlined in the Green City Baseline.

Figure 4 – Framework of the GCAP



As a strategic framework, this document was developed using a systematic, evidence-based, and participatory approach, ensuring that the GCAP actions developed were grounded holistically. This will ultimately increase the effectiveness of its implementation and the ability to respond in time to each identified challenge.

Vision of GCAP

The GCAP vision is a concise statement representing a common, focused idea of the desired change in the long-term perspective to which GCAP will contribute until 2040. The vision is based on the environmental topic challenges and the corresponding sector challenges and allows for an understanding of what should be achieved regarding environmental performance and quality of life in BDBiH.

The vision statement was developed based on the Technical Assessment Report, the Policy and Urban Framework Report, existing strategic and planning documents and policies, an online survey, and the findings of stakeholders in BDBiH.

During the second stakeholder engagement workshop and after the green challenges prioritization session, the Consultant presented the key elements that GCAP

BDBiH's vision should contain. The present stakeholders were divided into several groups, and each group, considering the proposed elements, prepared its proposal for a vision statement and presented it at the end of the session. There was a total of six vision statement proposals of different forms and scope (short statements, statements focused only on specific development areas, broad statements of a descriptive nature).



Picture 4 – 2nd Stakeholder Workshop – Vision creation

Further elaboration of the vision statement was done through an online survey from 5th to 26th of June 2023. The online survey was sent to all stakeholders participating in the development of the Green City Action Plan via the official email address of GCAP Brčko (gcapbrcko@gmail.com), and a total of 26 responses were received. The consultant reconsidered and partially revised the vision statement proposal that received the most votes to ensure that all elements from the other vision proposals were included and to obtain a comprehensive vision statement, together with proposed strategic goals and a long list of actions.

Strategic objectives

Strategic objectives represent general and long-term environmental goals that need to be achieved during the GCAP validity period. They have been set up to serve as a main guide for the action plan, defining and communicating what the plan seeks to achieve. They were developed for each environmental topic area based on the state, pressure, and response indicators related to environmental challenges.

Once the strategic objectives for each environmental topic were created, they, and the final version of vision were presented and discussed during the 3rd Stakeholder Workshop. After input and suggestions from the workshop, the TEG further commented on the revised strategic goals. The strategic objectives are harmonized with the existing strategies and follow the rules of BDBiH to prepare strategic documents. Please refer to Section 3 for the vision statement and strategic objectives developed during the Stakeholder Workshop

Priorities

Priorities are key fields and action directions for achieving strategic goals for each environmental topic area. The long-term strategic objectives have been converted to a set of priorities against which it will be

possible to establish whether the BDBiH is progressing towards the long-term vision.

The priorities were determined based on the “Rulebook on the preparation of strategic documents in BDBiH”⁴, local by-law that regulates the process, scope, and manner of development all strategic documents for the BDBiH. Priorities are key fields and direction of action for the achievement of strategic objectives. They have been identified for each urban sector that exerts pressure on environmental assets.

Actions

Actions are recommended measures the BDBiH can implement over the next 1-5 years. The short-term actions (prioritised) are designed to progress towards the priorities and strategic objectives. They are set out in the form of a timeline indicating the key steps needed to implement each action, and the BDBiH Administration will take forward the Actions in the triennial budget programming.

Initially, a Long List of Actions was developed, and priority actions were identified. The process of prioritizing actions took place in two steps, as it aimed to focus on actions with the most significant environmental, economic, and social benefits while considering budget constraints.

Step 1: Prioritisation of the initial list of actions by stakeholders

An initial list of actions was identified for each urban sector: water supply and wastewater, energy, buildings, transport, solid waste, and land use. A description of each action has been prepared, considering the context, classification, link to the strategic objective, estimated duration and costs, and recommended stakeholder as a responsible implementer of the action.

Prioritisation of actions took place in the 3rd Stakeholder Engagement Workshop

⁴ Rulebook on the Content and methodology for development, monitoring and supervision of the implementation of strategic documents and implementation documents (Official Gazette of BDBiH, No. 42/23)



Picture 5 – Stakeholders prioritisation of actions

with the aim to discuss and jointly check the relevance of the initial actions so that they can be revised and improved because the result of this process will be the final list of actions needed to respond to urgent environmental challenges. The Workshop aimed to conduct prioritisation of the long list of actions first by ranging actions within the urban sector and then by the influence of different environmental assets and social and economic values:

- Environmental values: impact of actions on the strategic objectives and understanding of how actions address multiple objectives
- Social values: how actions impact on public health in general, gender and minority equality
- Economic values: benefit of actions in terms of economic growth, economic inclusion, and employment

Step 2: Prioritization of the actions with TEG and District Administration

A draft report with a vision, strategic objectives, priorities, and an initial list of actions has been distributed to the local

specialists from TEG, including other public institutions that could be important in implementing proposed actions in the future.

For this step of prioritization, a new ranking list was prepared, where for each initial action, information on the current status of the actions was requested (does not exist, in work/ negotiations, exists) and the criteria were generative for all actions:

- initial and basic studies,
- technical documentation,
- co-financing,
- technical readiness, and
- human capacities.

A priority list of actions for GCAP Brčko was established based on the ranking results.

The final draft of the GCAP has been submitted to the Brčko District Government in September 2024. Once the City Administration has adopted it, the GCAP will elaborate on Brčko annual budgets, capital investment plans, triennial budgetary programmes, and other mid-term plans.

GCAP Approval Process

An approval process will be defined in cooperation with the GCO to ensure that the GCAP will be formally adopted as District policy and embedded within the BDBiH Administration's budget. The process for GCAP approval is:

- When the GCAP is prepared, the Mayor, as an authorised proposer, submits it as a draft to the Government of BDBiH as a decision-making body authorised to adopt strategic documents.

1.3.3 Green City Action Plan Implementation

The GCAP is adopted by the BDBiH Government and used as the basis for the inclusion of Brčko's capital investment plans and triennial development programmes and budgets. This will be crucial for building political support, and a concrete effort will be made to ensure that the first stage of the implementation period begins in early 2025. For the implementation of individual actions, further analysis of financing needs and options will be conducted, and sources of financing will be identified and sought.

1.3.4 Green City Action Plan Monitoring and Reporting

Green City Monitoring and Reporting of the Action Plan for the Green City will identify what has been achieved in a given period, and how together with successes and opportunities you should plan the next period. GCAP challenges, objectives, actions, and targets must be periodically revisited to identify changes in State, Pressure, and Response indicators that could require a revised approach and an updated GCAP. Chapter 5 provides further detail on the monitoring that will guide the implementation process.

BDBiH profile and Environmental Baseline

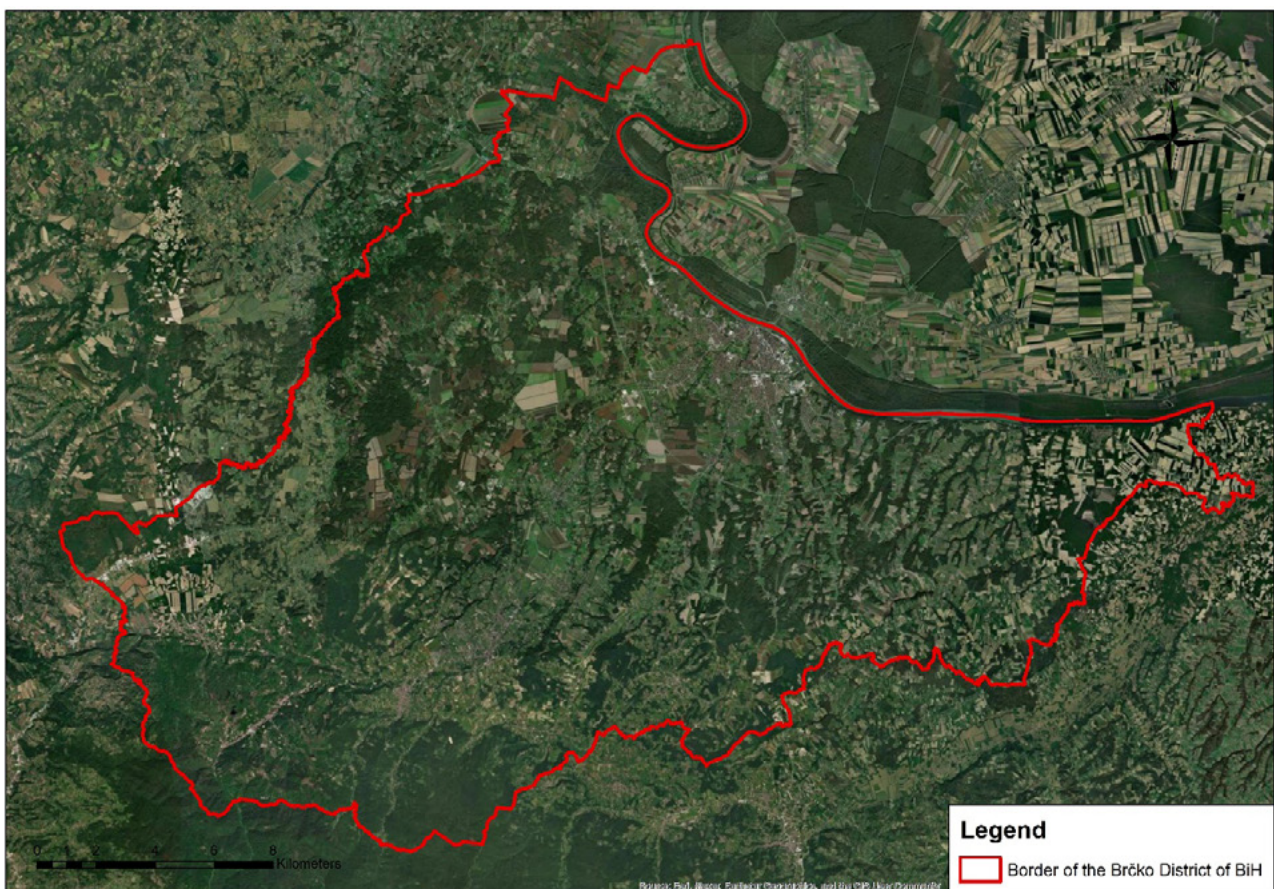
2.1 BDBiH Profile

Geographical position

The BDBiH covers an area of 493 km² (0.96% of Bosnia and Herzegovina's total area). It is located along the Sava River in the country's northeast at latitude 44°53' and longitude 18°49'. The City of Brčko is the administrative seat of the BDBiH, an independent unit of local self-government created on the territory

of Bosnia and Herzegovina (BiH) following an arbitration process.

The BDBiH was formed on the entire territory of the former Brčko Municipality. According to the internal administrative borders in Bosnia and Herzegovina, the BDBiH borders several municipalities of the Republic Srpska and two of the ten cantons of the Federation of Bosnia and Herzegovina: the Tuzla Canton



Picture 6 – BDBiH map

in the southwest and Posavina county in the northwest.

Given that it is one of the rare points in BiH where different types of transport (railway, road, and river) converge, the BDBiH is important for the industrial and economic development of the entire country. Additionally, it is almost equidistant from three large industrial, economic, political and consumer centres: Belgrade (200 km), Zagreb (270 km) and Sarajevo (210 km), with which it is connected by road, rail and/or river.

The central city area is 183 km², i.e., 16% of the area belongs to the urban area of the BDBiH. The altitude of the BDBiH ranges between 96 and 200 m.a.s.l. with 80% of the territory

The average age was 41.5 for women and 38.9 for men, indicating that women have a longer life expectancy and form the majority of the population older than 65, while men are predominant in all other age groups.⁵

The ageing population, low fertility rates, and immigration pose the most significant demographic challenges for BDBiH and Bosnia and Herzegovina. The main reason for emigration is a lack of employment opportunities, but there are more male emigrants than female.

According to data from the **Labor** Force Survey in the first quarter of 2023, among the total labour force, 17,000 individuals (57.1%) were men, and 13,000 (42.9%) were women.

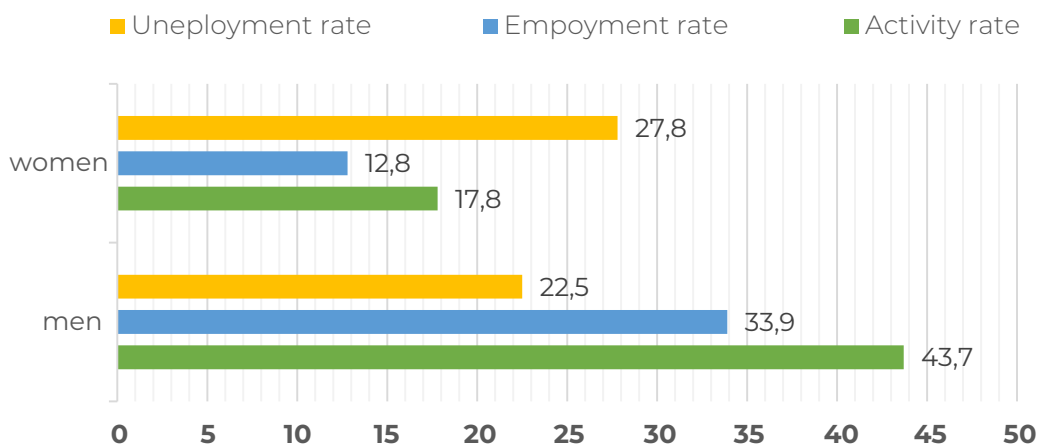


Figure 5 – Labour market rates by sex, 2022

at an altitude below 200 m.a.s.l. Hence, it can be concluded that relief in the BDBiH is predominantly plain, with a mountainous area in the southern part of the territory.

Social and demographic context

In BDBiH in 2021, the **population** numbered 81,910, comprising 40,497 males and 41,413 females. The activity rates are low for men, but particularly for women, so is the employment rate - 33.9 for men and 12.8 for women. Unemployment rates are around 26%.

During this period, 65% of the total workforce fell into the age group of 25 to 49 years, 26.2% in the 50 to 64 age group, 8.1% in the 15 to 24 age group, and 0.7% aged 65 and older. The highest number of employed persons work in the processing industry, accommodation, and food (tourism and hospitality) sector, and women are well represented in this sector.

⁵ Demography in BDBiH 2017 -2021, Statistical Office, 2022, available at https://bhas.gov.ba/data/Publikacije/Bilteni/2022/BRC_07_2021_Y4_1_BS.pdf

Data about the **educational structure** in BDBiH is officially available from the 2013 census. On the territory of BDBiH are five preschools, sixteen elementary schools, four high schools and eight faculties – institutions for higher education. In high schools in 2021/2022, there were 2,618 children, of which 1,362 were girls. In artisan schools, there are 418 boys and 110 girls. In grammar schools, there are more girls, 254 and 135 boys, and in technical schools, the number of children is balanced.

Older people face a poor material situation: low pensions and incomes and the lack of social services, especially for those over 75 years old. The report states that the minimum pension 2019 was 348.06 KM (EUR 177.02). It also states that the average pension was 416.45 KM (EUR 211.81), and the average salary was 958.00 KM (EUR 487.24). The BDBiH provides help to pensioners who receive less than 150 KM—around 11,000 people.

In BDBiH, **gender** norms, roles, and patterns, according to key informants, remain robust. Public utility companies and businesses, in general, are still male-dominated. Out of 78 local community offices, in only four, women are presidents⁶. In the Parliament of BDBiH, out of 31 members of parliament, only three are women⁷.

Economy

Due to its geographical position, the BDBiH has great economic conditions in the agricultural and food industry and trade.

In the BDBiH, the GDP in 2022 reached 1,128 million KM, representing an increase of 15.2% compared to the previous year. These data can be linked to the economic growth recorded from 2018 to 2022 and confirm the positive economic trends of BDBiH, which opens up new opportunities and contributes to creating a favourable climate for further economic initiatives.

At the end of 2022, the total number of active business entities in the BDBiH was 4,842, of which 2,053 were active legal entities and 2,789 were independent entrepreneurs.

One of the dominant production branches in BDBiH is the processing industry, within which the food and food production, light metal processing, and wood processing industries have the most significant potential.

According to the BDBiH Spatial Plan, fourteen industrial zones have been identified that provide good opportunities for economic development, both for domestic and foreign investors. The “Baza McGovern” business park is the most promising zone with great development potential.

Significant potential for economic development is represented by the Port of Brčko, which, based on the Decision of the Council of Ministers of BiH, is the only international river port in BiH and is connected to the ports of the Black Sea Basin (Danube). Through the “Brčko Port” on the Sava River, it is possible to trade with the Danube ports of Central Europe and the Black Sea ports.

2.2 Institutional and Policy Framework

Institutional set-up

Amendment I of the Constitution of Bosnia and Herzegovina established that the BDBiH is a unit of local self-government that has its institutions, laws, regulations, competencies, and Statute and is responsible for all issues that do not fall under the jurisdiction of the State of Bosnia and Herzegovina. Unlike all other local self-government units in BiH, BDBiH has a different role in the state's legal and political sphere system. Starting from the definition of the actual position in the constitutional and legal system of the state, the BDBiH represents a local unit of self-government under the BiH's direct sovereignty.

⁶ <https://sap.bdcentral.net/Content/Read/kontakti-mz-bdbih?lang=hr>

⁷ <https://skupstinabd.ba/index.php/ba/poslaniciumenijuoskupstiniprebaceno.html#>

The highest legislative body of BDBiH is the District Assembly, which is responsible for approving and adopting laws, by-laws, and other policy documents related to governance and administration.

The internal organisation of the Government of the BDBiH is divided into the Office of the Mayor of the BDBiH and twelve departments. On the territory of BDBiH, one public utility - JP “Komunalno Brčko” d.o.o. is responsible for communal affairs operations. It has been operating since January 1, 2008. by

Two main strategies that define the policies related to the state of environmental resources (air, water resources, drinking water, land, land use, biodiversity, and ecosystems) on the territory of the BDBiH are represented by the **Spatial Development Strategy of the BDBiH** and the **Environmental Protection Strategy of the BDBiH 2022 – 2032**. The Spatial Plan for BDBiH expired in 2017, and the new one for the next planning period has not been prepared yet. Climate change issues have been addressed in the **Sustainable Energy and Climate Action Plan (SECAP)**

Government of Brčko District BiH

Mayor Cabinet

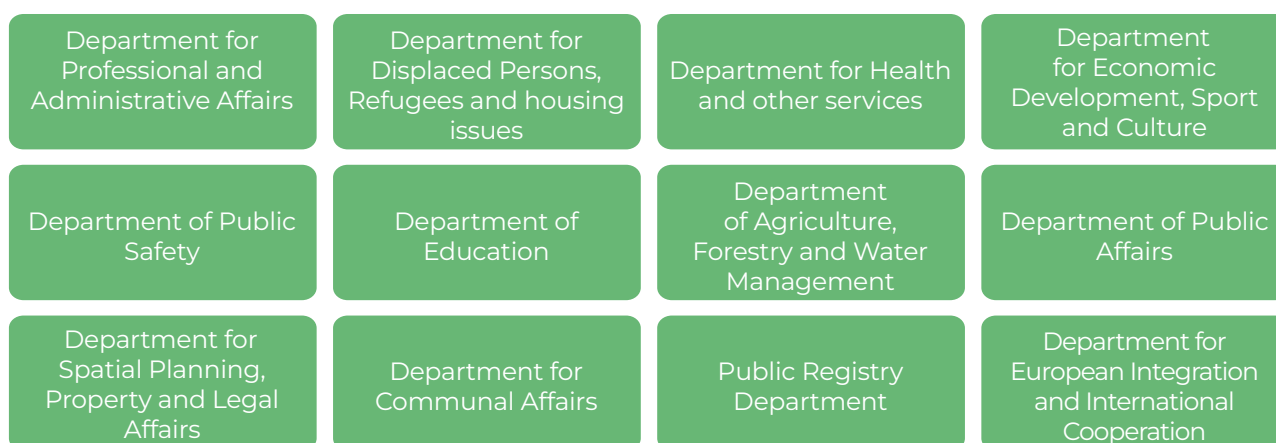


Figure 6 – Institutional set-up

the Decision on Establishment and the Law on Public Enterprises of the BDBiH. “Komunalno Brčko” d.o.o. is organised through an organisational structure of four work units: (i) RJ Elektrodistribucija, (ii) RJ Vodovod i kanalizacija, (iii) RJ Čistoća, and (iv) RJ Administration.

Regulatory Framework

As a local unit of self-government under the direct sovereignty of the BiH and with its institutions, BDBiH has its own Statute, laws, and regulations.

BDBiH until 2030 and are in line with the Strategy for adaptation to climate change and low-emission development of Bosnia and Herzegovina for 2020-2030.

2.3 BDBiH Finance

The fiscal system in Bosnia and Herzegovina (BiH) is highly decentralised, reflecting the provisions of the country’s constitution. According to the official numbers of BDBiH’s financial situation in the period between 2018

and 2023⁸ the revenues and expenditures of the BDBiH increased over the last few years, with the increasing budget deficit culminating in 2020 as the adverse effects of COVID-19. After 2020, the excess of costs over total revenues is planned to decrease. The BDBiH budget for 2024 amounts to 399,4 million KM.

Potential threats to the BDBiH's budget availability in Bosnia and Herzegovina include economic instability, political instability, and a lack of foreign investment. Additionally, the BDBiH is subject to the economic and political conditions of Bosnia and Herzegovina, which can affect its budget availability because the total budget of the BDBiH contains two primary sources: BiH state and BDBiH-level revenues.

Following the Law on the Budget of the BDBiH ("Official Gazette of the BDBiH", number 34/19), a three-year framework budget is being prepared, which presents a preliminary draft of the budget for the first year, and framework plans for the next two years. A framework budget document is a complex and comprehensive medium-term planning document that includes analyses and projections of the budget of the BDBiH and financial plans of extra-budgetary funds and extra-budgetary users who are obliged to apply budget accounting. The annual budget is one of the key instruments of the Government of the BDBiH and enables the implementation of the Government's policy goals through programs and concrete activities. The Finance Directorate of the BDBiH prepares three-year and one-year budgets and is responsible for their implementation and control.

2.4 Findings from the technical assessment of the indicators' database and key environmental challenges

The state of the environment was analysed according to the topics identified according to the EBRD methodology. Data for the state of the environment have been assessed in the context of the environmental baseline, which was developed using the State-Pressure-Response model (described in Section 1).

Based on the available data from the BDBiH and the data collected during additional documentation research at the level of BiH, the total number of populated core indicators is 60 (81%), optional indicators are 33 (54%), and one additional indicator has been introduced (Annex 3).

As described in Section 1, state and pressure indicators have been populated using locally available or typical regional data, and indicator values have been benchmarked using standardized benchmarking definitions specific to each indicator. Benchmarking was conducted using one of the three standardized categories for the response indicators.

As part of this process, the interlinkages between state topics and pressure sectors were analysed and summarised in a "problem tree" (Annex 4).

After linking the condition and pressure indicators, which clearly explain which sectors contribute to the priority environmental challenges, a mapping of the pressure themes concerning the environmental challenges is presented. This enables the clear identification of common sectors of pressures operating between and among areas of environmental challenges rather than affecting each challenge in isolation.

⁸ <http://www.vlada.bdcentral.net/Content/Read/dokumenti-budzet>

Table 1 – Average of populated indicators and benchmark flags for state, pressure, and resources indicators by indicator type/sector







Indicator type/sector	Summary of benchmark flags		
State indicators			
Air quality	RED	YELLOW	GREEN
Water resources	RED	YELLOW	GREEN
Soil	GREEN		
Green Space	GREEN		
Biodiversity	GREEN		
Climate Mitigation	RED	YELLOW	
Climate Adaptation	RED		GREEN
Pressure indicators			
Transport	RED		YELLOW GREEN
Energy	RED	YELLOW	GREEN
Buildings	RED	YELLOW	GREEN
Water	RED	YELLOW	GREEN
Solid waste	RED		YELLOW
Land use	RED		GREEN
Response indicators			
Transport	RED		
Buildings	RED	YELLOW	GREEN
Industries	RED		YELLOW
Energy	RED		YELLOW
Water	RED	YELLOW	GREEN
Solid Waste	RED	YELLOW	
Land use	RED		YELLOW

'green' = high performance

'yellow' = medium performance

'red' = low performance

Table 2 – Mapping pressure sectors against environmental topics

Pressure sectors/ Environmental topic	Water resources	Air quality	Soil	Climate Mitigation	Biodiversity	Climate adaptation	Green spaces
 Transport		Fossil fuels Non-motorised provision Transport modal share		Fossil fuels Non-motorised provision Transport modal share			Insufficient flood risk management and extreme events
 Energy		District heating		District heating		Resilience of electricity network	
 Buildings		Energy consumption in buildings		Energy consumption in buildings		Energy performance and green certification	
 Water supply and wastewater	Water supply network Wastewater collection and treatment		Wastewater collection and treatment		Wastewater collection and treatment	Portable water storage	
 Solid waste	Waste disposal	Waste disposal Waste collection and recycling	Waste disposal	Waste disposal Waste collection and recycling	Waste disposal		Waste disposal
 Land use			Urban planning Urban density		Urban planning Monitoring		Urban planning Urban density

Direct impact on environmental asset



Indirect impact on environmental asset

Although the state indicators for soil quality, green spaces and biodiversity are marked overall as “green”, the “red” flagged pressure indicators linked to them suggested that these should be taken forward in the analysis (See Table 1). All pressure indicators marked with “red” were prioritised in further analysis. Finally, response indicators corresponding to the pressure indicators benchmarked as “red” or “yellow” have been selected.

During the 2nd Workshop, stakeholders provided input for the ranking of each of the seven identified priority green city challenges and conducted overall ranking for each of the key pressures identified for each priority green city challenge. Considering the stakeholders’ suggestions and feedback during the Workshop, the central pressure is foreseen in the water resources, air quality and soil. However, all other environmental assets will be considered as linked pressure indicators marked with “red” important for BDBiH’s further development. The list of prioritised challenges after input from the Workshop and based on the findings from Technical analysis is presented in Annex 5.

The sub-sections below briefly discuss each environmental and pressure topic based on the indicator database, technical analysis, and stakeholders’ inputs.

2.4.1 Environmental (state) topics


To assess the state of the environment, data related to water resources, air quality, soil, climate change mitigation, climate adaptation and resistance to the risk of natural disasters, biodiversity and ecosystems and green areas were collected and analyzed. The database of indicators served as a guideline for data collection, and the data were benchmarked against reference values. More information can be found in Annex 3 - Indicator database.

Water resources

The quality of water resources is primarily influenced by urban and industrial wastewater and solid waste.

Monitoring of surface waters was carried out on four watercourses (Sava, Tinja, Brka and Blizna) in the period 2018-2021 and on three watercourses (Sava/Blizna, Tinja and Brka) in the period 2012-2017. The average values of biological oxygen demand in the previous ten years were primarily in “yellow”, and in 2012, 2016 and 2018 were in “red”, primarily due to high values on the Blizna and Brka profiles. The biggest polluters are wastewater and used water from households, which are discharged into the mentioned watercourses. On the other hand, the average values of

Table 3 – Water resources: linked pressure and response indicators

State indicator	Pressure indicator	Response indicator
 Water resources	S: % of MSW disposed in non-sanitary ways (dumps, water, etc.)	Littering and non-compliance to sorting systems are disincentivised through fines and penalties.
	I: % of WW treated according to applicable national standards	Industrial WW treatment was not promoted, enforced through fiscal incentives and fining
	W: water consumption per capita	Water saving and reuse encouraged through awareness campaigns partially implemented.
	W: power plants water consumption	Water savings gaps
	W: Industrial water consumption	Metering & billing for water is regulated.
	W: No- revenue water	Coverage and efficiency of water supply
	W: % of municipal WW treated according to national standards	access to WW collection and treatment is partially improved through planning & investment
		Wastewater treatment is not promoted through regulations and fiscal incentives.
	WW billing is not regulated.	

ammonium ions (NH_4^+) mainly were in “red”, except in 2014 when they were in “yellow”. The maximum values were recorded in 2016 due to the huge concentration of ammonium ion (NH_4^+) on the profile of the Blizna watercourse, which is located about 500 m from its mouth with the Sava River. Both indicators have fluctuating trends with negative implications. The huge concentration of ammonium ion (NH_4^+) has been noticed on the profile of the Blizna watercourse due to the poor coverage of the sewage system in this densely populated basin, as well as the low flow of this watercourse, especially in the summer months. Two main pressure indicators are recognised per the “problem tree” that could pressure the state of water resources: % of the wastewater treated from the industries and % of municipal WW treated according to national standards. However, no data for those two indicators is available.


According to the report “Monitoring the Quality of Surface waters in the BDBiH – 2021” and data from the profiles of the Brka and Blizna rivers, the origin of the detected high concentrations of ammonia nitrogen is most likely due to anthropogenic activities: discharge of urban sewage, industrial wastewater, and the use of artificial fertilisers in agricultural fields.

Air Quality

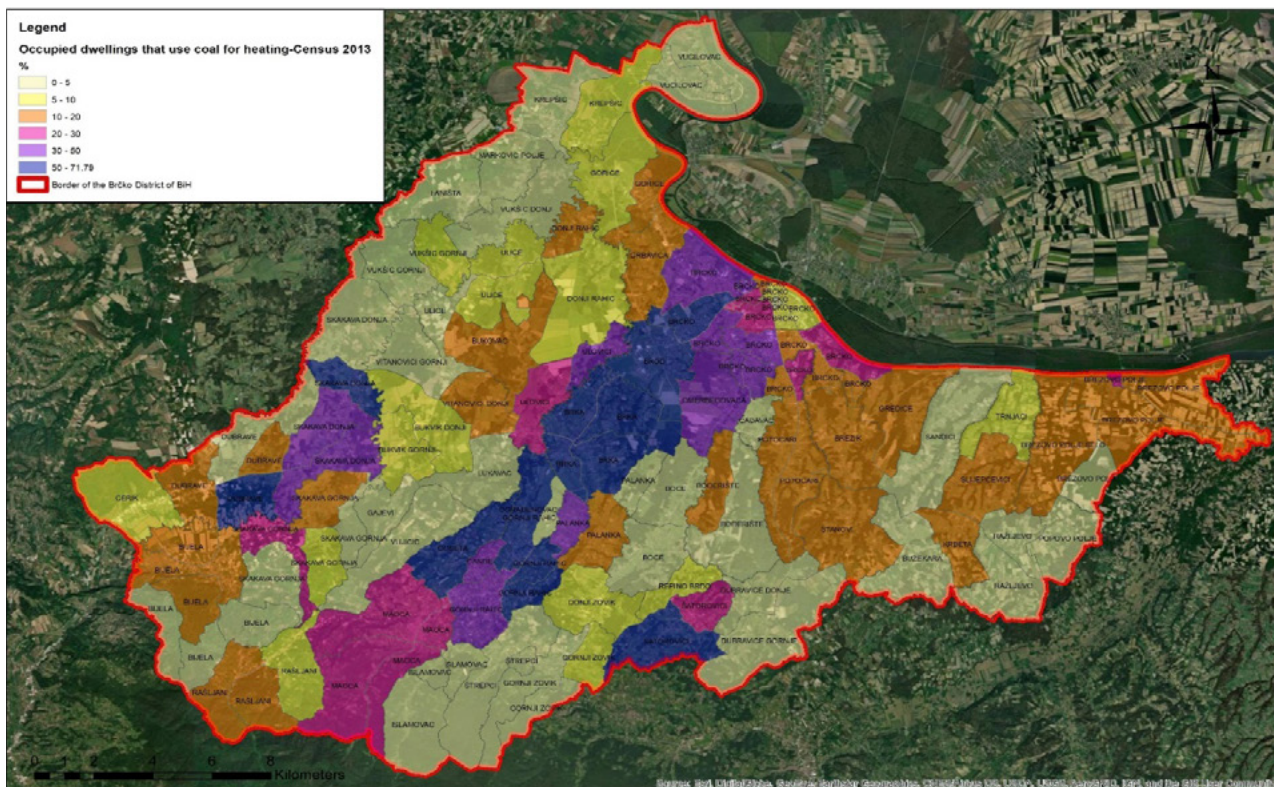
The primary pressure on BDBiH's air quality comes from the transport and energy sectors. Air pollution in the BDBiH is relatively high, especially during winter. The biggest the cause of pollution is the use of coal and firewood in home fireplaces and emissions from traffic, and to a lesser extent due to the operation of industrial plants.



Table 4 – Air quality - linked pressure and response indicators

State indicator	Pressure indicator	Response indicator
 Air quality	T: Average age of car	High-polluted vehicles are not regulated
	T: Transport modal share	Extension and improvement of public non-motorised transport is not promoted
	T: Average travel speed	Traffic demand is not managed through smart technologies.
	E: Electricity interruptions	The resilience of the electricity network
	E: Share of households connected to district heating	Coverage and quality of heat supply is not improved through investment
	B: Electricity consumption in buildings	Green building is not promoted
	I: Electricity consumption in industries	EE technologies are not supported through private investment.
S: Municipal solid waste treated	Composting, recycling, and waste-to-energy are not promoted.	

Picture 7 – Occupied dwellings that use coal for heating (%) by statistical units according to the final results of the Census of population, households, and apartments in 2013.



The low concentration of NO₂ during the summer indicates that the impact of traffic (diesel cars) is much less pronounced than that of furnaces.

Air quality on the territory of the BDBiH is monitored only in the urban area of BDBiH. It does not perform regular air monitoring, and since 2010, only in 2018, air quality was monitored for all 12 months. In 2012, 2014, 2018 and 2019, monitoring was performed at one or two locations in the urban area of Brčko. There is no continuity in monitoring the concentration of PM₁₀ in the air, and PM_{2.5} is not measured at all. The negative impact of the heating season on air quality is evident in the case of PM₁₀, whose concentrations in the winter months are about three times higher than in the summer months. The concentration of SO₂ is significantly beyond the limited values, which is mainly connected to the extensive use of coal for heating in the territory of the BDBiH.


Soil

Land in the BDBiH is threatened by various types of degradation: from infection, soil contamination with heavy metals and other contaminants, soil degradation in the narrower sense to destruction or physical destruction as the most severe form of land degradation, caused by surface mining (gravel pits in fields, quarries), construction settlements, warehouses of various materials, roads, factories, gas stations, uncontrolled forest cutting, landfills of industrial, medical and communal waste, etc.⁹

Soil monitoring does not exist in the territory of Brčko District. The last systematic monitoring of agricultural soil quality (100 plots) was carried out in 2007 through the preparation of the Study on Control of Fertility and Soil Pollution in the BDBiH. The results showed that an increased concentration of total cadmium was found in a more

⁹ Strategy for Environmental Protection of BDBiH

Table 5 – Soil-linked pressure and response indicators


State indicator	Pressure indicator	Response indicator
 Soil	S: % of MSW disposed of in a not sanitary way	Littering and non-compliance to sorting systems are disincentivised through fines and penalties.
	W: % of WW treated according to applicable national standards	Wastewater treatment is not promoted through regulations and fiscal incentives
	I: Heavy metals, Pb emission, intensity from manufacturing industry	Industrial WW treatment was not promoted
	L: Population density on urban land	Density partially regulated
	L: Share of brownfield development	Density partially regulated

significant number of samples. The lack of systematic and continuous soil quality monitoring makes it difficult to determine a precise correlation between the state indicator and the related pressure and response indicators. However, there is an indication that solid waste management and inappropriate land use pressure could have the most significant negative impact on soils. Regarding responses, the lack of municipal solid waste disposal and industrial waste emissions are also areas that must be addressed.

Climate mitigation

BDBiH developed and approved an Action plan for energy-sustainable development and climate change of the BDBiH (SECAP) until 2030. For SECAP development, a reference inventory of CO₂ emissions (Baseline emission inventory—BEI) was created for the year 2012 as a reference/base, while the control CO₂ emissions inventory (Monitoring emission inventory—MEI) was created for 2019, but for the following sectors: buildings, transport, and public light.

Table 6 – Climate mitigation - linked pressure and response indicators

State indicator	Pressure indicator	Response indicator
 Climate change and GHG	T: Average age of the car	High-polluted vehicles are not regulated.
	T: Percentage of diesel cars in total vehicle fleet	
	T: Transport modal share	Extension and improvement of public non-motorised transport is not promoted
	B: Electricity consumption in buildings	Public and private investment in energy efficiency in buildings
	B: Electricity consumption in residential buildings	Green building is not promoted
	B: Fossil fuel consumption for heating and cooling in public buildings	Coverage and quality of heat supply are not improved through investment
	E: Share of households connected to district heating	Coverage and quality of electricity and heat supply not improved through investment
S: % of MSW disposed of in a non-sanitary way	Composting, recycling, and waste-to-energy are not promoted	

Regarding the state indicators, both mitigation indicators have been assessed not for the BDBiH but for the whole country of BiH using the Fourth National Communication and Third Biennial Update Report for BiH under the UNFCCC. Both state indicators seem to be below the benchmarked threshold. Some policies and measures discussed in other sectors (air quality) should also be applied to tackle the control of GHG emissions.

The main pressures are the average age of the city's vehicle fleet (14 years), motorisation rate, usage of diesel cars, and a huge number of households seemingly using coal, wood, and other fuels for heating, considering the lack of a district heating system.


Biodiversity and climate adaptation

The area of biodiversity and ecosystems is very scarce in data. The institutions of the BDBiH do not have up-to-date inventory data on species of plants, animals and fungi and changes in their populations over time, as well as data on the types and distribution

of habitats (ecosystems). Very limited data was available regarding the climate change adaptation indicators. The only available data was in 2014 regarding the economic damage indicator, and in 2015, data related to floods.

Although the main challenge in this area is the lack of systematic and continuous biodiversity monitoring, several sectors have been identified as main pressures on biodiversity: solid waste disposal and land use in terms of population density on urban land. Also, pressure on climate adaptation could not be fully assessed, considering that only available data refers to water sector related to portable water storage, which was below the threshold (marked as "red") and the percentage of dwellings damaged by the most intense flooding in the last ten years (benchmarking as "yellow"). In response to climate adaptation requirements, BDBiH developed an Action Plan for sustainable energy management and adaptation to climate change (SECAP) of BDBiH until 2030. In addition, there is a noticeable lack of capacity in human resources and special teams for protection and rescue actions, as well as a lack of financial resources.

Table 7 – Biodiversity and climate adaptation - linked pressure and response indicators

State indicator	Pressure indicator	Response indicator
 Biodiversity and climate adaptation	S: % of MSV disposed of in non-sanitary way	Composting, recycling and waste-to-energy are not promoted
	W: % of municipal WW treated according to national standards	Access to WW collection and treatment is partially improved through planning & investment
	L: Population density on urban land	Density partially regulated
	L: Share of brownfields development	Mixed development is promoted through zoning regulations or incentives.
	W: % of dwellings damaged by most intense flooding in the last ten years	Coverage and efficiency of water supply networks are improved through plans and investment
	W: annual number of stormwater/sewerage/overflows / 10 km network	Drainage facilities to be developed through plans and investment
		Business & community resilience are encouraged through awareness campaigns.


Green spaces

Green space areas in Brčko generally represent the last remnants of the natural ambience in the urban environment. The open green space areas and their pedestrian accessibility, as well as the share of green space areas within urban limits, is a clear indicator of the quality of life and sustainability in the urban area of Brčko. Institutions of the BDBiH do not have data on green space areas in their territory in the form

marked according to the traffic light principle: "green", "yellow", and "red". When data were unavailable, "grey" colour was used for marking. An overview of data availability and thresholds is presented in Annex 4.

The following sub-sections briefly analyse each pressure sector and key environmental challenges.

Table 8 – Green spaces - linked pressure and response indicators

State indicator	Pressure indicator	Response indicator
 Green spaces	L: Population density on urban land	Density partially regulated
	L: Share of brownfields development	Mixed development is promoted through zoning regulations or incentives.

of a register, or such data are not clearly stated in the spatial planning documents, primarily in the urban plan.

Even though the core state indicators of green spaces have been discarded from the priority of state indicators, stakeholders expressed importance of its inclusion for future green city actions. The stakeholders' primary concern is the insufficient size of green areas in the urban part of the BDBiH and the inadequate infrastructure and equipment that would serve all target groups (children's playgrounds, access to mothers with children, and disabled persons). Concerning that, one of the basic ways of forming compact urban settlements as part of the concept of integrated land use with sufficient green spaces is the response indicator refers to density regulation, primarily residential and commercial density regulation.

2.4.2 Urban (pressure) Sectors and Key Challenges

The impact of urban sectors was analysed based on available documentation and data assessed for the indicator database. Depending on the threshold value, they are

Water supply and wastewater


Water supply and consumption in BDBiH are not within acceptable limits, and large losses and non-revenue water indicate the need for significant investments in reconstructing the existing water supply network based on a planned approach and strategic choice of locality.

Reconstruction of the existing water supply network is needed, and in line with that, the works must be planned in a way that does not compromise the supply of hygienically safe water to the entire consumption area. The sites must be defined and incorporated into planning documents to protect underground water reserves scheduled for use in the upcoming period (Spatial Plans, Urban plans).

According to the collected and analysed data, existing wastewater treatment needs to be improved and more efficient. The percentage of the BDBiH's population connected to the sewage system is only about 47%¹⁰, mainly in urban areas. The rest

¹⁰ Strategy of Environmental Protection Brcko district of Bosnia and Herzegovina 2022-2032

Table 9 – Key environmental challenges for the water supply and wastewater sector

Sector	Challenges
 <p>Water supply and wastewater</p>	<p>Water resources zones: Insufficient planning and protection of water supply zones could affect drinking water quality. By defining the sanitary zones around the main/central location of the “Plazulje” water source, expanding these zones, or adequately updating them, conditions could be established for the quality protection of the water intake and captured raw water.</p>
	<p>Lack of policies and technical documentation: The absence of Water Law as the overarching legislation for water management and accompanying by-laws could endanger water resources and their unsustainable use. In addition, it is necessary to define strategic measures and priorities with planning documents and study-technical documentation for water supply and wastewater infrastructure.</p>
	<p>Wastewater collection and treatment provision: A lack of a wastewater treatment system will require the construction of wastewater treatment plants. In addition, reconstruction of wastewater and storm sewers and constructing and expanding sewerage systems in the city zones and local communities are also needed.</p>
	<p>Water supply network: Leaks and unauthorised consumers have led to huge water losses and uncertainty in the water supply. The water supply network must be extended and improved to reduce non-revenue water.</p>

of the population discharges wastewater into septic tanks or directly into waterways. The wastewater collectors in the BDBiH are not entirely constructed in terms of capacity and concept, and neither is the wastewater treatment plant (WWTP). This means the constructed collectors gather wastewater and used water from the urban area. To transport this collected water, it is necessary to build transport pipelines to the location where the WWTP (Wastewater Treatment Plant) is planned. Considering the configuration characteristics of the drainage area from which the collection and transport of wastewater and used water are planned, as well as defining drainage facilities (locations of pumping stations), it is necessary to develop a technical concept for this system.

It is highly important to approach all listed issues systematically, develop strategic and planning documents and technical documentation, build the capacities of responsible institutions, and ensure sufficient funds for the implementation of the water projects identified.

Transport


The transport sector in BDBiH is characterised by an older, more polluting car fleet, a lack of dedicated public transit routes, and limited options for non-motorised users, including walking and cycling. The average age of the car fleet in the city is 18 years¹¹. Therefore, those cars require a higher degree of maintenance and, as such, produce more emissions and have adverse health impacts.

The lack of cycling paths is surprising due to the relatively flat topography of the city and the wide rights of way offered on several routes in and out of the city.

Public transport in BDBiH was assigned to a private company, and data related to public transport was mostly unavailable. Passenger transportation in BDBiH is carried out on 35 urban and suburban lines. Based on feedback from stakeholders, citizens are not satisfied with the public transport service, and pressure is being exerted for its improvement.

¹¹ Registracija motornih vozila (iddeea.gov.ba)

Table 10 – Key environmental challenges for the transport sector

Sector	Challenges
 Transport	Monitoring data: The lack of data on the transport sector in Brčko District is evident. For the analysis and planning of traffic and transportation systems, there is a lack of data that can be obtained through comprehensive research. Traffic data collection through city-wide systems will enable evidence-based planning, predicting, and evaluating traffic proposals, facilitating informed decision-making for urban development.
	Pollution from the ageing vehicle fleet: Use of older car, more polluting car fleets (highly polluted vehicles) are still in traffic and are not regulated by the policies or incentives. New public transport policy should establish a regulatory framework requiring operators to replace their existing diesel bus fleets with more fuel-efficient, low-emission vehicles.
	Public transport: Public city transport and non-motorised movements need to be adequately included in the project planning and implementation systems; thus, the regulatory framework currently needs to be developed.
	Non-motorised transport: Brčko lacks sufficiently developed infrastructure for cycling and walking. Poor safety conditions and road designs that focus on motorised transport contribute to an unfavourable environment for walking and cycling. Therefore, there is a need to recognise the value of non-motorised transport better as a sustainable way to develop transport infrastructure in the future.


Buildings

The building sector is divided into three categories: residential, public, and commercial. Its performance is directly reflected in the quantity of GHG emissions, electricity and heat consumption, and energy efficiency.

According to the data from SECAP for BDBiH, total CO₂ emissions for the buildings sector

were 312,082 t/year in 2018 and 322,844 t/year in 2019. The CO₂ emissions increased, mostly due to the increase in electricity and fossil fuel consumption, especially in the building sector. Green building promotion through standards and fiscal incentives does not exist in BDBiH, and investments in green infrastructure, currently neglected in the BDBiH, are necessary.

Table 11 – Key environmental challenges for the buildings sector

Sector	Challenges
 Buildings	Green buildings: District policies currently neglect investment in green buildings, and implementing by-laws that will regulate and subsidise the introduction of green buildings are lacking.
	Electricity consumption: Currently, there is no mid or long-term planning for supporting building renovation within the Government but rather ad-hoc year to year, depending on donor-supported projects and initiatives (and their co-financing). Household stoves were identified as the major contributor to poor air quality. Huge heating demand (low energy efficiency) and low income of some households are the underlying causes of excessive contribution to the pollution from household stoves. High electricity consumption and low energy efficiency in the building sector are a ubiquitous problem, but long-term solutions have yet to be carried out.
	Energy performance in buildings: The information system for energy management as an essential tool for overseeing and analysing energy and water consumption in all public buildings does not exist. In addition, the energy performance of the buildings could be empowered by the introduction of energy performance monitoring and energy audits that will point to specific activities required for each facility to achieve maximum energy savings and implement energy efficiency and renewable energy measures in residential buildings.

When it comes to electricity consumption, currently, there is no mid- or long-term planning for supporting building renovation within the Government but rather ad hoc year to year, depending on donor-supported projects and initiatives (and their co-financing). Household stoves were identified as the major contributor to poor air quality.

Huge heating demand (low energy efficiency) and low incomes of some households are the underlying causes of household stoves' excessive contribution to pollution. Although the strategic documents contain a wide range of measures, the implementation of which would undoubtedly improve the urban resilience of BDBiH in the buildings sector, there is an obvious lack of green infrastructure measures and solutions, which have proven to be an excellent way to improve energy efficiency and reduce climate change impact.

Energy

Electricity supply and distribution in BDBiH is under the jurisdiction of JP „Komunalno Brčko“ - Division Elektro distribucija, which is public company owned by District Brčko. Regarding the production of electricity, the BDBiH does not have any source of electricity, i.e. BDBiH is the exclusive consumer of energy and electricity energy is mainly supplied from the power system of the Republika Srpska. BDBiH allocates significant funds for construction through the BDBiH budget of electric power infrastructure and through the Department for Communal Affairs builds and hands over to management of JP „Komunalno Brčko.”¹².

In the last year, some strategic documents and laws were adopted, such as SECAP, the Law on electricity, the Law on energy efficiency, and the Law on renewable energy sources, which aim to regulate whole processes related to energy supply and consumption in BDBiH. However, no measures have been implemented so far.

Also, renewable energy sources have significant potential for developing an energy supply system for BDBiH, including electricity, heating, and cooling (independent district systems).

Table 12 – Key environmental challenges for the energy sector

Sector	Challenge
 Energy	Lack of implementing by-laws: According to the so-called “Energy package”, most of the essential issues in the energy management process are predicted but require quick adoption of secondary legislation. The prerequisite for any planning in the energy sector is the collection of data concerning the production and consumption of electricity and thermal energy in the territory of BDBiH. Also, implementing by-laws is necessary for the full applicability of the provisions of the entire energy law package. Thus, drafting and adopting those regulations should start as soon as possible.
	District Heating System: Currently, space heating in BDBiH is carried out through many small individual heating devices, while local central heating systems are present in very few residential and most public buildings. Fossil fuels and electricity are used for heating in most public buildings; the same is true in the housing sector.


Solid Waste

BDBiH currently faces the problem of adequate waste management. The city's landfill is 2 kilometres from the city centre, 300 meters from the nearest residential area, and about 50 meters from the Sava River.

The landfill is unsanitary and needs to be remediated. Circular economy principles have yet to be introduced into the strategic waste management framework, and management systems for different waste categories still need to be established.

¹² Development Strategy of Brčko District of BiH

Table 13 – Key environmental challenges for the solid waste


Sector	Challenge
 Solid waste	<p>Inadequate waste management: In 2004, responsible Brčko institutions started harmonising the legal framework with EU waste management requirements, but this has yet to be achieved. The household waste collection system needs to be improved; same type of containers is used for both commercial and industrial producers, and a separation system needs to be established at the source of origin.</p>
	<p>Landfill is not sanitary: The current landfill needs to be remediated. Its remaining life is a matter of concern, and currently, all municipal waste is collected and transported to the regional landfill Zvornik.</p>

Land use

Unfortunately, the situation in this area is not satisfactory. The most important strategic spatial planning documents (spatial and urban plan) are outdated (adopted in 2007), and new documents based on modern principles and methodology are urgently needed.

Also, the implementation of strategic spatial planning documents is very low and is significantly the result of oversized planning propositions based on unrealistic demographic and economic projections. The low population density and the dispersion of buildings in the entire urban area produce higher costs of equipping with municipal infrastructure and its subsequent maintenance.

**Table 14 – Key environmental challenges for the land use**

Sector	Challenge
 Land use	<p>Strategic documents outdated: Spatial planning documents generally represent the primary instrument of policy implementation in the field of land use in the Brčko District of BiH. Unfortunately, the situation in this area is not satisfactory. The most important strategic spatial planning documents (spatial and urban plans) are outdated (adopted in 2007), and new documents based on modern principles and methodology are urgently needed.</p>
	<p>Monitoring data: Data on population density, movements, spatial and urban planning, and all urban sectors are not integrated and digitised. Collecting and integrating all data and ensuring easy reading and analysis is necessary for further planning development. This is a prerequisite for the future development of spatial and urban plans.</p>
	<p>Lack of urban green areas: Brčko District, despite having green areas outside the city centre, still needs green areas in the form of parks for daily use. The lack of park planning within residential areas was identified as a challenge for the District. Residential and commercial construction, as well as traffic infrastructure, should be planned together with green parks. Therefore, these priorities do not have to be mutually exclusive, and integrating green space standards into urban development and regeneration projects should be understood as a possibility.</p>

In addition, the average distance travelled by all commuters to work and the time spent commuting increase, which affects the transport system, primarily the public transport system. A prerequisite for improving the land use sector is developing an appropriate strategic and legislative policy that will integrate all sectors, consider improving environmental assets, and reduce the pressure from urban development.

2.5 Cross-cutting themes

The GCAP pursues a comprehensive assessment of a city's environmental and urban development challenges, focusing on seven urban sectors. It also envisages, considering the BDBiH's cross-cutting elements of resilience and vulnerability to natural disasters, gender and economic inclusion, and smart (digital) maturity.

Risk and Vulnerability of the District

After the floods in 2014, the Government's attention was mainly focused on repairing the damage. Significant progress was made in implementing the *Action plan for flood protection and river management in BiH*. Works included reconstruction of the Sava River defensive embankment – II, III, IV and V phase of reconstruction (national component) and regulation of the Brka River – I phase (regional component). The Department of Agriculture, Forestry and Water Management of the BDBiH participated in the activities necessary to create flood hazard maps and flood risk maps for BiH (including BD), a prominent measure of the previously mentioned Action plan.

However, the relevant institutions of the BD BiH invest only in riverbed regulation works and short sections of embankments for flood protection in priority areas. At the same time, non-structural measures identified by strategic documents (such as raising public awareness, capacity-building for disaster risk management, etc.) are neglected or rely

on external assistance from international institutions.

Although the strategic documents contain a wide range of measures, the implementation of which would certainly improve the urban resilience of the BD BiH and reduce risk from identified hazards, there is an obvious lack of nature-based solutions which have proven to be an excellent way to fight climate change impacts in cities around the world.

Gender and Economic Inclusion

Gender assessment has been conducted based on existing reports, available data in the BDBiH administration, and interviews with key informants and women living in various settlements in BDBiH. The challenge in conducting gender assessments and planning relevant actions lies in the lack of data, specifically sex-disaggregated data. This gap is particularly significant in areas such as entrepreneurship, agricultural production, knowledge of climate change, green skills, and interest. Therefore, there is a need to develop and utilise databases further to inform the creation of specific actions and measures, primarily concerning employment opportunities in green jobs and sustainable solutions in existing businesses and housing.

The investment and improvements in public transportation are crucial for enhancing overall quality of life and economic opportunities, as well as access to various services, particularly for rural and older women. While disparities in the labour market are significant, especially at the higher education level, informal skills and opportunities for green jobs for women need to be further explored with appropriate measures. This is also pertinent to women in agricultural production and women-led businesses. Many young women enrolled in relevant universities could be employed in green jobs and climate-related sectors, so affirmative measures at the level of the BDBiH could be applied.

There are women's organisations and active individuals who can contribute to the development of campaigns and engagement

of local communities, playing an essential role in furthering the implementation of specific actions under the GCAP.

The economy of the BDBiH faces a series of short- and long-term challenges. Short-term challenges are related to the revitalisation of all sorts of businesses in all sectors due to the negative effects of the pandemic-induced crisis. These revitalisation measures should be adapted to the features of each target group of entrepreneurs and firms. Revitalisation from adverse effects should be accompanied by support for introducing preventive business adaptation measures to mitigate the adverse impact of similar future crises.

Smart maturity

The Government of BDBiH has not developed the strategic framework or dedicated institution to lead specific-oriented to Smart Integration (SI) and Digital Transformation (DT) operations. From that fact, no financial and other resources are allocated, needed to particularly develop measures and launch projects related to digital transformation.

However, existing district strategies recognize digital transformation actions within specific environmental and urban sectors as important segment for alignment with international standards. However, it is notable that implementation of these strategies is hindered by a lack of capacity and financial allocation, mainly at the District level. A notable gap in digital skills exists and coordination between relevant departments in the Government, including other public institutions are missing too.

Challenges for smart development persist, and lack of infrastructure and resources to support further digitalization in all sectors are notable:

- Transport: Information on public transport is not available, and smart counting systems for vehicles does not exist as well
- Water sector: water quality monitoring is entirely manual without any automatization and sensors; SCADA system is developed and deployed at the high-density level and a good level of automatization but can't be considered as the smart system because there is no data collection, storage, and analysis nor any autonomous and automatized reaction to trigger values and measurements on various parameters in the water system; there is also notable lack of GIS system that will support cadastre of underground installations
- Solid waste: notable lack of digitalized system for monitoring and managing solid waste
- Energy: BDBiH put lot of efforts and invest in the remote monitoring and management of the medium voltage electrical grid. The main distribution centre for remote monitoring and control is already established, and has strong potential to deliver smart services
- Buildings: Lack of ICT-based system for monitoring energy efficiency and heating energy consumption
- Land-use: main challenge is unique and overall GIS which will include accurate maps of all ecological and urban sectors

The BDBiH GCAP does not foresee a strategic objective or a concrete smart action that will define all the needs of the digital transformation of a smart city. Instead, specific cross-cutting smart actions are integrated into the proposed GCAP actions of urban sectors. Integrated smart actions will contribute to accelerate the digital transformation and support the district in its goal to develop into a digitally connected, sustainable and efficient urban environment.

Green City Vision, Strategic Objectives and Priorities

3.1 Green City Vision

The vision statement for Brčko took into account the identified challenges of the green city and the overall aspiration of the city regarding its future development. It was developed based on the Technical Assessment Report, the Policy and Urban Framework Report, existing strategic and planning documents and policies, an online survey, and the findings of stakeholders in BDBiH (more details about vision creation can be seen in Section 1).

The strategic goals are set so that their achievement does not depend solely on the actions provided for in the GCAP but can be upgraded with new or revised actions after five years of implementation of the GCAP.

A major challenge in the **water sector** is the need for wastewater treatment. For the construction of such a facility, all activities related to analyses and feasibility studies are planned for an initial period of five years, so the concrete investment for the construction can be planned only from 2029.

”Brčko District - a green urban community on the water (Sava River) with a healthy environment for all its inhabitants and future generations, with sustainable planning and efficient investment in green infrastructure. Brčko will become an innovative and sustainable community of preserved water resources, clean and healthy air and preserved soil, resistant to climate change and weather disasters.”

3.2 Green City Strategic objectives

Under the umbrella of BDBiH’s green city vision, **strategic objectives** have been formulated that reflect inputs received from stakeholder engagement activities. These strategic objectives are presented as environmental themes/asset-specific long-term goals for green city development, which guide the identification of specific priorities and relevant green city measures.

The impact on **air quality** is coming from the transport and energy sectors. The biggest challenge is the lack of an independent heating system, for which a series of planning measures and technical documentation preparations are necessary. The construction of the heating system is envisaged only after 2030 since its planning should be approached in a planned manner through the preparation of feasibility studies, which will be performed during the GCAP implementation.

Actions foreseen within the waste management and land use sector are short-term. Establishing GIS for BDBiH is only the first step in its application because this system requires constant updating and filling with new data. Therefore, further efforts to operationalise GIS will need longer period than five years.






The impact of climate change and the reduction of emissions is recognised in the buildings and transport sectors, and the measures planned by the GCAP are achievable until 2030. Given that the measures themselves are just establishing systems that need to be further implemented, achieving the goal is foreseen for a more extended

period after the implementation of the GCAP. The introduction of energy management in buildings and the principle of sustainable urban mobility is only the first step in implementing those measures.

The foundation of planning District development and the sustainable use of land lies in the spatial and urban plans. In addition to the envisaged construction of green areas and parks in the urban part of the District, these strategic plans will ensure other development measures after 2030.

The following table shows a summary of all strategic goals and indicators of impact.

Table 15 – Strategic objectives and impact indicators

Prioritised Environmental Topic	Strategic objective (SO)	Coverage of Strategic Objective	Indicator	Baseline value	Targeted Value	Short-term and mid-term actions	Long-term actions
 Water resources	1. Ensure water resources sustainability through planning and construction of water supply and wastewater infrastructure, supported by an operationally viable tariff system	Strategic objective covers thematic areas such as drinking water, wastewater, use/consumption of water, water ecosystem and management of water areas	Biochemical Oxygen Demand BOD in rivers	2.9 mg/L	<2 mg/L	2025-2029	2030-2040
			Ammonium NH ₄ concentration	520 µg/L	<200 µg/L		
 Air Quality	2. To improve air quality by applying energy resource-efficient technologies with reduced environmental impacts, introduction of low carbon emissions motorized and non-motorized transport modes and incentives for “green” building investments	Strategic objective covers thematic areas such as energy supply system and public transport	Average daily concentration of SO ₂	65 µg/m ³	<50 µg/m ³	2025-2030	2031-2040
			Average daily concentration of PM ₁₀	28 µg/m ³	<20 µg/m ³		
 Soil	3. Improve soil quality throughout the District by reducing solid waste, implementing land quality monitoring and strengthen nature protection	Strategic objective covers thematic areas such as system for management of quality of land and waste management system	Number of contaminated sites	No data	<10	2025-2028	
			Measurement and concentration of pollutants	No data	Mg/kg < than determined by international standards		
			Abundance of all species	No data	< 2% decline		
			Damage from natural disaster	7%	<1%		
 Climate change	4. Reduce Greenhouse gas emissions by applying low-emission transport policies, efficient energy management and the introduction of green public procurement criteria	Strategic objective covers thematic areas such as energy efficiency in public and commercial buildings and transport system and its infrastructure	Annual CO ₂ emissions per unit of GDP	1.76 Tonne/m. USD of GDP, Or	< 0.35 Tonne/m. USD of GDP	2025-2028	
				1.72 kgCO ₂ ekv/ 1USD BDP			
 Green spaces	5. Improve the land use sector through appropriate strategic and legislative policies that will integrate all sectors considering the improvement of environmental assets and the reduction of urban development pressure	Strategic objective covers thematic areas such as planning of land use at local level and green infrastructure	Share of population living within 300m of open green areas	No data	>50%	2025-2028	2028-2040

3.3 Green City Priorities

After the Green City Vision and Objectives, priorities were determined as key fields and directions of actions/measures for achieving the strategic objective. They were formulated as per the pressure topics, achievable within the period of validity of the GCAP document, and mutually harmonised according to the objectively verifiable indicators. Each priority is marked with a hierarchically lower ordinal number of the relevant strategic objective.

Strategic objective 1. Ensure water resources sustainability through planning and construction of water supply and wastewater infrastructure, supported by an operationally viable tariff system

Priority 1.1 Improve regulatory policy in the field of water management

This will be achieved by drafting and adopting key strategic and planning documents that ensure water resource management for a more extended period. The master plan aims to initiate or continue the activity focused on reserving and safeguarding new springs, creating conditions for finding new water reserves, more reliable insight into the water supply infrastructure and strategic planning of new actions in water supply, drainage, and water treatment. Emphasis will also be placed on the preparation of documentation related to sanitary protection zones, considering that drinking water quality needs to be protected at the water sources of BDBiH. In addition, new law and accompanying by-laws need to be developed, considering the requirements of EU water legislation to ensure more efficient water management and improvement of water services.

Priority 1.2 Extend and modernise water supply system

This will be achieved by improving drinking water treatment and the water supply network. Modernising the drinking water treatment process will increase the capacity

of produced water, ensuring reliability in both quantity and quality. In addition, through the reconstruction and extension of the water supply infrastructure, losses in the water supply system during the delivery of water to end consumers will be reduced, the number of breakdowns in the water supply network will be reduced, and the reliability of the water supply will be increased. Currently, non-revenue water is 53%.

Priority 1.3 Establish wastewater treatment system

This will be achieved by preparing technical and investment documentation related to wastewater, including municipal and industrial, further improving the sewage network and constructing a wastewater treatment plant. By implementing measures included in this priority, conditions for quality and sustainable management of wastewater and used water collection and treatment in the BDBiH will be created. The scope includes the collection and transportation of wastewater to the future WWTP, including the urban city zone of Brčko, Phase 1. It also includes the settlements of Maoča, Skakava Donja, Bijela, Brka, and Gornji Rahić, which is Phase 2. In Phase 1, the WWTP capacity would be around 45,000 PE; in the ultimate phase, Phase 2, it would be around 60,000 PE. The construction of WWTP Phase 2 can commence after the completion of Phase 1 and the construction of the sewerage network and household connections in the settlements covered by Phase 2. In general, this will positively impact people's health and quality of life in the BDBiH.

Priority 1.4 Empower water management monitoring and planning-

This will be achieved through data collection and analysis using computer models for water and wastewater linked with database systems in GIS. Information obtained through this measure will help develop action plans for investments in new water supply and sewerage networks. This measure will provide the missing data that can contribute to improving customer relations and revenue planning while simultaneously providing the basis for developing effective action plans

with cost estimates. A proper understanding of the functioning of water supply and sewerage networks can only be achieved with appropriate collected data describing the objects, their condition, and how they operate.

Strategic objective 2. To improve air quality by applying energy resource-efficient technologies with reduced environmental impacts, introduction of low carbon emissions transport policies

Priority 2.1 Strengthen energy supply system

Establishing the energy data collection and reporting system will help better plan and prioritise activities in the energy production and consumption sectors. In addition, this will be achieved by the adoption of the energy by-laws and designation of the implementation body, which will ensure further projects and investments in the energy sector. However, key efforts need to be put into the determination and construction of the district heating system mainly because the realisation of this measure will improve air quality in BDBiH, and a large quantity of the spot pollution sources will be eliminated. The construction of the district heating plant is preceded by two feasibility studies, which will determine conditions, location, equipment, power and other most suitable and efficient characteristics of the plant. The rough estimation of the investment for district heating plant construction is 95,000,000 EUR, including the heating network. The estimated construction time of the mentioned cogeneration plant is four years, and in that time, it is necessary to develop the heating system and the biomass plantations needed as a source of energy.

Priority 2.2 Introduce low-emission transport

This will be achieved by enhancing traffic data collection through city-wide systems, implementing a multimodal transport demand model, and implementing low-emission transport policies, which will

significantly reduce carbon emissions, mitigate climate change, improve air quality, promote sustainable transportation, and conserve the environment. In addition, public transport - bus transportation reform will be implemented, and enhancing public transit will result in reduced emissions, increased efficiency, improved accessibility, fostering economic development, and enhancing citizens' quality of life. The primary investment for this priority lies in replacing the existing bus fleet and introducing bus operation reform with a value of 15,000,000 EUR. In parallel, the Sustainable Urban Mobility Planning concept will be applied as a comprehensive approach to developing transportation systems in urban areas.

Strategic objective 3. Improve soil quality throughout the District by reducing solid waste and implementing land quality monitoring

Priority 3.1 Build a system for improving the quality of land

This will be achieved by establishing soil quality monitoring, including purchasing monitoring stations for heavy metals and organic pollutants measurement, and developing a GIS database of contaminated sites in the BDBiH. Through the identification of contaminated sites, conditions will be created for their future remediation, which will enable new zones for brownfield development.

Priority 3.2 Strengthen waste management system

This will be achieved through a system of recording and reporting on waste and the best solutions for waste processing from the District area to achieve self-sufficiency, considering waste prevention, reuse, recycling, and treatment. An efficient recording and reporting system will ensure reliable data, improved strategic planning, and sustainable future investments in the waste management system sector. In addition, the study will

envisage the necessary infrastructure for waste collection, processing, treatment, and disposal of municipal solid waste and other selected waste streams.

Strategic objective 4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorised and non-motorised modes of transport

Priority 4.1 Integrate energy efficiency standards in buildings

This will be achieved through several policy and infrastructure measures. First, the establishment of clear criteria for nearly zero-energy buildings (nZEB) through primary energy indicators (kWh/m²) and the minimum share of renewable energy sources use (%) will significantly contribute to alignment with the EU legislation and achieving goals for decarbonisation in the building sector. After that, introducing energy management in buildings will ensure the monitoring and management of energy consumption with the potential to generate savings. This needs to be followed by the preparation and adoption of a by-law on Energy Audit, which will streamline energy assessment processes, providing standardized criteria and targeted recommendations to improve energy efficiency in the BDBiH, including other secondary legislation in building construction, which will contribute to the energy efficiency sector. Last but not least is an investment in solar collectors for electricity production and the preparation of hot water in the system for savings in energy use. Main investments are foreseen in the renovation of buildings (public, private and commercial) by implementing energy efficiency measures: thermal insulation of the external walls and roofs, replacement of the existing joinery and the installation/replacement of an energy-efficient heating/cooling systems, e.g., centralised/standalone heat pumps, solar systems, etc. A rough estimation of the building renovation investment is 266,000,000

EUR, of which 13,000,000 EUR is allocated for public buildings.

Priority 4.2 Build a sustainable transport system and its infrastructure

This will be achieved by introducing the concept of Sustainable Urban Mobility in BDBiH, improving cycling infrastructure, promoting non-motorised ways of transport and prioritising pedestrian infrastructure. The Sustainable Urban Mobility Plan (SUMP) enables better planning and integration of sustainable transportation options in urban areas, reducing CO₂ emissions, promoting public transport, encouraging sustainable mobility, and enhancing citizens' quality of life. Contribution to this will be achieved by implementing bicycle paths for the entire city and a network of public bicycle parking throughout the city, Enhancing pedestrian infrastructure, and expanding city centre zones.

Strategic objective 5. Improve the land use sector through appropriate strategic and legislative policies that will integrate all sectors considering the improvement of environmental assets and the reduction of urban development pressure

Priority 5.1 Enable sustainable strategic planning

This will be achieved through the development of crucial strategic plans for the BDBiH. A new spatial and urban plan will ensure more balanced spatial development of the entire territory of BDBiH. This plan will provide conditions for sustainable use of natural resources, construction of capital infrastructure, establishment of business zones, improvement of public services, and environmental protection. In addition, the capacities of administration and strengthening mechanisms for adopting strategic documents will be increased.

Priority 5.2 Strengthen green infrastructure

This will be achieved by planning and constructing new green spaces. New public parks will improve the quality of life in the

urban area of Brčko, primarily by reducing the distance to public green areas for the population in the peripheral part of the narrower urban area.

Table 16 – Priorities and impact indicators

Strategic objectives	Priorities	Indicator	Baseline value	Targeted value
1. Ensure water resources sustainability through planning and construction of water supply and wastewater infrastructure, supported by an operationally viable tariff system	1.1 Improvement of regulatory policy in the field of water management	Status of water regulatory policy	Lack of plans, studies and laws in water sector	All regulatory policy documents are in place
	1.2 Extend and modernize water supply system	Non-revenue water	53%	<30%
	1.3 Establish wastewater treatment system	Wastewater treated as per national standards	<60% of population	>60% of population
	1.4 Empower water management	Consumption per unit of city GDP	<0.022 L/day/USD	>0.022 L/day/USD
2. Improve air quality by applying energy resource-efficient technologies with reduced environmental impacts, introduction of low carbon emissions transport policies	2.1 Establish energy supply system	Share of population with access to quality heating	>90%	>90%
	2.2 Introduce low-emission transport	Average age and type of car fleet	>15 years	< 9 years
3. Improve soil quality throughout the District by reducing solid waste and implementing land quality monitoring	3.1 Build a system for improving the quality of land	Status of soil monitoring	Absence of soil monitoring	>50% data collected and monitoring ensured
	3.2 Strengthen waste management system	Municipal solid waste treated in sorting, processing and treatment plants	24%	>75%
4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorized and non-motorized modes of transport	4.1 Integrate energy efficiency standards in buildings	Energy efficiency in residential buildings	<21 kWh/m ²	44 kWh/m ²
	4.2 Build a sustainable transport system and its infrastructure	Modal share in transport	Private transport 68%	Private transport <30%
5. Improve the land use sector through appropriate strategic and legislative policies that will integrate all sectors considering the improvement of environmental assets and the reduction of urban development pressure	5.1 Improve land planning documentation	Land density	>794 residents/km ²	<794 residents/km ²
	5.2 Improve of green infrastructure	Open green areas	<19 m ² /capita	>22 m ² /capita

Green City Actions







4.1 Actions Summary

The GCAP identifies 43 priority actions across six key sectors. While strategic objectives are about environmental topics, priorities and actions are developed in relation to sectors covering:

- Water
- Transport
- Energy
- Buildings
- Solid waste
- Land use


Actions within this GCAP are broadly categorised into investment actions, of which 17 and 26 policy actions across all sectors. The actions also have a secondary classification where under "policy" included modelling and improving information base; development of policies, plans, legislation and regulations; awareness raising, training and capacity building; and the "investment" actions, which covered capital investment improving existing infrastructure and investments in construction a new one.

The total costs of the GCAP actions per sector are presented below:



Sector	Estimated Costs		
	Cost (consultancy / development) EUR/KM	CapEx EUR/KM	OpEx EUR/KM
 Water supply and wastewater resources	1,500,000/ 2,940,000	44,750,000/ 87,710,000	669,000/ 1,311,240
 Transport	1,085,000/ 2,126,600	17,100,000/ 33,516,000	477,000/ 934,920
 Buildings	322,500/ 632,100	268,060,000/ 525,397,600	163,000/ 319,480
 Energy	620,000/ 1,215,200	95,000,000/ 186,200,000	19,250,000/ 37,730,000
 Solid waste	335,000/ 656,600	2,000,000/ 3,938,000	80,000/ 156,800
 Land use	532,000/ 1,042,720	1,500,000/ 2,940,000	37,500/ 73,500
TOTAL	4,394,500/ 8,613,220	428,410,000/ 839,683,600	20,639,000/ 40,452,440


The detailed action proformas (action cards) are presented in the subsections below, including the value of local currency. The exchange rate used to calculate the amount in convertible marks is 1euro=1.96KM



Table 17 – Summary of GCAP actions


Sector	Action No.	Action Title	Action classification	Estimated Costs [EUR]			Cross-cutting themes (Directly/Partially/No)			Duration	Estimated carbon emission reduction (Annual tCO ₂ e) - Environmental benefit ¹³
				Cost (consultancy / development)	CapEx	OpEx	Climate action	Gender and Social	Smart component		
 Water supply and waste-waterresources	1.1.1	Preparation of a master plan for the area of water supply and wastewater drainage	Policy	600,000	/	/	Partially	Partially	Partially	2025-2027	n/a
	1.1.2	Establishment of sanitary protection zones	Investment	/	100,000	9,000	Partially	Partially	/	2025-2027	n/a
	1.1.3	Water management legal framework development	Policy	150,000	/	/	Partially	Partially	/	2025-2028	n/a
	1.2.1	Improvement of the drinking water treatment process	Investment		500,000	15,000	Partially	Partially	Partially	2025-2027	TBD
	1.2.2	Reconstruction and extension of the water supply network and the reduction of non-revenue water	Investment		10,000,000	200,000	Partially	Partially	Partially	2025-2030	61 tCO ₂ /y
	1.3.1	Feasibility Study about current and future wastewater treatment	Policy	750,000	/	/	Partially	Partially	Partially	2025-2028	n/a
	1.3.2	Construction of the sewage network: expansion, rehabilitation, and construction of new sections	Investment		10,000,000	200,000	Partially	Partially	Partially	2025-2029	n/a
	1.3.3	Construction of a wastewater treatment plant - WWTP	Investment		24,000,000	225,000	Partially	Partially	Partially	2029-2032	n/a
	1.4.1	Modernisation and digitalisation in water management	Investment		150,000	20,000	Partially	Partially	Directly	2025-2027	n/a

¹³ Environmental benefits are presented in the action cards.

Sector	Action No.	Action Title	Action classification	Estimated Costs [EUR]			Cross-cutting themes (Directly/Partially/No)			Duration	Estimated carbon emission reduction (Annual tCO ₂ e) - Environmental benefit ¹³
				Cost (consultancy / development)	CapEx	OpEx	Climate action	Gender and Social	Smart component		
 Transport	2.2.1	Development of a data collection program for the entire city and a multimodal transport model	Policy	800,000	/	/	Directly	Partially	Directly	2025-2028	1,200 tCO ₂ /y
	2.2.2	Develop low-emission transport policies	Policy	100,000	/	/	Partially	Partially	/	2025-2028	n/a
	2.2.3	Prepare a feasibility study of the rapid (fast) public transport system corridor	Policy	150,000	/	/	Partially	Partially	Partially	2028-2030	600 tCO ₂ /y
	2.2.4	Implementation of bus operation reform	Investment		15,000,000	300,000	Partially	Partially	Directly	2025-2032	750 tCO ₂ /y
	4.2.1	Sustainable Urban Mobility Plan (SUMP) for BDBiH	Investment		100,000	17,000	Partially	Partially	Partially	2025-2027	4,000 tCO ₂ /y
	4.2.2	Promotional campaigns for car sharing, walking, and cycling	Policy	35,000	/	/	Partially	Partially	Partially	2025-2028	900 tCO ₂ /y
	4.2.3	Expand and improve cycling infrastructure	Investment		1,000,000	110,000	Partially	Partially	/	2025-2028	300 tCO ₂ /y
	4.2.4	Implementation of the pedestrian priority infrastructure	Investment		1,000,000	50,000	Partially	Partially	/	2025-2030	120 tCO ₂ /y
 Buildings	4.1.1	Definition of nearly zero energy buildings (nZEB) through primary energy indicators (kWh/m ²) and the minimum share of RES use (%)	Policy	17,500	/	/	Directly	Partially	Partially	2025-2026	n/a
	4.1.2	Introduction of energy management in public buildings	Policy	150,000	/	/	Directly	Partially	Partially	2025-2027	n/a
	4.1.3	Rulebook on Energy Audits	Policy	10,000	/	/	Partially	Partially	Partially	2025-2026	n/a
	4.1.4	Drafting of other secondary legislation in the field of building construction	Policy	50,000	/	/	Partially	/	Partially	2025-2027	n/a
	4.1.5	Study on Renewable Energy Potential in BDBiH Buildings	Policy	70,000	/	/	Directly	Partially	/	2025-2026	n/a

Sector	Action No.	Action Title	Action classification	Estimated Costs [EUR]			Cross-cutting themes (Directly/Partially/No)			Duration	Estimated carbon emission reduction (Annual tCO ₂ e) - Environmental benefit ¹³
				Cost (consultancy / development)	CapEx	OpEx	Climate action	Gender and Social	Smart component		
 Buildings	4.1.6	Installation of solar systems (PV and for the preparation of domestic hot water) in public institutions	Investment		2,000,000	10,000	Directly	/	Partially	2025-2028	32 tCO ₂ /y
	4.1.7	Installation of thermostatic sets and their smart metering in all buildings owned by Brcko District	Investment		60,000	3,000	Directly	/	Partially	2025-2028	75 tCO ₂ /y
	4.1.8	Establishment of a legal framework for efficient energy management and the introduction of green public procurement criteria for the purchase of electrical appliances for buildings	Policy	25,000	/	/	Partially	/	/	2025-2027	n/a
	4.1.9	Improvement of energy efficiency in buildings owned by Brcko District	Investment		13,000,000	50,000	Directly	Partially	Directly	2026-2030	980.12 tCO ₂
	4.1.10	Improvement of energy efficiency in residential buildings and family houses	Investment		182,000,000	50,000	Directly	Partially	Directly	2026-2030	16,216 tCO ₂
	4.1.11	Improvement of energy efficiency in commercial and service buildings	Investment		71,000,000	50,000	Directly	Partially	Directly	2026-2030	9,288 tCO ₂

Sector	Action No.	Action Title	Action classification	Estimated Costs [EUR]			Cross-cutting themes (Directly/Partially/No)			Duration	Estimated carbon emission reduction (Annual tCO ₂ e) - Environmental benefit ¹³
				Cost (consultancy / development)	CapEx	OpEx	Climate action	Gender and Social	Smart component		
 Energy	2.1.1	Establish energy data collection	Policy	70,000	/	/	Partially	Partially	Partially	2025-2026	n/a
	2.1.2	Development of by-laws related to the energy sector	Policy	100,000	/	/	Partially	Partially	/	2025-2027	n/a
	2.1.3	Development of a feasibility study for the construction of a cogeneration plant in BDBiH	Policy	250,000	/	/	Directly	Partially	/	2025-2027	n/a
	2.1.4	Development of a feasibility study for the construction of a district heating system for the BDBiH	Policy	200,000	/	/	Directly	Partially	Directly	2027-2029	n/a
	2.1.5	Construction of a cogeneration plant	Investment		95,000,000	19,250,000	Directly	Partially	Partially	2029-2033	31,720 tCO ₂ /y
 Solid waste	3.2.1	Improvement of the system of records and reporting on waste	Policy	55,000	/	/	Partially	Partially	Partially	2025-2027	n/a
	3.2.2	Study on possibilities of waste prevention, treatment, and recycling	Investment	280,000	/	/	Partially	Partially	Partially	2025-2026	n/a
	3.2.3	Collection infrastructure for mixed (residual) and recyclable waste	Investment		2,000,000	80,000	Partially	Partially	No	2025-2027	n/a

Sector	Action No.	Action Title	Action classification	Estimated Costs [EUR]			Cross-cutting themes (Directly/Partially/No)			Duration	Estimated carbon emission reduction (Annual tCO ₂ e) - Environmental benefit ¹⁵
				Cost (consultancy / development)	CapEx	OpEx	Climate action	Gender and Social	Smart component		
 Land use	5.1.1	Completion of the Spatial Plan of the BDBiH	Policy	75,000	/	/	Partially	Partially	Partially	2025-2026	n/a
	5.1.2	Drafting and adoption of the new Urban Plan of the town of Brčko	Policy	200,000	/	/	Partially	Partially	Directly	2025-2027	n/a
	5.1.3	Strengthening the mechanism for adopting detailed spatial planning documents	Policy	15,000	/	/	Partially	Partially	Partially	2025-2026	n/a
	5.1.4	Preparation of the Study of Protected Nature Areas in BDBiH	Policy	50,000	/	/	Directly	Partially	Partially	2025-2026	n/a
	5.2.1	Establishment of new public parks and green infrastructure in the narrower urban area of Brčko	Investment		1,500,000	37,500	Partially	Partially	/	2026-2029	100 tCO ₂ /y
	3.1.1	Establishment of soil quality monitoring in the BDBiH	Policy	22,000	/	/	Partially	/	Partially	2025-2026	n/a
	3.1.2	Development of a GIS database of contaminated sites in the BDBiH	Policy	170,000	/	/	Partially	Partially	Directly	2025-2026	n/a
		TOTAL		4,394,500	428,410,000	20,676,500					59,731 tCO₂/y


4.2 Water Actions

Nine actions have been shortlisted in the water sector. Three actions are in the policy category since they relate to study and planning documentation, a prerequisite for further investments in the water sector. The remaining six actions are investments in the water supply system and wastewater

infrastructure, with an estimated total value of 44,750,000 EUR.

The water sector in GCAP also included actions whose implementation is planned even after five years, because their implementation (Construction of WWTP) is in the initial phase and depends on other actions foreseen in this plan.

Table 18 – Timeline for water sector actions

Sector	Action title	Duration						
		2025	2026	2027	2028	2029	2030	2031-2040
 Water supply and wastewater resources	1.1.1 Preparation of a master plan for the area of water supply and wastewater drainage							
	1.1.2 Establishment of sanitary protection zones							
	1.1.3 Water management legal framework development							
	1.2.1 Improvement of drinking water treatment process							
	1.2.2 Reconstruction and extension of the water supply network and the reduction of non-revenue water							
	1.3.1 Feasibility study about current and future wastewater treatment							
	1.3.2 Construction of the sewage network: expansion, rehabilitation, and construction of new sections							
	1.3.3 Construction of a wastewater treatment plant – WWTP							Continuation of construction
	1.4.1 Modernization and digitalization in water management							

Action: 1.1.1 – Preparation of a master plan for the area of water supply and wastewater drainage	Type	Policy
Link with the strategic goal	1. Ensure water resources sustainability through planning and construction of water supply and wastewater infrastructure, supported by an operationally viable tariff system	Priority 1.1 Improve regulatory policy in the field of water
Linkage to Existing Policies/Plans	Development Strategy of BDBiH 2021–2027. Environmental Protection Strategy of the BDBiH for 2022–2032.	
Strategic projects	/	
Description	<p>The goal of creating a master plan is to initiate or continue the activity focused on reserving and safeguarding new springs. Additionally, it aims to define inputs, descriptions, and ownership of communal infrastructure, and to thoroughly enhance the specific action plan for ongoing planning and construction of facilities for water supply and water canalization within the territory of BDBiH.</p> <p>Considering the lack of strategic planning and technical documentation, addressing vital issues in water supply and wastewater management requires urgent action by developing missing documents. This would accelerate the possibility of formulating technical solutions and defining the financial framework for implementation. Reviewing the existing documentation and utilising it appropriately for the next development phase is necessary.</p> <p>Priorities have been identified as follows:</p> <ul style="list-style-type: none"> - analysis of the quality and quantity of groundwater reserves at potential source locations (Majevica area) - establishment of a cadastre of municipal infrastructure (GIS) with positional characteristics of built objects - development of an Action Plan for the construction of water facilities and municipal infrastructure objects <p>By analysing the underground water reserves, data on the quantities and quality of resources that need to be protected for the next planning period, a minimum of 50 years, will be obtained and implemented through procedures for protecting and reserving space.</p> <p>By continuing the already initiated activities of creating a cadastre of communal infrastructure, the scope will be expanded, user involvement will be increased, and the identification and exchange of data on communal infrastructure in BDBiH will be significantly improved.</p> <p>Through the amendment of existing plans for the construction of water supply and sewage facilities, priorities and financing methods will be defined for locations and parts of settlements in the BDBiH according to the degree of priority and criteria set by the Government of the BDBiH.</p>	
Implementation duration	24 months, starting from 2025	

Implementation process and timeline	Steps (partly in parallel)		Duration	
	Analysis of the quality and quantity of groundwater reserves at potential source locations (Majevica area) <ul style="list-style-type: none"> • Prepare Terms of Reference • Select the consultant • Desk (hydrogeological studies and detailed analyses) and field analysis • Preparation of a report on the underground water reserves in the observed area. 		<i>Six months</i>	
	Establishment of a cadastre of municipal infrastructure (GIS) with positional characteristics of existing objects <ul style="list-style-type: none"> • Purchase of software • to perform a survey of underground installations and municipal infrastructure objects • training of end-users should be conducted, instructing them on how to input new data and exchange information with owners of other underground installations. 		<i>Twelve months</i>	
	Development of an Action Plan for constructing water facilities and municipal infrastructure objects. <ul style="list-style-type: none"> • Establish working group • Assess available documentation • Prepare a draft Action Plan • Adopt Action Plan 		<i>Six months</i>	
Action link to indicators	State indicators		Pressure indicator	
	5. Water use		Water - 25., 26., 27.	
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values	
	Status Analysis of the quality and quantity of groundwater reserves at potential source locations (Majevica area)	There is no analysis conducted.	The analysis of underground water reserves has been completed and adopted.	
	The user functionality of GIS in the Government services of BDBiH	A portion of the GIS cadastre is in operation within the area of BDBiH	Full operability and implementation of GIS across the entire area of BDBiH	
	The state of completion of the Action Plan and its applicability in the area of the city and settlements of BDBiH	The Action Plan has yet to be completed or is not applicable in practice.	The Action Plan has been adopted and is in the functional usage phase.	

The development effect and contribution of the measure	Implementing these measures creates conditions for finding new water reserves, more reliable insight into the water supply infrastructure and strategic planning of new actions in water supply, drainage and water treatment.		
The institution responsible for the implementation	Department for Spatial Planning, Property and Legal Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department of Municipal Affairs JP "Komunalno Brčko" Development Fund Consultant for documentation preparation	Involve Empower Involve Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	More intense seasonal water shortages are the result of climate change. Improved planning and management will reduce pressure on water resources	The action is gender neutral with the potential impact to entire population. To ensure gender and social responsiveness of the intervention, sex-disaggregated data needs to be utilized in the development of action plans and documentation. It is necessary that various groups are consulted during the process of action plan development and that different perspectives and needs are considered.	Masterplan should define clear actions for the digital transformation of water sector. The establishment of a Master plan will be an opportunity to identify key steps and actions for the digital transformation of the water sector. Additionally, the action seeks to support the establishment of a cadastre of municipal infrastructure (GIS) with positional characteristics of built objects.
CO₂ reduction / Environmental benefit	This action has no direct outcomes but is needed for the implementation of other water sector related measures that result water reduction and energy savings and CO ₂ emission reduction		
Indicative Project Costs	Cost (EURO / KM)		
	600,000/1,176,000		
Notes on cost estimates:	The costs of implementing this measure include expenses for selecting appropriate experts to develop the planned documents and their engagement until the finalization of these documents. Subsequently, implementation and support for local staff in carrying out planned activities are necessary. Additionally, there are costs related to the plans and projects, necessary workshops for consultations with stakeholders on drafts and final plans, legal procedures for adoption, and similar activities.		
Potential Financing Instruments and Sources	Instrument	Source	
	International funds (Grand) District budget	70%/420,000 30%/180,000	

Action: 1.1.2 - establishment of sanitary protection zones area		Type	Investment
Link with the strategic goal	1. Ensure water resources sustainability through planning and construction of water supply and wastewater infrastructure, supported by an operationally viable tariff system	Priority	1.1 Improve regulatory policy in the field of water
Linkage to Existing Policies/Plans	Development Strategy of BDBiH 2021–2027. Environmental Protection Strategy of the BDBiH for 2022–2032.		
Strategic projects	/		
Description	<p>This measure aims to protect the quality of drinking water and thereby the health of citizens within the supply consumption area.</p> <p>By defining the sanitary zones around the main/central location of the “Plazulje” water source, expanding these zones, or adequately updating them, conditions are established for the quality protection of the water intake and captured raw water. Additionally, the possibility of land use and the manner of land use will be precisely defined in each designated zone. For the reliability of implementing prescribed measures and the accuracy of cadastral boundaries of each zone, it is necessary for the Assembly of BDBiH to approve the documentation prepared for this purpose.</p>		
Implementation duration	24 months, starting in 2025		
Implementation process and timeline	Step (Subsequent)		Duration
	Elaboration of studies on sanitary zones of springs		Twelve months/completed
	Assembly procedure for approving the program		Six months
	Establishment of zones and implementation of programs		Six months
Action link to indicators	State indicators		Pressure indicator
	5. Water use		25. Water consumption
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Status of sanitary zones of water sources	5 % (partially developed documentation)	100% (Elaborates on the establishment of sanitary zones prepared, decisions on establishment made)
The effect and contribution of the measure	Establishing sanitary zones at the water sources of BDBiH will protect the quality of drinking water Protection zones will be established in the area defined as the water source, and the manner of use of that space will be determined.		
The institution responsible for the implementation	Department for Spatial Planning, Property and Legal Affairs		

Other stakeholders	Stakeholder Group		Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department of Municipal Affairs JP “Komunalno Brčko” Institute for planning, design and development Consultant for documentation preparation Citizens		Involve Involve Empower Consult Collaborate Inform	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion		Smart component
	The action will enforce groundwater protection and secure sources of fresh water	The intervention is gender neutral, with the potential impact to entire population. Still, rural population and population that lives in informal settlements are specifically affected by the lack of infrastructure and it particularly affects women and, unpaid household work or access to (menstrual) hygiene. The increased access to water will ensure benefits for families located in rural areas and reduce unpaid work hours for women in laundry or other household work. It is important that both men and women are consulted during the planning phase and that all data are available sex disaggregated.		/
CO₂ reduction / Environmental benefit	This action does not directly impact CO ₂ reduction but is needed to implement other water sector-related measures that reduce water treatment, needs energy savings and CO ₂ emission reduction.			
Indicative Project Costs	CapEx (EURO / KM)		OpEx (EURO / KM)	
	100,000/196,000		9,000/18,000	
Notes on cost estimates:	The costs of implementing this measure include expenses for the selection procedures of appropriate experts to develop the planned documents and their engagement until the finalization of these documents. Additionally, it encompasses the cost of plans and projects, necessary workshops for consultations with stakeholders on drafts and final sanitary zone protection programs, legal procedures for adoption, and similar. After the completed documentation, the construction of the zones includes the procurement of equipment (fence) and its installation, and the estimated costs of land expropriation are also included in the investment.			
Potential Financing Instruments and Sources	Instrument		Source	
	International funds (EBRD, UNDP, SECO) Own sources - District budget		50%/50,000 50%/50,000	

Action: 1.1.3 – Water management legal framework development		Type	Policy
Link with the strategic goal	1. Ensure water resources sustainability through planning and construction of water supply and wastewater infrastructure, supported by an operationally viable tariff system	Priority	1.1 Improve regulatory policy in the field of water
Linkage to Existing Policies/Plans	Development Strategy of BDBiH 2021–2027. Environmental Protection Strategy of the BDBiH for 2022–2032.		
Strategic projects	/		
Description	<p>This measure aims to adopt adequate legal regulations that are harmonized with the EU Water Framework Directive, whose provisions should serve as a framework for action in the water sector., It will then develop and adopt a series of corresponding secondary legislative acts.</p> <p>The framework areas of action include:</p> <ol style="list-style-type: none"> 1. Adoption of the Water Law of the BDBiH. 2. Development and adoption of secondary legislative acts related to the water sector in accordance with the adopted Water Law of the BDBiH. <p>BDBiH still lacks a Water Law as the overarching legislation for water management. Therefore, accompanying documents, regulations, and decrees must be drafted accordingly. New legislative regulation is needed in water management, provision of water services, and alignment with EU legislation. The applicability of certain EU directives requires specific adjustments and amendments to existing regulations.</p> <p>Improving the legal and institutional framework to harmonize water legislation in the BDBiH with EU legislation is essential for protecting water quality and ensuring the availability and sustainability of water resources. Additionally, enhancing legal and sub-legal regulations in water legislation is crucial.</p>		
Implementation duration	<i>36 months, starting in 2025</i>		
Implementation process and timeline	Step (Subsequent)	Duration	
	Establishment of a Working Group (WG) and definition of the scope of work (Terms of references)	<i>Four months</i>	
	Preparation of public procurement	<i>Four months</i>	
	Evaluation of proposals and selection of the consultant	<i>Two months</i>	
	Implementation of the project: Drafting legislation and consultation with the WG	<i>Twenty months</i>	
	Review and adoption	<i>Six months</i>	
Action link to indicators	State indicators	Pressure indicator	
	5. Water use	/	

Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	The status of the water regulations	Water regulations do not exist	Law and accompanying regulations adopted
The development effect and contribution of the measure	Creating laws and sub-legal acts in accordance with EU legislation, will result in more efficient water management and raise the level of service to end users.		
The institution responsible for the implementation	Department for Spatial Planning, Property and Legal Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department of Municipal Affairs JP "Komunalno Brčko" Consultant for documentation preparation	Involve Empower Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart Component
	Harmonization with EU legislation and the Water Framework Directive will improve water quality securing water resources for exploitation.	The action is gender natural. Although the new legislation will enhance overall access to clean water and improve infrastructure and wastewater management, costs may be unevenly distributed, leading to various socio-economic impacts. Hence, conducting an impact assessment of the legislation is essential, and policymakers should contemplate implementing policies to mitigate any adverse socio-economic effects and ensure the legislation not only mitigates risks, but actively promotes access to economic opportunities for women and other traditionally underserved groups.	/
CO₂ reduction / Environmental benefit	This action has no direct environmental benefits but is needed to implement water sector-related measures. It will reduce water use, energy savings, and CO ₂ emissions, resulting in an increased health situation and a modern and economic water supply system.		
Indicative Project Costs	Costs (EURO / KM)		
	150,000/294,000		
Notes on cost estimates:	Implementing this measure includes expenses for the procedures described in the implementation steps. This includes the selecting appropriate experts to draft laws, necessary workshops for consultations with stakeholders on drafts, legal procedures for adoption, and similar activities.		
Potential Financing Instruments and Sources	Instrument	Source	
	International funds (Grant) District Budget - Own-source	50% / 75,000 50% / 75,000	

Action: 1.2.1 - Improvement of drinking water treatment process		Type	Investment
Link with strategic goal	1. Ensure water resources sustainability through planning and construction of water supply and wastewater infrastructure, supported by an operationally viable tariff system	Priority	1.2 Extend and modernize the water supply system
Linkage to Existing Policies/Plans	Development Strategy of BDBiH 2021–2027. Environmental Protection Strategy of the BDBiH for the period 2022–2032.		
Strategic projects	/		
Description	<p>This measure aims to plan and execute the revitalization of the drinking water treatment plant, constructed approximately 15 years ago. Due to the prospectively increased number of connected households and industries, necessary works will be defined based on identified weaknesses, observed occurrences, and accordingly, a list of priority activities will be compiled. For these purposes, a company with relevant experience in drinking water technology will be engaged.</p> <p>The Plazulje water plant provides complete production and water supply to the urban area of the BDBiH by extracting water from the Sava River and 12 wells at the Plazulje water source. The plant has a capacity of 330 l/s, but it is not operating at full capacity as only about 100 l/s are currently being used.</p> <p>To improve the plant's operation and, with that, the quality of the water, it is necessary to analyze the current situation, identify weaknesses, and based on relevant indicators, propose specific measures for modernizing the drinking water treatment process, or the technological process of treating the captured water. Additionally, the existing SCADA system needs to be upgraded with new monitoring parameters resulting from the modernization of the process, and the installation of appropriate measurement and control equipment.</p> <p>The ultimate goal is reliability in the production process of hygienically safe drinking water and its delivery to end users.</p>		
Implementation duration	24 months, starting in 2025		
Implementation process and timeline	Step (Subsequent)	Duration	
	Public tender procedure for designer selection	Two months	
	Design phase: Planning and defining necessary works and selecting priority measures for revitalization.	Ten months	
	Public tender for selecting the implementing contractor.	Two months	
	Construction and implementation phase, guided by supervision and project monitoring	Ten months	

Action link to indicators	State indicators		Pressure indicator
	5. Water use		25.3, 25.4, 25.5
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Status of the drinking water plant	Existing drinking water plant	Drinking water plant with improved operation and increased capacity (2026)
The development effect and contribution of the measure	<p>Modernizing the drinking water treatment process will increase the capacity of produced water, ensuring reliability in both quantity and quality. Additionally, energy consumption will decrease, and the level of service delivery to end users will be elevated.</p> <p>Additionally, the reliability of producing and delivering hygienically safe water will increase.</p>		
The institution responsible for the implementation	Department for Spatial Planning, Property and Legal Affairs		
Other stakeholders	Stakeholder Group		Engagement (Inform, Consult, Involve, Collaborate, Empower)
	Department of Municipal Affairs JP "Komunalno Brčko" Consultant for design Consultant for construction Consultant for supervision Citizens/recipients		Involve Empower Collaborate Collaborate Collaborate Inform/consult
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	
	Climate change is producing more intense seasonal water shortages. Expanding the capacity for drinking water treatment will improve the resilience of the drinking water supply	The action is gender neutral. Considering that women are underrepresented in technical positions in PUCs and their employment opportunities are limited in the water and wastewater management. In addition to the water supply, which will benefit all citizens, the new technological solutions and facilities could increase employment opportunities for women in utility companies. All data about connected households needs to be sex disaggregated and include composition of the household.	
Smart component	SCADA control enables remote control and monitoring. Some information can be gathered and stored for further analysis. SCADA cannot provide self-control operation and smart operations are limited. This concept provides a basic level of smart system		
CO₂ reduction / Environmental benefit	Improving the water treatment plant will lead to a lower energy consumption (kWh/m ³). The main impact will be the increased level of hygienically safe drinking water.		

Indicative Project Costs	CapEx (EURO / KM)	OpEx (EURO / KM)
	500,000/980,000	15,000/29,400
Notes on cost estimates:	<p>The CAPEX is based on expert judgement and benchmarking of similar actions. The OpEx is estimated to be 3% of CapEx on an annual level</p> <p>The costs of this measure include the expenses of the public procurement procedure for selecting a designer, developing project documentation, conducting a public tender selecting contractors, the construction and implementation phase, and supervision for monitoring the progress of the works.</p>	
Potential Financing Instruments and Sources	Instrument	Source
	Own-source - District Budget	10% / 50,000
	Loan (EBRD, EIB WB, others)	90% / 450,000

Action: 1.2.2 - Reconstruction and extension of the water supply network and the reduction of non-revenue water		Type	Investment
Link with the strategic goal	1. Ensure water resources sustainability through planning and construction of water supply and wastewater infrastructure, supported by an operationally viable tariff system	Priority	1.2 Extend and modernize the water supply system
Linkage to Existing Policies/Plans	Development Strategy of BDBiH 2021–2027. Environmental Protection Strategy of the BDBiH for 2022–2032.		
Strategic projects	/		
Description	<p>Many parts of the existing water supply network need to be updated, and they are of inadequate quality and/or over- or undersized. Those circumstances lead to leakages, non-revenue water, and especially to the risk of contaminated drinking water. Furthermore, only some settlements of the District are connected to the public water supply system, which forces parts of the population to care for their water supply independently and bear the risk of lower water quality and higher costs.</p> <p>The urban area's water supply network is dilapidated and has frequent pipe bursts. Such a network cannot satisfy the flow and pressure required for certain consumption zones. Therefore, it is necessary to reconstruct the existing distribution network and establish DMA (District Metered Area) zones. This means that a zoning project for the BDBiH's water supply system would be developed, dividing the water supply system into individual zones and defining the necessary investments for project implementation. After the project is developed, implementation would begin by installing the required equipment and establishing a remote monitoring system for water flow. This way, essential information would be collected from the water supply system (data on flow rates and pipeline pressures) through the installed equipment. This will result in a more efficient water supply to the consumer area, continuous monitoring of vital parameters in the network, recording of consumption in established zones, and a safe reduction of the required energy for the functioning of the entire system.</p>		
Implementation duration	60 months, starting in 2025		
Implementation process and timeline	Step (Subsequent)	Duration	
	Determine the scope of work and Action plan for reconstruction and extension	Four months	
	Development of project documentation; Tender procedure for planned activities (design, construction, revision, and construction supervision).	Twenty months	
	Construction works – project implementation Construction and equipping of built structures.	Thirty-six months	
	Project monitoring and reporting	Continuously	

Action link to indicators	State indicators	Pressure indicator	
	5. Water use	25., 25.1, 25.2, 25.3, 25.4, 25.5	
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	The length of the reconstructed water supply network	0 km	30 km (2030)
The development effect and contribution of the measure	Improving the current state through the construction and reconstruction of water supply infrastructure in the BDBiH is one of the crucial tasks in the planning period. Water supply systems are vital parts of the overall community infrastructure of the BDBiH. Estimated investments in infrastructure for optimal water supply require significant funding to achieve an acceptable level of condition and performance in line with the needs of the citizens and economy of the Brčko District of BiH. The construction and reconstruction of this infrastructure, in the management and maintenance phase, will require a change in approach to improve system performance, reduce operational costs, and enable a more extensive coverage of the population of the BDBiH (especially the eastern part) who have access to this communal infrastructure and associated services.		
The institution responsible for the implementation	Department for Spatial Planning, Property and Legal Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department of Municipal Affairs JP "Komunalno Brčko" Consultant for design Consultant for construction Consultant for supervision Citizens/recipients	Involve Empower Collaborate Collaborate Collaborate Inform/consult	

	Climate Action	Gender and Social inclusion	Smart component
	By reducing water quality impacts on the water environment, water resources are saved and available for exploitation improving the resilience of the drinking water supply	The action design is gender neutral with the potential impact to entire population, particularly rural population, or population in suburban settlements, where infrastructure is underdeveloped. The lack of infrastructure, especially water, specifically affects women, girls, and the elderly, considering household work, agriculture, or the need to collect water from other sources. Therefore, the intervention will increase access to water for this underserved population. To ensure gender and social responsiveness, all data in the planning and monitoring phases need to be available by sex, age, and household composition.	Reconstruction and extension of the water supply network will ensure digital transformation of the system, ensuring holistic overview of the utility operation, providing tools for fast detection of anomalies, and for the prioritization of improvement initiatives. Information system will ensure efficient reporting of key performance indicators, remote monitoring, fast water leakage detection, and secure a stable water supply with focus on water quality.
CO₂ reduction / Environmental benefit	<p>61 tCO₂/y</p> <p>Based on data from JKP "Komunalno" for 2023, the water produced amounted to approximately 4,500,000 m³ for users within the city area (220 km of water supply network). The quantity of water delivered to consumers was 2,110,000 m³, indicating that the amount of non-revenue water was 2,390,000 m³. With this measure, the rehabilitation of the water supply network was planned for a length of 30 km. Based on the proportional relationship between water losses in the entire system and the plan for the reconstruction of the water supply network, it is calculated that the planned reconstruction reduces the quantity of non-revenue water to around 325,000 m³. Considering that the average price of water in 2023 for the observed consumer area (households at 1.25 KM/m³ and industry at 2.50 KM/m³) is approximately 1.88 KM/m³ (1.1 euros/m³), the result of this reconstruction is an annual saving of 358,500 euros. Savings of 325,000 m³ will lead to a CO₂ reduction of around 160MWh per year.</p>		
Indicative Project Costs	CapEx (EURO / KM)	OpEx (EURO / KM)	
	10,000,000/19,600,000	200,000 /392,000	
Notes on cost estimates:	The costs of this measure include preparing project documentation, tender procedure for planned activities (design, construction, revision, and construction supervision), construction works and equipping constructed facilities, and project monitoring and reporting. The costs for the reconstruction works were estimated at 300 Euro/m for the water supply pipeline. The OpEx is estimated at 2% of the total investment.		
Potential Financing Instruments and Sources	Instrument	Source	
	International funds UNDP, CZDA, SECO - Grant	10% / 1,000,000	
	Own-source – District budget	20% / 2,000,000	
	Loan (EBRD, EIB, WB, KfW)	70% / 7,000,000	

Action 1.3.1 - Feasibility study about current and future wastewater treatment		Type	Policy
Link with the strategic goal	1. Ensure water resources sustainability through planning and construction of water supply and wastewater infrastructure, supported by an operationally viable tariff system	Priority	1.3 Establish the wastewater treatment system
Linkage to Existing Policies/Plans	Development Strategy of BDBiH 2021–2027. Environmental Protection Strategy of the BDBiH for 2022–2032.		
Strategic projects	/		
Description	<p>The BDBiH still lacks adopted long-term technical solutions in wastewater treatment and sewage, which manifests operationally as a deficiency (during the implementation of individual projects in the field) and often results in individual, irrational, and uncoordinated technical solutions. Therefore, this measure will include the development of a long-term Concept for sewerage and wastewater treatment in the BDBiH, including a feasibility study for the collection, transport, and treatment of domestic and industrial wastewater and used water. Developing the mentioned documentation creates conditions for quality and sustainable management of wastewater and used water collection and treatment in the BDBiH. This will raise human health protection and quality of life in the BDBiH. It will also create conditions for selecting the most favourable wastewater treatment method before discharge to the ultimate recipient.</p> <p>The study shall also focus on a systematic approach to treating industrial wastewater in the BDBiH, and the aim is to establish a form of registry for industrial polluters who discharge their wastewater from production processes into existing or new sewage collectors. This approach aims to gather data on the level of wastewater load from each industrial polluter, the quantity, and the need for pre-treatment before discharge into sewage collectors. To obtain such data, it is necessary to compile a list of industries discharging their treated or not-treated wastewater into sewage collectors, perform necessary measurements, laboratory analyses, and determine the degree of pollution-load.</p>		
Implementation duration	36 months, starting in 2025		
Implementation process and timeline	Step (Subsequent)	Duration	
	Tender procedure for selecting the Consultant for the feasibility study.	Two months	
	Preparation of the feasibility study, including a complete survey and evaluation of the existing waste water collection and treatment assets	Thirty-four months	
Action link to indicators	State indicators	Pressure indicator	
	2. – Water resources, 2.1 - Ammonium NH ₄ concentration in rivers and lakes	23, 24, 26., 26.1, 26.2, 27., 27.1, 27.2	
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Preparatory documentation for the conceptual design of wastewater disposal and treatment.	The number of preparatory documents – 0 (2025)	Completed preparatory documents for the collection and treatment of wastewater (2027)

The development effect and contribution of the measure to the achievement of priorities	<p>The feasibility study creates the conditions for adequate wastewater project design (technical documentation) development. It will also create conditions for selecting the most favourable wastewater treatment method before discharge into the final recipient.</p> <p>Industrial polluters are obligated to pre-treat their wastewater generated during the production process of final products or through water use in technological processes (such as washing, cleaning, irrigation, etc.) before discharging it into the final recipient. Each industrial sector represents a separate user system, and the treatment of used water requires a specific approach in selecting technologies and purification processes and removing residues after the treatment process (waste materials of various origins). Preparing the mentioned documentation creates conditions for selecting the wastewater treatment method and the purification technology before discharge into the final recipient. In this way, the quality of the recipient water resources is protected, and the level of protection of human health and quality of life in the BDBiH is improved.</p>		
The institution responsible for the implementation	Department for Spatial Planning, Property and Legal Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department of Municipal Affairs JP "Komunalno Brčko" Consultant for Feasibility Study Industries NGOs	Involve Empower Collaborate Inform/Consult Inform/Consult	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	By reducing water quality impacts on the water environment, this water is available for exploitation	<p>The action is gender neutral, with the significant impact to entire population. Wastewater could indirectly benefit women by improving overall environmental quality and public health in the community. However, it is also essential to consider the socio-economic dimension, which may involve assessing how the costs and benefits of wastewater treatment are distributed among different socio-economic groups within the community. For instance, the financial burden of implementing wastewater treatment measures may disproportionately affect low-income households or small businesses, potentially exacerbating existing socioeconomic inequalities.</p> <p>Women often have valuable insights into community water usage patterns, priorities, and challenges that can inform more effective project design and implementation. Involving women in decision-making processes related to water infrastructure projects including wastewater management, can ensure that their perspectives and needs are considered.</p>	

CO₂ reduction / Environmental benefit	The Feasibility Study will not have any direct impact on CO ₂ reduction or the environment	
Indicative Project Costs	Costs (EURO / KM) Costs	
	750,000/1,470,000	
Notes on cost estimates:	The costs relate to developing the feasibility study, which includes a comprehensive survey and evaluation of the existing assets.	
Potential Financing Instruments and Sources	Instrument	Source
	International funds (UNDP, GIZ, SECO) Own-source – District budget	50% / 375,000 50% / 375,000

Action: 1.3.2 - Construction of the sewage network: expansion, rehabilitation and construction of new sections		Type	Investment
Link with the strategic goal	1. Ensure water resources sustainability through planning and construction of water supply and wastewater infrastructure, supported by an operationally viable tariff system	Priority	1.3 Establish the wastewater treatment system
Linkage to Existing Policies/Plans	Development Strategy of BDBiH 2021–2027. Environmental Protection Strategy of the BDBiH for 2022–2032.		
Strategic projects	/		
Description	A complete sewerage system does not exist for the BDBiH area, although documentation has been prepared for urban sewerage collectors and wastewater treatment plants through previous studies and project solutions. So far, only certain channels of a separate sewerage system have been built. The sewerage system of the BDBiH consists of two independent subsystems: urban and rural. The construction of the sewerage system began during the Austro-Hungarian Empire, while the foundations of the modern sewerage network were laid in the 1970s. The estimate is that around 60% of the population of the BDBiH disposes of wastewater through the sewerage network. Unfortunately, the remaining 40% discharge wastewater into septic tanks or directly into nearby natural recipients. Given the drainage conditions and terrain configuration, several pumping stations must be built in the sewage and industrial sewage network. Rainwater is collected through separate stormwater collectors and discharged into the nearest streams and the Sava River via multiple outlets without prior treatment.		
Implementation duration	48 months, starting in 2025		
Implementation process and timeline	Step (Subsequent)	Duration	
	Tender procedure to select the design consultant	Two months	
	Design phase	Eight months	
	Tender documentation and procedure for selecting the construction company	Two months	
	Construction of the sewage network	Thirty-six months	
Action link to indicators	State indicators	Pressure indicator	
	2. – Water resources, 2.1 - Ammonium NH ₄ concentration in rivers and lakes	26., 26.1, 26.2, 27., 27.1, 27.2	

Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Length of the network to be constructed and reconstructed	0 km - 0 %	25 km-100 % (2029)
The development effect and contribution of the measure to the achievement of priorities	Through Action 1.1.1 in the Master Action Plan, priorities and values for constructing planned infrastructure will be defined. The task is to ensure wastewater transportation to the planned wastewater treatment plant. This improves public health and the state of river ecosystems, reduces the risk of floods, and generally enhances the living space and urban environment.		
The institution responsible for the implementation	Department for Spatial Planning, Property and Legal Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department of Municipal Affairs JP "Komunalno Brčko" Consultant for design Consultant for construction Consultant for supervision Citizens/recipients	Involve Empower Collaborate Collaborate Collaborate Inform/consult	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	By reducing water quality impacts on the water environment, this water is available for exploitation	The action is gender neutral, with the impact to entire population. In order to ensure gender and inclusion responsiveness, it is important for the action plan to consider gender-sensitive approaches to ensure that the benefits of improved wastewater treatment are equitably distributed and that the specific needs of women and men are considered in the planning and implementation process.	The action will include construction of new sewers as well as the rehabilitation of parts of the existing assets. The investment shall also comprise the implementation of smart measures, such as the digital survey of the complete sewerage system combined with the establishment of a GIS-system, furthermore the installation of flowmeters (especially for industrial emitters) and a smart control system for the pumping stations.

CO₂ reduction / Environmental benefit	<p>The main environmental benefit will be the prevention of untreated wastewater trickling to the ground and polluting the groundwater due to leakages, as well as the prevention of wastewater reaching surface waters without being adequately treated. Consequently, this measure will significantly impact the quality of the drinking water and the consumer's health.</p> <p>Furthermore, rehabilitating the sewage system will reduce the frequently recurring sewer overflows, which nowadays are expected to increase due to climate change relevant heavy rainfalls</p>	
Indicative Project Costs	CapEx (EURO / KM)	OpEx (EURO / KM)
Notes on cost estimates:	<p>The network length that needs to be extended and reconstructed is approximately 25 km. The calculated CapEx include the construction works ,all design and procurement costs, and supervision of works. The estimated costs for rehabilitation and constructions works are 360 Euro per m sewerage pipeline.</p> <p>It should be noted that the costs of pipeline installation will vary depending on the location of the works (roadway, narrow urban area, suburban area, open field), soil conditions, labour and material costs, and the diameter of the pipeline. Additionally, the required length of the pipeline is currently very uncertain, so this cost represents only an estimate. The cost estimation considers described smart measures.</p>	
Potential Financing Instruments and Sources	Instrument	Source
	International funds – Grant (KfW, GIZ)	10% / 1,000,000
	Own-source – District budget	10% / 1,000,000
	International loan (EBRD, EIB, WB)	80% / 8,000,000

Action: 1.3.3 - Construction of a wastewater treatment plant		Type	Investment
Link with the strategic goal	1. Ensure water resources sustainability through planning and construction of water supply and wastewater infrastructure, supported by an operationally viable tariff system	Priority	1.3 Improvement of the wastewater treatment system
Linkage to Existing Policies/Plans	Development Strategy of BDBiH 2021–2027. Environmental Protection Strategy of the BDBiH for 2022–2032.		
Strategic projects	/		
Description	<p>Due to the results of the actions mentioned above 1.1.1, 1.1.6, and 1.1.7, the main sewerage routes, the area covered by wastewater collection and transport, the collection concept, the quantity and quality of collected water, and the facility's location will be known. The current action will include designing, procuring, supervising and constructing a state-of-the-art wastewater treatment plant. The design phase will focus on a multi-criteria analysis of treatment technologies, a description of the methodology of the selected technology, a presentation of facilities, and financial indicators for the construction and operation. It will be based on a projected period of at least 50 years.</p> <p>The entire technological treatment procedure for incoming wastewater must be monitored using state-of-the-art techniques in each treatment line, from the water line to the disposal of treated sludge. For this purpose, it is necessary to establish a SCADA system for the entire WWTP (Wastewater Treatment Plant).</p> <p>The estimated earliest year for the start of construction of the wastewater treatment plant is 2029 and the estimated duration for construction is 4 years. This assumption considers all the previous conditions are met (determined location, capacity, technology, etc.).</p>		
Implementation duration	48 months, starting in 2029		
Implementation process and timeline	Step (subsequent)	Duration	
	Public tender procedure for designer	Two months	
	Design phase including permits	Eighteen months	
	Preparation of investment technical documentation and public tender for selecting implementing contractor	Four months	
	Construction and implementation phase, guided by supervision and project monitoring	Twenty-four months	
Action link to indicators	State indicators		Pressure indicator
	2. – Water resources, 2.1 - Ammonium NH ₄ concentration in rivers and lakes		26., 26.1, 26.2, 27., 27.1, 27.2

Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values	
	The status of the construction of WWTP	The WWTP has not been constructed.	The WWTP has been constructed (2033)	
The development effect and contribution of the measure	This measure improves public health and the condition of river ecosystems, reduces the risk of floods, and generally enhances living space and the urban environment.			
The institution responsible for the implementation	Department for Spatial Planning, Property and Legal Affairs			
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)		
	Department of Municipal Affairs JP "Komunalno Brčko" Consultant for design Consultant for construction Consultant for supervision Citizens/recipients	Involve Empower Collaborate Collaborate Collaborate Inform/consult		
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion		Smart component
	By reducing water quality impacts on the water environment, this water is available for exploitation	The action is gender neutral and to be gender responsive and ensure contribution to gender equality, additional employment opportunities for women should be considered. Women are underrepresented in the wastewater treatment sector, and the new WWTP could increase employment opportunities for women and youth. Also, during the planning stage, extensive consultations about the WWTP should be conducted with affected communities, ensuring the participation of women.		The implementation of smart measurement and control systems, which are connected with the flowmeters and pumping stations of the sewerage system, will be crucial to ensure a sustainable and energy efficient operation of the waste water treatment plant.
CO ₂ reduction / Environmental benefit	Although the operation of the new wastewater treatment plant will increase CO ₂ production, the plant will significantly impact the environment, especially the groundwater and surface water (rivers) and ,consequently, the drinking water quality and the general health situation. In the long-term, the possible carbon emissions reductions with the new wastewater treatment plant will depend on the energy intensity of the energy recovery on the site			

Indicative Project Costs	CapEx (EURO / KM)	OpEx (EURO / KM)
	24,000,000/47,040,000	225,000/441,000
Notes on cost estimates:	The CAPEX is based on an estimation of 85.000 person equivalent (PE) and specific costs of 250 Euro/PE and includes the design, procurement, supervision and total construction of the wastewater treatment plant	
Potential Financing Instruments and Sources	Instrument	Source
	National budget (BiH) Own-source – District budget Loan (EBRD, EIB, WB)	20% / 4,800,000 10% / 2,400,000 70% / 16,800,000

Action: 1.4.1 – Modernization and digitalization of water management		Type	Investment
Link with the strategic goal	1. Ensure water resources sustainability through planning and construction of water supply and wastewater infrastructure, supported by an operationally viable tariff system	Priority	1.4 Empower water management monitoring and planning
Linkage to Existing Policies/Plans	Development Strategy of BDBiH 2021–2027. Environmental Protection Strategy of the BDBiH for 2022–2032.		
Strategic projects	/		
Description	<p>This action will include applying ICT systems in modelling, forecasting and monitoring vital system parameters, planned expansion of the network and analysis of collected data (EPANET, NM Aqua, Arc Gis, Q Gis, etc.). This action aims to modernize the services responsible for monitoring, development, and planning of the water supply network in a contemporary manner, utilizing collected data with a high degree of reliability to plan network expansions, construct necessary reservoir space, define the number of consumers, determine specific water consumption, and monitor energy consumption for production and delivery. This rationalizes production and management, controls resource consumption, and systematically manages based on measured data.</p> <p>With the existing ICT system, monitoring, controlling, and planning production and technological processes in providing water supply services is very easy and reliable. By processing the collected data adequately, it is possible to logically plan the expansion of the water supply network and connect new users or equip new locations following spatial planning documentation. All distribution pipelines and key nodes in the water supply system, such as water reservoirs, water sources, DMA zones in the distribution system, as well as the monitoring system for the Sava River and SCADA elements, should be entered into GIS as part of the electronic cadastre for infrastructure monitoring and planning.</p> <p>For example, the preparation of a GIS central database will contain existing information about the entire system, whether it's related to water supply or sewage. This allows for identifying the status and characteristics of each water supply and wastewater system component. It involves tracking the technological process from wells or water intakes, transportation to treatment and disinfection systems, the condition of water treatment systems, distribution networks, pumping stations, and reservoirs to connections to industrial or private end-users. Similarly, a similar approach can be applied to wastewater and stormwater, including manholes, overflows, pumping stations, and river discharges.</p> <p>Similar user approaches can be found in modelling systems (EPANET, NM Aqua), which serve for hydraulic modelling of water supply or drainage networks, reservoir areas, monitoring system losses, and planning the needs of new consumers.</p>		
Implementation duration	24 months, starting from 2025		

Implementation process and timeline	Step (could partly be done in parallel)		Duration
	Procurement of software, although some of them are free (EPANET, QGIS).		Two months
	User training		Six months
	Selection of equipment and service providers, data entry, data processing, analysis, and final reports.		Sixteen months
Action link to indicators	State indicators		Pressure indicator
	5. Water use		25., 25.1, 25.2, 25.3, 25.5
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	The status of ICT software utilization.	Applicability 10%	In function 100% (2027)
The development effect and contribution of the measure to the achievement of priorities	A proper understanding of the functioning of water supply and sewerage networks can only be achieved with appropriate collected data describing the objects, their condition, and how they operate. This can be achieved through data collection and analysis using computer models for water and wastewater linked with database systems in GIS. Information obtained through this measure will help develop action plans for investments in new water supply and sewerage networks. This measure will collect missing data which can improve customer relations and revenue planning and provide the basis for developing effective action plans with cost assessments.		
The institution responsible for the implementation	Department for Spatial Planning, Property and Legal Affairs		
Other stakeholders	Stakeholder Group		Engagement (Inform, Consult, Involve, Collaborate, Empower)
	Department of Municipal Affairs JP "Komunalno Brčko" Consultant / trainers		Involve Empower Collaborate

Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	Climate change is producing more intense seasonal water shortages. Improving water management and planning by using modern IT tools will enhance the resilience of the drinking water supply	The action is gender neutral and the system's expansion could lead to broader access to clean water across various parts of BDBiH, thereby improving overall access to essential services. In order to ensure gender responsiveness to the action, sex disaggregated data about the households that have access to the system and any other relevant data.	This action directly targets the digital transformation of water sector. Massive sensor deployment together with SCADA control system provides enough level of control and monitoring and provides enough mechanisms for data-driven smart and self-controlling of the water supply system
CO₂ reduction / Environmental benefit	/		
Indicative Project Costs	CapEx (EURO / KM)		OpEx (EURO / KM)
	150,000/294,000		20,000/39,200
Notes on cost estimates:	<p>The CAPEX is based on expert judgement and benchmarking of similar activities</p> <p>The costs relate to:</p> <ul style="list-style-type: none"> - Procurement of software - Selection of equipment and service providers (data entry, data processing, analysis, and final reports) - User training 		
Potential Financing Instruments and Sources	Instrument	Source	
	International funds (UNDP, GIZ) - Grant Own-source – District Budget	10% / 15,000 90% / 135,000	


4.3 Transport Actions

Eight actions have been shortlisted in the transport sector that contribute to improving air quality and reducing emissions. Five of them (five actions) refer to developing policies that will create the foundation for further

investment in transport infrastructure and reform changes in upgrading the bus fleet with low-emission vehicles.

It is estimated that the capital expenditure for transport actions is 17,000,000 EUR of the total GCAP budget.

Table 19 – Timeline for transport sector actions

Sector	Action title	Duration					
		2025	2026	2027	2028	2029	2030
 Transport	2.2.1 Development of a data collection program for the entire city and a multimodal transport model						
	2.2.2. Develop low-emission transport policies						
	2.2.3 Prepare a feasibility study of the rapid (fast) public transport system corridor						
	2.2.4 Implementation of bus operation reform						
	4.2.1 Sustainable Urban Mobility Plan (SUMP) for Brčko District						
	4.2.2 Promotional campaigns for car sharing, walking and cycling						
	4.2.3 Expand and improve cycling infrastructure						
	4.2.4 Implementation of the pedestrian priority infrastructure						

Action: 2.2.1 Development of a data collection program for the entire city and a multimodal transport model		Type	Policy
Link with the strategic goal	2. Improve air quality by applying energy resource-efficient technologies with reduced environmental impacts, introduction of low carbon emissions transport policies	Priority	2.2 Introduce low-emission transport
Linkage to Existing Policies/Plans	Law on road transport in BDBiH Development Strategy of BDBiH 2021–2027. Environmental Protection Strategy of BDBiH for the period 2016–2026 Framework Strategy of Transport of Bosnia and Herzegovina for the period 2016 – 2030		
Strategic projects	/		
Description	<p>The BDBiH has made some progress in data collection systems for traffic management but does not yet have a fully comprehensive setup. Currently, the district is implementing certain elements, such as using GPS data for transport planning and surveys for trip purposes, but comprehensive systems like inductive loops, ANPR, and extensive use of CCTV for behaviour monitoring are still being developed.</p> <p>For example, using an advanced method, BDBiH investigated the use of electric vehicles in its taxi service. The method includes multi-criteria decision-making (MCDM) for ranking EVs according to taxi service ratings and contributes to more stable decision-making and innovative EV purchase modelling for taxi services.</p> <p>The complete data collection system should include the following devices and components:</p> <ul style="list-style-type: none"> • Inductive loops for recording traffic flows; • Automatic number plate recognition (ANPR) cameras to monitor vehicle movements and CCTV cameras installed to monitor behaviour; ANPR cameras automatically recognize vehicle registration plates, which can be used for vehicle counting and parking management, facilitating the monitoring of traffic violations and the identification of stolen vehicles. CCTV cameras monitor traffic behaviour, including vehicle and pedestrian counting, improving road and public safety. Guidelines for this system are given in the international standard for vehicle number plate recognition systems ISO/TS 21184:2021. Therefore, BD should adopt the above standard. • Annual collection and recording of public transport and taxi driving; • Data collection on city parking; • Surveys about the source and purpose of the trip, including Origin-Destination survey; • Use GPS data from mobile phones and appropriate data from existing applications. <p>This infrastructure will be strategically positioned on key corridors and local roads to comply with privacy laws. Collected data will inform urban planning and decision-making.</p> <p>The city-wide transport demand model will predict and evaluate traffic scenarios for comprehensive urban planning. It will incorporate all modes of transportation, aiding evidence-based decision-making. Installation and operation of these systems must adhere to privacy regulations and coordinate with urban planning initiatives.</p> <p>The data collected in the described manner would be used multiple times in the planning and management of the traffic system in BD. They are essential for preparing and monitoring the implementation of SUMP.</p>		

Implementation duration	<i>Duration 36 months, starting in 2025</i>		
Implementation process and timeline	Step (subsequent)	Duration	
	Needs assessment and capacity analysis	<i>Nine months</i>	
	Deployment of data collection infrastructure	<i>Eighteen months</i>	
	Implementation and system testing	<i>Nine months</i>	
	Continuous monitoring and evaluation of efficiency	<i>Continuously</i>	
Action link to indicators	State indicators		Pressure indicator
	1. Air quality		10., 11., 12.1, 13.
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Existence of a multimodal transport system	The system does not exist	System fully operational
	Monitoring of transport frequency	Monitoring does not exist	Monitoring established
The development effect and contribution of the measure	The measure enhances traffic data collection through city-wide systems and implements a multimodal transport demand model. This enables evidence-based planning, predicting, and evaluating traffic proposals, facilitating informed decision-making for urban development.		
The institution responsible for the implementation	Department for Public Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department of Communal Affairs Private transport operators Development Fund Public Enterprise Putevi Brcko Consultant for purchase of equipment	Involve Empower Involve Consult Collaborate	

Cross-cutting themes / benefits	Climate action	Gender and Social inclusion	Smart component
	This action will ensure the regulation of traffic in the core city centre and the regulation of emissions of GHG related to travel inside the BDBiH	The action is gender neutral, with high relevance for gender and social inclusion, considering that women use public transportation more than men and especially in terms of care transportation and gender roles in the households that limits access to private vehicles. Surveys about trip patterns needs to have gender component and to ensure that further planning take into consideration needs of women and men equally, including safety, accessibility, and availability of public transport. All data need to be sex disaggregated and analysed to ensure gender responsive policy and decision making.	City-wide traffic data collection system and the implementation of a city-wide multimodal transport demand model. In addition, Automatic number plate recognition (ANPR) cameras to monitor vehicle movements and CCTV cameras are envisaged to be installed.
CO ₂ emission reduction / Environmental benefit	1,200 tCO ₂ /year		
Indicative Project Costs	Costs (EURO / KM) 800,000/1,568,000		
Notes on cost estimates:	Costs include procurement of hardware, data collection equipment, development of software and data storage infrastructure for the development of a city-wide data collection program and multimodal transportation model, consulting firm services for model development including citizen surveys, annual operational costs, and equipment repair and maintenance. Thus, rough estimation of the costs was based on 25 traffic junctions, 25 ANPR, 25 CCTV cameras, needed survey, consultant services, further operation and maintenance.		
Potential Financing Instruments and Sources	Instrument	Source	
	International fund - Grant)	40% / 320,000	
	National government (BiH)	30% / 240,000	
	Own resources – District budget	30% / 240,000	

Action: 2.2.2 Develop low-emission transport policies		Type	Policy
Link with the strategic goal	2. Improve air quality by applying energy resource-efficient technologies with reduced environmental impacts, introduction of low carbon emissions transport policies	Priority	2.2 Introduce low-emission transport
Linkage to Existing Policies/Plans	Environmental Protection Strategy of BDBiH for 2016–2026. Action Plan for Sustainable Energy Management and Climate Change Adaptation (SECAP) of BDBiH, up to 2030. Framework Strategy of Transport of Bosnia and Herzegovina for the period 2016 - 2030 Development Strategy of BDBiH 2021–2027. Spatial Development Strategy of BDBiH 2018–2038		
Strategic projects	/		
Description	<p>Developing a low-emission transport policy should include a policy for low-emission public transport services and incentives for low-emission vehicles.</p> <p>Regarding public transport, the policy aims to establish a regulatory framework requiring operators to replace their diesel bus fleets with more fuel-efficient, low-emission vehicles. The replacement plan should be aligned with financing possibilities over 25 years. Some funds can also be generated by selling diesel vehicles that should not be stored. The policy for promoting low-emission vehicles will focus on supporting measures at the BDBiH level to encourage wider adoption of such vehicles. Specific tasks in this regard would include:</p> <ul style="list-style-type: none"> • strengthening regulations on low-emission and electric vehicles; • implementing low-emission pilot projects or electric drives; • consumer incentives such as purchase grants, registration tax benefits, domestic infrastructure incentives; and • establishing an organizational unit (department) for traffic and transport innovations, focusing on improving policies and proposals related to low-emission vehicles. <p>The low-emission transport policy should be based on:</p> <ul style="list-style-type: none"> • A study on building the necessary infrastructure for electric and plug-in hybrid vehicles. • Data collected through the city-wide data collection program and the multimodal transport model • Encouraging the procurement and use of hybrid, electric, and plug-in passenger vehicles (purchase subsidies, the right to enter “green” urban areas, discounted/free parking, etc.), and public vehicles. • Implementing a decision on the minimum share of liquid biofuels in the retail market (Decision proposed for the Action Plan for the level of Bosnia and Herzegovina). • Reforming the passenger car taxation system will discourage the use of old vehicles and encourage the purchase of vehicles with lower emissions (lower fuel consumption, electric and hybrid, LPG and CNG). • Developing infrastructure for hybrid, electric, and plug-in passenger vehicles (charging stations, disposal of used parts, etc.). 		
Implementation duration	duration of 36 months, starting in 2025		

Implementation process and timeline	Step (in parallel)		Duration
	Analysis of the current situation and setting emissions reduction targets.		Six months (1 – 6)
	Development of a study on building the necessary infrastructure for electric and plug-in hybrid vehicles.		Six months (6 – 12)
	Developing a policy to incentivize the purchase and use of hybrid, electric, and plug-in passenger vehicles, as well as public vehicles.		Six months (6 – 12)
	Implementing the decision on the minimum share of liquid biofuels in the retail market.		Six months (14 – 20)
	Reforming the taxation system for passenger vehicles will discourage the use of older vehicles and encourage the purchase of vehicles with lower emissions.		Six months (14 – 20)
	Building infrastructure for hybrid, electric, and plug-in passenger vehicles.		Six months (14 – 24)
Establishment of an organizational unit for traffic innovation, focusing on improving policies related to low-emission vehicles.		Six months (24 – 36, and could start earlier)	
Action link to indicators	State indicators	Pressure indicator	
	1. Air quality	10., 10.1, 10.2, 10.3, 11., 12.1, 13., 13.1	
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	The status of low-emission transport policies.	There is no low-emission transport policy.	Adopted low-emission transport policies.
	Status of the study on the construction of necessary infrastructure for electric and plug-in hybrid vehicles	There is no comprehensive analysis	A study on the construction of the necessary infrastructure for electric and plug-in hybrid vehicles was completed and adopted
	Status of the incentive model for the purchase and use of hybrid, electric, and plug-in passenger vehicles	There is currently no incentive scheme for hybrid, electric, and plug-in passenger vehicles	An adopted model for encouraging the purchase and use of hybrid, electric and plug-in passenger vehicles
	State of infrastructure for hybrid, electric, and plug-in passenger vehicles	Insufficiently developed infrastructure for hybrid, electric and plug-in passenger vehicles	Built minimum infrastructure for hybrid, electric and plug-in passenger vehicles
	The status of changes to the vehicle taxation system	The existing system of taxation discourages the acquisition and use of low-polluting vehicles	An improved system of taxation was adopted (in coordination with the state and entity level)

The development effect and contribution of the measure	Implementing low-emission transport policies can significantly reduce carbon emissions, mitigate climate change, improve air quality, promote sustainable transportation, and conserve the environment. This involves encouraging low-emission vehicles, expanding public transport, adopting clean energy, and promoting cycling/walking.		
The institution responsible for the implementation	Department for Public Affairs		
Other stakeholders	Stakeholder Group		Engagement (Inform, Consult, Involve, Collaborate, Empower)
	Institute for Planning, Designing and Development of the BDBiH Private transport operators, Consultant		Involve Empower Empower Collaborate
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	
	This action promotes the use of fuel-efficient low-emission vehicles and electric vehicles, avoiding emissions of GHGs related to travel inside Brčko	The action is gender neutral, although the transport is significant to empowerment of women. To make the development of a low-emission transport policy gender-responsive, ensure the inclusion of gender-specific impacts in policy analysis, engage diverse stakeholder groups, including women's organisations, in the planning and decision-making processes, and provide targeted support and incentives for women to access and benefit from low-emission transportation options.	
Smart component	/		
CO₂ emission reduction / Environmental benefit	No direct carbon emissions reduction is expected,		
Indicative Project Costs	Costs (EURO / KM)		
	100,000/196,000		
Notes on cost estimates:	Costs included consultant services for study and policy development, including infrastructure foreseen for hybrid, electric, and plug-in passenger vehicles		
Potential Financing Instruments and Sources	Instrument		Source
	International funding - Grant National funding - government of BiH Own resources – District budget		55% / 55,000 25% / 25,000 25% / 25,000

Action: 2.2.3 Prepare a feasibility study of the rapid (fast) public transport system corridor		Type	Policy
Link with the strategic goal	2. Improve air quality by applying energy resource-efficient technologies with reduced environmental impacts, introduction of low carbon emissions transport policies	Priority	2.2 Introduce low-emission transport
Linkage to Existing Policies/Plans	Law on road transport in BDBiH Framework Strategy of Transport of Bosnia and Herzegovina for the period 2016 – 2030 Development Strategy of BDBiH 2021–2027. Spatial Development Strategy of BDBiH 2018–2038 Environmental Protection Strategy of BDBiH for the period 2016–2026		
Strategic projects	/		
Description	<p>With increasing demand for public transport, capacity enhancement becomes crucial. During peak hours, passenger flow exceeding 2,000-2,500 passengers/hour could lead to 20-30 buses/hour, causing significant traffic congestion. Hence, exploring a high-capacity rail system is necessary.</p> <p>A feasibility study for light rail, tram, or BRT in critical corridors of BDBiH is proposed. This study should assess current and future demand, system specifications, potential routes integrated with land use plans, conceptual line designs, economic viability, social, financial, and environmental risks, financial mechanisms, and phased implementation plans.</p> <p>The steps for implementing this measure are:</p> <p>1. Analysis of Public Transport Demand: The first step is a detailed analysis of the current and future demand for public transport on critical routes and corridors in the BDBiH. This includes analyzing the number of passengers, their routes, and travel frequencies, taking into account age and gender.</p> <p>2. Identification of Critical Corridors: Identify critical corridors or routes with high demand for public transport and where introducing a rail transport system would be most beneficial.</p> <p>3. Feasibility Study: Conduct a feasibility study for various options of rail transport systems, including light rail, tramways, and bus rapid transit (BRT). This study should cover demand analysis, technical specifications, potential routes, intersectional priorities, economic and financial aspects, and social, financial, and environmental risks.</p> <p>4. Stakeholder Consultations: Involve relevant stakeholders, including local communities, transport operators, government agencies, and civic groups (CSOs dealing with the position of marginalized groups, women, and women's groups), in the decision-making process and gather feedback on proposed rail transport systems.</p> <p>5. Selection of the Best Option: Based on the feasibility study results and stakeholder feedback, select the best option for introducing a higher-capacity rail transport system. This option should be economically, environmentally, and socially sustainable, considering the needs and priorities of the local community.</p> <p>Once the best option is chosen, further development and implementation of the rail transport system follow, including route planning, infrastructure construction, vehicle procurement, and establishment of operational systems.</p>		

Implementation duration	<i>Duration 24 months, starting in 2025</i>		
Implementation process and timeline	Step (subsequent, but some steps can be implemented in parallel)	Duration	
	Analysis of Public Transport Demand	<i>Three months (1 – 3)</i>	
	Identification of Critical Corridors	<i>Six months (1 – 6)</i>	
	Development of a Feasibility Study	<i>Nine months (3 – 12)</i>	
	Stakeholder Consultations	<i>Three months (12 – 15)</i>	
	Selection of the Best Option	<i>Three months (21 – 24)</i>	
	Further implementation	<i>continuously</i>	
Action link to indicators	State indicators	Pressure indicator	
	1. Air quality, 7. Climate change and GHG	11., 12.	
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Status of a feasibility study of the rapid (fast) public transport system corridor	There is no feasibility study of the rapid (fast) public transport system corridor	The feasibility study of the rapid (fast) public transport system corridor in the BDBiH has been completed and adopted
The development effect and contribution of the measure	The measure's effects include increased public transport capacity, reduced congestion, and improved citizen mobility. The measure's suitability stems from a thorough analysis of demand and alignment of public transport with the city's needs.		
The institution responsible for the implementation	Department for Public Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	local communities transport operators government agencies civic groups	Involve Involve Consult Consult	

Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	This action promotes the use of non-motorized transport (rail system), avoiding GHG emissions related to travel inside BDBiH.	Accessibility of public transport, including the rail system, will contribute to women's needs. In feasibility and economic studies, the employment of women in public transport should be additionally examined. It is necessary to include both, women and men, from various groups groups at stakeholders' consultation, and all data needs to be sex disaggregated and analysed in order to ensure gender responsive decision making about the best option.	This action will include digital technologies and their application towards integrating public transport systems, specifically for traffic management, user information, and public transport planning and management. FS will assess and propose technologies such as intelligent transport system with video detectors and a surveillance systems, e-ticketing system and real-time information to passengers (electronic panel).
CO₂ emission reduction / Environmental benefit	600 tCO ₂ /y		
Indicative Project Costs	Costs (EURO / KM)		
	150,000/294,000		
Notes on cost estimates:	The cost of the feasibility study development is based on expert judgement and benchmarking of similar activities. The cost will include an independent consultant for the development of the Feasibility Study		
Potential Financing Instruments and Sources	Instrument	Sources	
	International funding - Grant National funding - government of BiH Own source revenue – District budget	50% / 75,000 25% / 37,500 25% / 37,500	

Action: 2.2.4 Implementation of bus operation reform		Type	Investment
Link with the strategic goal	2. Improve air quality by applying energy resource-efficient technologies with reduced environmental impacts, introduction of low carbon emissions transport policies	Priority	2.2 Introduce low-emission transport
Linkage to Existing Policies/Plans	Environmental Protection Strategy of BDBiH for 2016–2026. Law on road transport in BDBiH Framework Strategy of Transport of Bosnia and Herzegovina for the period 2016 – 2030 Development Strategy of BDBiH 2021–2027		
Strategic projects	/		
Description	<p>The reform of bus operations in BDBiH involves implementing new urban transport models, upgrading the bus fleet with low-emission vehicles, and integrating ticketing systems. Analytical studies will define service areas, legal frameworks, and tariff systems. Procurement of low-emission buses will be a contractual requirement for operators, promoting environmentally friendly transport. Integrated ticketing will streamline passenger journeys across different transport modes, enhancing the convenience and attractiveness of public transit. To implement unified ticketing systems effectively, operators and the city must collaborate.</p> <p>Implementation Steps:</p> <p>Analysis (studies) and Planning:</p> <ul style="list-style-type: none"> • Conduct a comprehensive analysis of the current bus transportation system, including route network and transportation demands. • Define the legal framework for urban public transportation operations, including establishing fare systems and ticketing rules. • Conduct a feasibility study for introducing trams or other new public transportation systems. • Consider the establishment of a public utility company for urban passenger transport. • Define procedures for selecting carriers and passenger transportation service pricing. • Review and sign contracts for public urban transportation between the Government and the operator. <p>Upgrading the Bus Fleet:</p> <ul style="list-style-type: none"> • Initiate a tender process for procuring low-emission buses. • Set requirements for replacing existing buses with more efficient, low-emission vehicles. • Sign contracts with bus suppliers and ensure their delivery in accordance with standards. <p>Integrated Ticketing System:</p> <ul style="list-style-type: none"> • Implement an integrated ticketing system that allows passengers to use the same ticket for multiple modes of transport. • Introduce electronic or magnetic cards for ticket issuance. • Establish a revenue-sharing agreement between operators and the city to enable ticket collection. <p>Testing and Improvements:</p> <ul style="list-style-type: none"> • Conduct pilot projects for new urban transportation models, upgraded buses, and integrated ticketing systems. • Collect feedback from users and analyze the results of pilot projects. • Identify potential shortcomings and make necessary adjustments before broader implementation. 		

Description	<p>Broader Implementation:</p> <ul style="list-style-type: none"> Expand the improved transportation services to the entire urban region. Promote new urban transportation models and encourage citizens to use public transportation. Continuously monitor system performance and make necessary modifications to maintain service quality. <p>Adoption of mechanisms and sources of financing to increase the share of public transport (electrified and low emission) in total passenger kilometres)</p>		
Implementation duration	Duration 84 months, starting in 2025		
Implementation process and timeline	Step (after the first step, others can be done in parallel)	Duration	
	Analysis (studies) and Planning	12 months (1 – 12)	
	Upgrading the Bus Fleet	72 months (12 – 84)	
	Integrated Ticketing System	24 months (12 – 36)	
	Testing and Improvements	Nine months (12 – 21)	
	Broader Implementation	60 months (12 – 72)	
	Adoption of mechanisms and sources of financing	continuously	
Action link to indicators	State indicators	Pressure indicator	
	1. Air quality, 7. Climate change and GHG	11., 11.1, 11.4, 11.6, 12.1, 23.	
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Share of public transport passengers in total transport	Unknown	Satisfying level
	Travel time by public transport	Unknown	Satisfying level
	Status of mechanisms and sources of financing for public transport	There are no incentives for the public development of transportation	Adopted mechanisms
The development effect and contribution of the measure	The implementation of bus transportation reform and enhancement of public transit result in reduced emissions, increased efficiency, improved accessibility, fostering economic development, and enhancing citizens' quality of life.		

The institution responsible for the implementation	Department for Public Affairs		
Other stakeholders	Stakeholder Group		Engagement (Inform, Consult, Involve, Collaborate, Empower)
	Directorate for Finance Department for Public Safety local communities transport operators civic groups Independent Consultant		Consult Consult Involve Involve Involve Collaborate
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart Component
	This action promotes the use of fuel-efficient, low-emission vehicles and electric vehicles, avoiding GHG emissions related to travel inside BDBiH.	The action is gender neutral, but public transportation is crucial for women's mobility, particularly for elderly individuals and those with disabilities, as well as for boys and girls. According to the gender assessment, improving public transportation is a top priority. To adjust the timetables based on their needs, consultations with women and men from different parts of BDBiH will be necessary and gender sensitive analysis and gender impact assessment during should be undertaken in planning phase. Additionally, ensuring the accessibility of vehicles for persons with disabilities is essential.	An integrated ticketing system for multivendor public transportation operations has a basic level of smart, data-driven transportation and infrastructure planning. E-payment should be a part of the information system. The integrated ticketing system for public transportation can be easily integrated with the smart parking system when it is established, providing services like "Park-and-Ride"
CO₂ emission reduction / Environmental benefit	750 tCO ₂ /y		
Indicative Project Costs	CapEx (EURO / KM)		OpEx (EURO / KM)
	15,000,000/29,400,000		300,000/588,000
Notes on cost estimates:	The CAPEX is based on expert judgement and benchmarking of similar activities. OpEx is 2% of CapEx. Analysis (studies) and Planning: 400,000 EUR; Upgrading the Bus Fleet: 13,000,000 EUR; 1,000,000 EUR/bus / 1,000,000 (KM/bus); Integrated Ticketing System: 1,000,000 EUR; Testing and Improvements: 100,000 EUR; Broader Implementation: 500,000 EUR		
Potential Financing Instruments and Sources	Instrument		Sources
	International funding - Grant Transfer from the national government: Loan (EBRD, EIB, WB) Own source revenue – District budget		40% / 6,000,000 30% / 4,500,000 20% / 3,000,000 10% / 1,500,000

Action: 4.2.1 Sustainable Urban Mobility Plan (SUMP) for BDBiH		Type	Investment
Link with the strategic goal	4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorized and non-motorized modes of transport	Priority	4.2 Build a sustainable transport system and its infrastructure
Linkage to Existing Policies/Plans	Law on road transport in BDBiH Framework Strategy of Transport of Bosnia and Herzegovina for the period 2016 – 2030 Development Strategy of BDBiH 2021–2027. Spatial Development Strategy of BDBiH 2018–2038 Environmental Protection Strategy of BDBiH for 2016–2026.		
Strategic projects	/		
Description	<p>This action contains two components, the first one refers to the development of the plan itself, and the second one focuses on the beginning of the implementation of the plan in a form of a pilot project.</p> <p>Sustainable Urban Mobility Planning represents a comprehensive approach to developing transportation systems in urban areas aimed at improving residents' quality of life, reducing pollution, and promoting environmental sustainability. This strategy focuses on transportation and considers the broader context of urban planning, economic development, and environmental protection.</p> <p>Key elements of this approach include integrating various policy areas and sectors to develop comprehensive strategies, cooperating at all levels of government and administration to coordinate activities, and actively participating citizens and other stakeholders in the planning process.</p> <p>The goal of Sustainable Urban Mobility Planning is to develop integrated, sustainable transportation options and solutions that contribute to achieving clear goals and objectives. This may include improving public transportation, promoting cycling and walking, implementing innovative technologies, and developing infrastructure that supports sustainable modes of transportation.</p> <p>The content of Sustainable Urban Mobility Planning includes defining goals and tasks, developing long-term visions and implementation plans, assessing current and future impacts, and monitoring and evaluating implemented measures for continuous improvement.</p> <p>Furthermore, Sustainable Urban Mobility Planning is closely linked to other plans and strategies that promote sustainable development and reduce carbon dioxide emissions. The combined action of these strategies contributes to creating prosperous and sustainable cities that provide a high quality of life for their residents.</p>		

Description	<p>Steps in developing a SUMP, including implementation:</p> <p>1. Data Collection: The first step involves comprehensive data collection regarding urban transportation, including existing road networks, vehicle fleet information, passenger movement data, accident statistics, and other relevant information. Data from Action: 2.2.1 Development of a data collection program for the entire city and a multimodal transport model should be included in the data. This data collection enables a comprehensive analysis of the current state and identification of key challenges.</p> <p>2. Data Analysis: Following data collection, a detailed analysis is conducted to identify the problems and opportunities in urban transportation. This analysis involves identifying issues such as congestion, lack of access to transportation, air pollution, and other aspects affecting mobility and quality of life. The analysis also identifies improvement opportunities, such as potential bike routes or locations for expanding public transportation.</p> <p>3. Goal Setting: Clear goals and objectives are defined based on data analysis. These goals include reducing travel time, increasing sustainable transportation options, reducing CO₂ emissions, and improving transportation access for all residents. Defined goals guide further planning and implementation steps.</p> <p>4. Stakeholder Engagement: It is crucial to involve many stakeholders in the decision-making process, including government agencies, local communities, transportation providers, citizen associations, and other relevant actors. Stakeholder engagement ensures support and diverse perspectives in mobility planning.</p> <p>5. Implementation: The next step is implementing planned measures after defining strategies. This may involve building bike lanes, improving public transportation, and promoting alternative transport options. Implementation requires collaboration among all stakeholders to ensure successful goal achievement and changes in urban transportation.</p>		
Implementation duration	<i>Duration 24 months, starting from 2025</i>		
Implementation process and timeline	Step (subsequent)	Duration	
	Data Collection	<i>Three months</i>	
	Data Analysis	<i>Six months</i>	
	Goal Setting	<i>Six months</i>	
	Stakeholder engagement	<i>Six months</i>	
Implementation	<i>Three months and continuously</i>		
Action link to indicators	State indicators		Pressure indicator
	1. Air quality, 7. Climate change and GHG		10., 11., 12
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Status of the Sustainable Urban Mobility Plan in the BDBiH	There is no Sustainable Urban Mobility Plan for the BDBiH	The Sustainable Urban Mobility Plan of the BDBiH has been completed and adopted

The development effect and contribution of the measure	The Sustainable Urban Mobility Plan (SUMP) enables better planning and integration of sustainable transportation options in urban areas, reducing CO ₂ emissions, promoting public transport, encouraging sustainable mobility, and enhancing citizens' quality of life.		
The institution responsible for the implementation	Department for Public Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Institute for Planning, Designing and Development of the BDBiH Department for Spatial Planning and Property-Legal Affairs Traffic Police Media NGOs, other institutions, and civil society organizations Independent consultant	Collaborate Collaborate Consult Involve Involve Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	This action promotes the use of fuel-efficient, low-emission vehicles and electric vehicles, avoiding GHG emissions related to travel inside BDBiH.	The Sustainable Urban Mobility plan needs to ensure the visibility of needs and the participation of various groups, including women, men, boys, and girls. Indicators should be gender-sensitive, and the effects on gender equality and women's empowerment should be assessed. All data related to people needs to be gender and age disaggregated.	The development of SUMP provides an opportunity to improve data management by implementing GIS systems, smart sensors, IoT networks, Big Data analytics, and traffic prediction and modelling software.
CO₂ emission reduction / Environmental benefit	4,000 tCO ₂ /y		
Indicative Project Costs	CapEx (EURO / KM)	OpEx (EURO / KM)	
	100,000/196,000	17,000/33,320	
Notes on cost estimates:	The CAPEX is based on expert judgement and benchmarking of similar activities. OpEx is 17% of CapEx. Data Collection: 30,000 EUR; Data Analysis: 15,000 EUR; Goal Setting: 10,000 EUR; Stakeholder Engagement: 10,000 EUR; Implementation: 35,000 EUR		
Potential Financing Instruments and Sources	Instrument	Sources	
	International funding - Grant Own source revenue – District budget Transfer from the national government	40% / 40,000 30% / 30,000 30% / 30,000	

Action: 4.2.2 Promotional campaigns for car sharing, walking and cycling		Type	Policy
Link with the strategic goal	4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorized and non-motorized modes of transport	Priority	4.2 Build a sustainable transport system and its infrastructure
Linkage to Existing Policies/Plans	Law on roads of BDBiH, 2018 Law on road transport in BDBiH Framework Strategy of Transport of Bosnia and Herzegovina for the period 2016 – 2030 Development Strategy of BDBiH 2021–2027. Environmental Protection Strategy of BDBiH for the period 2016–2026		
Strategic projects	/		
Description	<p>This initiative entails implementing promotional campaigns for car sharing, cycling, and bike sharing at the city level, as well as walking, considering women’s safety and mobility patterns.</p> <p>The aim is to encourage people to replace car ownership with renting cars for shorter periods through ride-sharing schemes online. This concept would be promoted to encourage car sharing to and from work with colleagues, introduce workplace incentive programs for car sharing, develop car clubs where members would have access to vehicles on a short-term basis, and promote car-sharing culture to reduce the need for car ownership.</p> <p>The primary goal of the promotional campaign is to promote environmentally friendly and healthier lifestyles for citizens and visitors, encouraging an active approach and highlighting the benefits of cycling and bike sharing within the city. To encourage more cycling, various actions are planned, including incentive programs for purchasing bicycles, media promotion of cycling, workplace campaigns, events such as Cycling Month, car-free days on certain city streets, and various initiatives to improve cycling infrastructure.</p> <p>Additionally, promoting walking through activities such as Walking Month, Walk to School Day/Week, Car-Free Days, and campaigns focused on pedestrian safety are planned, specifically focusing on women’s safety during the night hours. Furthermore, electric mobility will be promoted through public institutions, for example, by providing bicycle and scooter parking lots and electric vehicle charging stations.</p> <p>To promote cycling, a “reward” can be implemented. This app awards points to users for cycling, which can then be redeemed at local stores. This encourages more people to cycle and supports the local economy.</p> <p>Furthermore, “raising awareness”, activities related to ecology and health will be carried out, such as car-free days in the city centre and promoting free bicycle rentals to encourage a healthier lifestyle.</p>		
Implementation duration	<i>Duration 36 months, starting in 2025</i>		

Implementation process and timeline	Step (subsequent)	Duration	
	Develop a detailed campaign plan for alternative transportation.	<i>Three months</i>	
	Implementation of a promotional campaign for car sharing at the city level	<i>11 months</i>	
	Implementation of a promotional campaign for cycling and bike sharing at the city level	<i>11 months</i>	
	Implement a promotional campaign for walking at the city level	<i>11 months</i>	
Action link to indicators	State indicators	Pressure indicator	
	8. Climate mitigation and GHG emissions 1. Air quality: 1.3	11., 12.	
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Number of awareness campaigns	0%	100% of planned campaigns implemented
The development effect and contribution of the measure	Increased awareness of the economy and the population about the importance of environmental protection. Integrating the gender perspective into policies through strengthening the capacities of employees in institutions.		
The institution responsible for the implementation	Department for Public Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department for Spatial Planning and Property-Legal Affairs Sub-Department for Support of the Ministry of Health and Non-Governmental Organizations Commission for Gender Equality of the Assembly of the BDBiH Business entities Chamber of Commerce NGOs and media Independent Consultant	Collaborate Collaborate Collaborate Involve Involve Consult Collaborate	

Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart Maturity
	This action promotes the use of non-motorized transport avoiding emissions of GHGs related to travel inside the BDBiH.	The action is gender neutral, but relevant for gender and social inclusion. Women's Mobility in rural areas is significant for accessing economic opportunities, cultural and social events, and overall quality of life. Fewer women than men have access to a car, so organizing car-sharing initiatives could increase women's access to transportation. To make the promotional campaigns for car sharing, cycling, bike sharing, and walking gender-responsive, focus on understanding and addressing the unique safety, accessibility, and mobility needs of women. Include targeted outreach and engagement strategies to ensure female participation, develop campaigns that address concerns about personal security, especially during non-daylight hours, and offer tailored incentives such as women-only car-sharing groups or cycling classes to boost. This could be done in cooperation with women's groups and organizations as a women-to-women service.	The development of a mobile app to support car / bike sharing services provides a basic level of smart elements, allowing the beneficiary to collect data over a long period on citizens' habits and preferences that can be used for infrastructure planning. E-payment should be a part of the information system. With this mobile application, data is obtained only on part of the transport system, so it is necessary to work on linking it with data from other transport services to later integrate it all into a complete smart service.
CO ₂ emission reduction / Environmental benefit	900 tCO ₂ /y		
Indicative Project Costs	Costs (EURO / KM)		
	35,000/68,600		
Notes on cost estimates:	The cost is based on expert judgement and benchmarking of similar activities. Develop a detailed campaign plan for alternative transportation: 5,000 EUR; Implementation of a promotional campaign for car sharing at the city level: 10,000 EUR; Implementation of a promotional campaign for cycling and bike sharing at the city level: 10,000 EUR; Implement a promotional campaign for walking at the city level: 10,000 EUR		
Potential Financing Instruments and Sources	Instrument	Sources	
	Own source – District budget Public-Private Partnership (PPP) Community initiative	25% / 8,750 20% / 7,000 55% / 19,750	

Action: 4.2.3 Expand and improve cycling infrastructure		Type	Investment
Link with the strategic goal	4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorized and non-motorized modes of transport	Priority	4.2 Build a sustainable transport system and its infrastructure
Linkage to Existing Policies/Plans	Environmental Protection Strategy of BDBiH for 2016–2026. Spatial Development Strategy of BDBiH 2018–2038 Law on roads of BDBiH, 2018 Framework Strategy of Transport of Bosnia and Herzegovina for the period 2016 – 2030 Development Strategy of BDBiH 2021–2027		
Strategic projects	/		
Description	<p>The activity includes implementing a bicycle path for the entire city and a network of public bicycle parking throughout the city. Introduce separate bicycle paths where possible and reconstruct the existing ones if necessary. Bicycle lanes should first connect the bus station, railway station, attractions in the city centre, shopping centres, sports and recreation centres, workplace locations, and other locations with a pronounced “attraction.” Potential routes for bicycle paths are the banks of rivers and streams and busy streets (corridors).</p> <p>Construction of cycling infrastructure:</p> <ul style="list-style-type: none"> • New infrastructure for bicycle parking will be crucial to support the enhancement of the city’s cycling network. • Bicycle facilities will be planned, designed, and installed in accordance with international standards emphasizing visibility, accessibility, safety, and maintenance. • New bicycle parking facilities will be distributed along the main cycling routes and strategically located at sites with high user frequency, such as tourists, workers, and students. • The number of parking spaces will be determined according to local standards or by conducting a study of bicycle parking capacity. • Promotion of cycling and public awareness: • Campaigns need to be conducted to inform the public and other interested groups about the benefits of cycling. • Campaigns will be carried out at various locations suitable for public information and at workplaces and employers, including municipal institutions. • The goal is to garner support for policies that promote cycling and ensure the necessary infrastructure, such as bicycle parking facilities and showers. 		
Implementation duration	<i>Duration 36 months, starting in 2025</i>		

Implementation process and timeline	Step (subsequent)		Duration
	Development of study, including Origin-Destination (O-D) survey		<i>Six months</i>
	Preparation of project documentation for new bicycle lines		<i>Six months</i>
	Implementing new citywide bike lanes and reconstructing as necessary.		<i>12 months</i>
	Building new bike parking near routes and in key areas.		<i>Six months</i>
Conducting awareness campaigns, engaging support.		<i>Six months</i>	
Action link to indicators	State indicators		Pressure indicator
	8. Climate mitigation and GHG; 1. Air quality		11., 12.
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	The degree of construction of cycling infrastructure	Insufficiently developed infrastructure	50% of planned
	Incentive models for promoting non-motorized transport	There are no incentive models for non-motorized transport	Adopted incentive model for non-motorized transport
The development effect and contribution of the measure	The effect and contribution are the increase in the share of renewable sources in the total electricity production in the BDBiH. More detailed effects and contributions are reflected in reducing traffic congestion and air pollution by promoting bicycle use, improving physical activity and the population's health, sustainable mobility, and better connectivity of urban areas.		
The institution responsible for the implementation	Department for Public Affairs		
Other stakeholders	Stakeholder Group		Engagement (Inform, Consult, Involve, Collaborate, Empower)
	Institute for Planning, Designing and Development JP "Putevi Brčko" doo NGOs and media Independent Consultant		Consult Collaborate and empower Involve Collaborate

Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	This action promotes the use of non-motorized transport, avoiding emissions of GHGs related to travel inside the BDBiH	The action is gender-neutral, potentially impacting increased mobility for women, men, and children. To make the implementation of a city-wide bicycle path network and public bicycle parking facilities gender-responsive, the planning and design of these infrastructures must consider the specific safety and accessibility concerns of women. Engage women in the planning process to gather insights on their preferences and concerns, provide well-lit and secure bicycle parking locations, and incorporate features in the paths such as emergency call points and clear signage. Additionally, organise targeted outreach and educational campaigns encouraging women to utilise cycling facilities, addressing any barriers they might face. Women's associations could be important partners in conducting local campaigns to ensure outreach to women.	/
CO ₂ emission reduction / Environmental benefit	300 tCO ₂ /y		
Indicative Project Costs	CapEx (EURO / KM)	OpEx (EURO / KM)	
	1,000,000/1,960,000	110,000/215,600	
Notes on cost estimates:	<p>The CAPEX is based on expert judgement and benchmarking of similar activities. OpEx is 11% of CapEx. (Construction of cycling infrastructure approx. 40 km¹⁴; Promotion of cycling and public awareness). Building a bike lane per meter costs: 10-50 (EURO / KM).</p> <p>Of the total investment, % per sub-actions: Development of study: 15% - 25%; Preparation of project documentation for new bicycle lines: 20% - 30%; Implementing new citywide bike lanes, reconstructing as necessary: 25% - 35%; Building new bike parking near routes and in key areas: 15% - 25%; Conducting awareness campaigns, engaging support: 15% - 25%</p>		
Potential Financing Instruments and Sources	Instrument	Sources	
	International funding - Grant Transfer from the national government Own source revenue – District budget Public-Private Partnership (PPP)	35% / 350,000 30% / 300,000 20% / 200,000 15% / 150,000	

¹⁴ Zavod za planiranje, projektovanje i razvoj Brčko distrikta BiH, u maju 2022. godine, izradio je „Idejno rješenje biciklističke staze i šetališta pored rijeke Save kroz teritoriju Brčko distrikta BiH“.

Action: 4.2.4 Implementation of the pedestrian priority infrastructure		Type	Investment
Link with the strategic goal	4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorized and non-motorized modes of transport	Priority	4.2 Build a sustainable transport system and its infrastructure
Linkage to Existing Policies/Plans	Law on roads of BDBiH, 2018 Law on road transport in BDBiH Framework Strategy of Transport of Bosnia and Herzegovina for the period 2016 – 2030 Development Strategy of BDBiH 2021–2027. Spatial Development Strategy of BDBiH 2018–2038 Environmental Protection Strategy of BDBiH for 2016–2026.		
Strategic projects	/		
Description	<p>The measure focuses on enhancing pedestrian priority infrastructure in BDBiH. It involves implementing pedestrian traffic lanes and expanding the pedestrian zone in the city centre. The flat terrain is conducive to walking, necessitating measures to improve mobility. A city-wide wayfinding information system will promote walking by enhancing connectivity and accessibility. Improved crosswalks, wider footpaths, and clear signage will facilitate navigation. Pilot projects will gauge user satisfaction before broader implementation. Extending the pedestrian zone aims to enhance accessibility, promote business activity, and improve environmental quality. The analysis will determine the need to expand existing pedestrian zones, considering traffic displacement and commercial impacts.</p> <p>To implement these measures for prioritizing pedestrian traffic and expanding pedestrian zones, the following steps need to be taken:</p> <p>1. Analysis and Planning:</p> <ul style="list-style-type: none"> - Detailed analysis of the current pedestrian infrastructure in the city, including identifying key areas with high pedestrian frequency and needed improvements. - Conduct Origin-Destination (O-D) survey - Development of a plan for expanding pedestrian zones and installing additional signage, considering urban, traffic, and safety factors. <p>2. Pilot Project Implementation:</p> <ul style="list-style-type: none"> - Selection of a smaller area for a pilot project to expand the pedestrian zone and implement new pedestrian signage and markings. - Monitoring the impact of the pilot project, including traffic analysis, pedestrian behaviour, and public feedback. <p>3. Learning from the Pilot Project:</p> <ul style="list-style-type: none"> - Evaluation of the results of the pilot project to identify strengths, weaknesses, opportunities, and threats. - Identification of potential improvements and adjustments before broader implementation. 		

Description	<p>4. Broader Implementation:</p> <ul style="list-style-type: none"> - Using lessons learned from the pilot project, the expansion of pedestrian zones to other parts of the city. - Additional pedestrian signalling, including adaptive traffic lights and markings, will be installed according to the plan created in the analysis and planning phase. <p>5. Monitoring and Maintenance:</p> <ul style="list-style-type: none"> - Regular monitoring of the performance of expanded pedestrian zones, including traffic analysis, safety, and user satisfaction. - Maintenance of pedestrian zone infrastructure and signage to ensure their functionality and safety. 		
Implementation duration	<i>Duration 60 months, starting in 2025</i>		
Implementation process and timeline	Step (subsequent)	Duration	
	Analyze existing infrastructure and pedestrian movement patterns and plans for implementing	<i>Nine months</i>	
	Pilot Project Implementation	<i>Ten months</i>	
	Learning from the Pilot Project	<i>Three months</i>	
	Broader Implementation	<i>38 months</i>	
	Monitoring and Maintenance	<i>continuously</i>	
Action link to indicators	State indicators	Pressure indicator	
	1. Air quality; 7. Climate change and GHG	11., 12.	
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Number of kilometres of built pedestrian road lines	% of Km in the year of project start	30% increased km when the pilot project ended
The development effect and contribution of the measure	<p>Enhancing pedestrian infrastructure and expanding city centre zones fosters sustainable urban mobility, improves accessibility, and stimulates local economic activity. This measure also aims to reduce air pollution and enhance the overall quality of the urban environment.</p> <p>Increasing the share of renewable energy sources in the total electricity production in the BDBiH.</p>		
The institution responsible for the implementation	Department for Public Affairs		


Other stakeholders	Stakeholder group		Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Institute for Planning, Designing and Development JP "Putevi Brčko" doo NGOs and media Independent Consultant		Consult Collaborate and empower Involve Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion		Smart Maturity
	This action promotes avoiding the use of motorized transport and, by so, avoiding GHG emissions related to travel inside the BDBiH.	The action is gender neutral and to make it gender responsible it is necessary to include gender dimension in analysis, pilot project design and monitoring. The needs analysis should include women's needs, specifically related to safety. Signs can be a good opportunity for the promotion of gender equality by using male and female figures for pedestrians and similar		/
CO₂ emission reduction / Environmental benefit	120 tCO ₂ /y			
Indicative Project Costs	CapEx (EURO / KM)		OpEx (EURO / KM)	
	1,000,000/1,960,000		50,000/98,000	
Notes on cost estimates:	The CAPEX is based on expert judgement and benchmarking of similar activities. OpEx is 5% of CapEx. Building a bike lane per meter costs: 10-50 EURO / KM). Of the total investment, % per sub-actions: Analyze existing infrastructure and pedestrian movement patterns and plans for implementation: 15% - 25%; Pilot Project Implementation: 20% - 30%; Learning from the Pilot Project: 10% - 15%; Broader Implementation: 25% - 35%; Monitoring and Maintenance: 15% - 25%			
Potential Financing Instruments and Sources	Instrument		Sources	
	Transfer from the national government Own source – District budget International funding – Grant Public-Private Partnership (PPP)		40% / 400,000 25% / 250,000 20% / 200,000 15% / 150,000	

4.4 Buildings Actions

Eleven actions have been shortlisted in the building sector. In addition to developing new policies and implementation documents (sub-laws), concrete investments are also necessary to improve energy efficiency in the building sector.

The biggest investments in the sector are in introducing energy efficiency in district buildings and residential and commercial buildings. The total capital expenditure for these actions is estimated at approximately 268,000,000 EUR.

Table 20 – Timeline for building sector actions

Sector	Action title	Duration						
		2025	2026	2027	2028	2029	2030	2031-2040
 Buildings	4.1.1 Definition of nearly zero energy buildings (nZEB) through primary energy indicators (kWh/m ²) and the minimum share of RES use (%)							
	4.1.2 Introduction of energy management in public buildings							
	4.1.3 Rulebook on Energy Audits							
	4.1.4 Drafting of other secondary legislation in the field of building construction							
	4.1.5 Study on Renewable Energy Potential in BDBiH Buildings							
	4.1.6 Installation of solar systems (PV and for the preparation of domestic hot water) in public institutions							
	4.1.7 Installation of thermostatic sets and their smart metering in all buildings owned by BDBiH							
	4.1.8 Establishment of a legal framework for efficient energy management and the introduction of green public procurement criteria for the purchase of electrical appliances for buildings owned by BDBiH							
	4.1.9 Improvement of energy efficiency in buildings owned by BDBiH							phase II
	4.1.10 Improvement of energy efficiency in residential buildings and residential family houses							phase II
	4.1.11 Improving energy efficiency in commercial and service buildings							phase II

Action: 4.1.1 Definition of nearly zero energy buildings (nZEB) through primary energy indicators (kWh/m²) and the minimum share of RES use (%)		Type	Policy
Link with the strategic goal	4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorized and non-motorized modes of transport	Priority	4.1 Integrate energy efficiency standards in buildings
Linkage to Existing Policies/Plans	Climate Change Adaptation and Low-Emission Development Strategy for Bosnia and Herzegovina for the period 2020-2030 EU legislative framework (EPBD) ¹⁵		
Strategic projects	/		
Description	<p>This measure aims to achieve compliance with the nZEB requirements prescribed by EPBD (Articles 2 and 9). A near-zero-energy building (nZEB) has a very high energy performance. The nearly zero or very low amount of energy required should be covered significantly by energy from renewable sources, including energy from renewable sources produced on-site or nearby.</p> <p>This action aims to define nZEB in local legislation through the definition of:</p> <ul style="list-style-type: none"> • a numerical indicator of primary energy in kWh/m², • the minimum share of RES use (%) • year from which nZEB will be enforced for all newly constructed buildings (separately for public and residential). <p>Current regulations concerning buildings and energy efficiency will be reviewed to understand their limitations and strengths. During the process, engagement with relevant stakeholders will be initiated to consider all insights while developing nZEB criteria (primary energy indicators and determining the minimum share of renewable energy sources required for nZEB compliance). This action aims to implement necessary regulatory changes to incorporate nZEB criteria into building codes.</p>		
Implementation duration	12 months, starting from 2025 ¹⁶		
Implementation process and timeline	Step (The steps regarding preliminary review and stakeholder consultation may be performed in parallel. The last two steps are shown in the correct order)	Duration	
	<i>Conducting a preliminary review of existing regulations and defining project objectives</i>	<i>Two months (1 – 2)</i>	
	<i>Stakeholder consultation (government bodies, experts, consultants)</i>	<i>Two months (1 – 2)</i>	
	<i>Development of nZEB criteria (primary energy indicators and the minimum share of RES use)</i>	<i>Six months (2 – 8)</i>	
	<i>Adoption of nZEB criteria into local legislation</i>	<i>Four months (8 – 12)</i>	

¹⁵ Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast)

¹⁶ The introduction of the nZEB definition will be in effect in the year prescribed by the new set of laws aligned with EU regulations. 2025. is given as an optimal assumption, provided that new laws are drafted as early as 2024.

Action link to indicators	State indicators		Pressure indicator
	8. Climate change and GHG emissions		18.1, 18.2, 18.3
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Status of the development of nZEB criteria	No primary energy indicators and minimum RES share for nZEB defined	Criteria developed
	Status of completion and adoption of the nZEB definition	No definition established in local legislation	Definition established and adopted
The development effect and contribution of the measure	<p>The establishment of clear criteria for nearly zero-energy buildings (nZEB) through primary energy indicators (kWh/m²) and the minimum share of renewable energy sources used (%) not only fosters the development of energy-efficient buildings but also significantly contributes to aligning with EU legislation and achieving goals for decarbonization in the building sector. Defining nZEB through primary energy indicators and a high minimum share of RES use leads to significant energy consumption and reductions in carbon emissions.</p> <p>Furthermore, increased use of locally available renewable energy resources reduces dependence on imported fuels, enhancing energy security and stability.</p>		
The institution responsible for the implementation	Office for Management of Public Assets		
Other stakeholders	Stakeholder Group		Engagement (Inform, Consult, Involve, Collaborate, Empower)
	Department for Communal Affairs Department for Public Affairs JP "Komunalno Brčko" Independent Consultant		Consult Consult and collaborate Empower Collaborate
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	Enforcement of energy efficiency measures and building codes will reduce GHG emissions	The action is gender neutral, and women are generally underrepresented in the construction industry, and efforts should be made to ensure the employment of both women and men in related projects. Additionally, statistics on ownership need to be gender disaggregated to enable monitoring of access to assets for both women and men	Adopting the nZEB regulation entails integrating different digital technologies with smart metering. This allows real-time monitoring and management of energy consumption and optimisation of energy use based on occupancy and weather conditions.

CO₂ emission reduction / Environmental benefit	This is a soft measure whose impact cannot be precisely quantified before adoption; however, it is crucial to enable the definition of nearly zero-energy buildings (nZEB) through primary energy indicators (kWh/m ²), the minimum share of RES use (%), and the year from which nZEB will be enforced for all newly constructed buildings.	
Indicative Project Costs	Costs (EURO / KM)	
	17,500/34,300	
Notes on cost estimates:	The cost of 17.500 EUR is estimated based on the costs of hiring specialized consultants and engineers to conduct cost-optimal analyses and modelling simulations required to define the nZEB standards.	
Potential Financing Instruments and Sources	Instrument	Source
	Own source (District budget)	100% / 17,500

Action: 4.1.2 Introduction of energy management in public buildings			Type	Policy
Link with the strategic goal	4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorized and non-motorized modes of transport	Priority	4.1 Integrate energy efficiency standards in buildings	
Linkage to Existing Policies/Plans	Law on Energy Efficiency ("Official Gazette of BDBiH", no. 25/2022) The Action Plan for Sustainable Energy Management and Adaptation to Climate Change (SECAP) of the BDBiH – Measure number Z-1			
Strategic projects	/			
Description	<p>The information system for energy management serves as an essential tool for overseeing and analyzing energy and water consumption in all public buildings. Its primary functions encompass:</p> <ul style="list-style-type: none"> • the collection and input of key building data/public building inventory, • monitoring of energy and water consumption, • easy access to information on total energy and water consumption, • calculations and analyses to identify and address undesirable or excessive consumption, • verification of achieved actual savings of energy and energy costs, • possibility of automatic remote readings on energy and water consumption • automatic alerts regarding operational irregularities. <p>The obligations under this measure are prescribed by the Law on Energy and Efficiency. Energy Management Information System (EMIS) has already been deployed and used in FBiH, RS (BiH), Serbia, and Croatia, and a similar solution could be used in BD. The EMIS will be used on existing hardware (no need for software installation). If the BDBiH government agrees, the EMIS could be transferred to local servers after fulfilling certain technical and human capacities within the appointed department/institution (middle/long term). This is optional for the short term and thus not foreseen during the given implementation duration. The described implementation steps are designed so that each subsequent step is carried out upon completing the previous one.</p>			
Implementation duration	18 months, starting from 2025			

Implementation process and timeline	Step (subsequent)		Duration
	<i>Initiation of the collaboration between IFIs or international implementation agencies and District Brčko regarding the usage of EMIS with the development of the project plan and the timeline for its integration in DB; determining server requirements for installation of EMIS, maintenance and training costs</i>		<i>Three months</i>
	<i>Decision on obligatory use of EMIS according to the Law on EE DB</i>		<i>One month</i>
	<i>Training of appointed energy managers</i>		<i>Twelve months</i>
	<i>Entering required data from the energy management system obliges prescribed by the Law on EE DB; continuous monitoring and verification of the actual consumption</i>		<i>Two months</i>
	<i>Installation of equipment for remote reading of energy and water consumption and connecting it to the EMIS, as prescribed by the Law on EE DB</i>		<i>continuously¹⁷</i>
Action link to indicators	State indicators		Pressure indicator
	8. Climate change and GHG emissions		18.3, 19.3
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Energy management information system in public buildings	Public buildings without energy management information system	All public buildings with energy management information system
The development effect and contribution of the measure	This measure aims to integrate EMIS dedicated to monitoring and managing energy consumption with the potential to generate savings, enabling detection and correction of irregularities or increases in consumption, thereby preventing undesired consequences and enhancing overall energy efficiency and reporting.		
The institution responsible for the implementation	Office for Management of Public Assets of Brcko District		

¹⁷ Law on Energy Efficiency in BDBiH ("Official Gazette BDBiH", number 25/22) - Article 36, paragraph d) stipulates that at all energy and water consumption measuring points in a building, part of a building, or a group of buildings where the total annual cost of energy and water consumption is equal to or greater than 50.000 KM, a remote consumption reading system shall be installed and connected to the Energy Management Information System, or access shall be provided to the BDBiH relevant department. Thus, continuous installation of the EMIS will be necessary, and the end-user will cover installation costs.

Other stakeholders	Stakeholder Group		Engagement (Inform, Consult, Involve, Collaborate, Empower)
	Department for Communal Affairs Department for Public Affairs JP "Komunalno Brčko" Independent Consultant		Consult Consult and collaborate Empower Collaborate
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	Enforcement of energy efficiency measures and building codes will reduce GHG emissions	In order to make the action gender responsive, it should be ensured that the system's design and deployment consider gender-specific usage patterns and impacts. Include women in the development and testing phases to gather diverse usability and access needs insights. Use the data collected to analyse differences in energy and water use in facilities predominantly used by women compared to those used by men and adjust policies to address any disparities. Provide training and capacity-building programs on the system's usage and benefits, ensuring these are accessible to both male and female staff in the public sector.	EMIS facilitates real-time monitoring, data analysis, and optimization of energy and water consumption in public sector buildings. Different sensors (temperature, occupancy, open/closed doors or windows, etc.) could be installed to improve monitoring and achieve additional savings.
CO₂ emission reduction / Environmental benefit	This is a action whose impact cannot be precisely quantified; however, it is crucial to enable the introduction of energy management in public buildings for overseeing and analysing energy and water consumption in all public buildings.		
Indicative Project Costs	Cost (EURO / KM)		
	150,000/294,000		
Notes on cost estimates:	The cost includes establishing EMIS in BDBiH, creating the public building inventory with all necessary detailed building data, integrating all energy and water measuring points for all buildings, and organizing training for appointed energy managers in the first year of EMIS usage. Thus, costs are estimated to cover the initial expenses occurring during the implementation duration (100,000 EUR), the annual software licenses, and the annual organization of training for new energy managers (50,000 EUR).		
Potential Financing Instruments and Sources	Instrument		Source
	Grant - International IFIs and international implementation agencies (UNDP or others) Own source - District budget		60% / 90,000 40% / 60,000

Action: 4.1.3 Rulebook on Energy Audits			Type	Policy
Link with the strategic goal	4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorized and non-motorized modes of transport	Priority	4.1 Integrate energy efficiency standards in buildings	
Linkage to Existing Policies/ Plans	Environmental Strategy of the BD BiH 2022-2032: Measure 4.5.1. Creating an enabling environment for energy efficiency and reduced final energy consumption			
Strategic projects	/			
Description	<p>This ongoing action aims to develop and implement a regulatory framework in alignment with the Law on Energy Efficiency of the BDBiH, particularly focusing on Article 26, Paragraph 2. Key project elements include:</p> <ul style="list-style-type: none"> • setting minimum criteria for energy audits, • establishing a structured reporting system, • defining licensing requirements for energy consultants in large enterprises and • specifying conditions for authorizing training organizations. 			
Implementation duration	12 months, starting from 2025			
Implementation process and timeline	Step (subsequent)		Duration	
	Engaging with key stakeholders, including government officials and other		Four months	
	Draft the Rulebook on Energy Audits based on the legal provisions specified in the Law on Energy Efficiency		Six months (finalized)	
	Adoption of the Rulebook on Energy Audits		Two months	
Action link to indicators	State indicators		Pressure indicator	
	8. Climate change and GHG emissions		18.	
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values	
	Status of setting minimum criteria for energy audits	There are no criteria for an energy audit	Criteria developed and adopted	
	Status of defining licensing requirements for energy consultants in large enterprises	There are no requirements for energy consultants in large enterprises	Requirements defined and adopted	
	Status of the Rulebook	Rulebook is not part of BDBiH legislation	Rulebook adopted	

The development effect and contribution of the measure to the achievement of priorities	Implementing the Rulebook on Energy Audits will streamline energy assessment processes, providing standardized criteria and targeted recommendations to improve energy efficiency in the BDBiH. Energy audits conducted following the rulebook will give detailed insights into energy consumption patterns. This, in turn, facilitates the generation of targeted and specific recommendations for energy efficiency improvements tailored to each audited sector.		
The institution responsible for the implementation	Department for Communal Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department for Public Affairs Independent Consultant	Consult Collaborate	
Cross-cutting themes	Climate Action	Gender and Social inclusion	Smart component
	Enforcement of energy efficiency measures will reduce GHG emissions	The action is gender neutral and energy audits are less affordable for small businesses, which women usually own. Additionally, women are less represented among energy audit experts. With targeted measures, this action can contribute to increasing access to new technologies, knowledge, and economic opportunities for both women and men	Implementing the Rulebook on Energy Audits ensures standardized data collection and targeted recommendations, which enhance data reliability and enable advanced analytics for future energy planning.
CO₂ emission reduction / Environmental benefit	This is a soft measure whose impact cannot be precisely quantified; however, it is crucial to enable the adoption of the Rulebook on Energy Audits to improve overall energy efficiency in Brčko.		
Indicative Project Costs	Cost (EURO / KM)		
	10,000/19,600		
Notes on cost estimates:	Cost includes consultant engagement in the development of the Rulebook on Energy Audits		
Potential Financing Instruments and Sources	Instrument		Source
	Grant (EU Funds/EU4Energy) Own source - District Budget		50% / 5,000 50% / 5,000

Action: 4.1.4 Drafting of other secondary legislation in the field of building construction		Type	Policy
Link with the strategic goal	4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorized and non-motorized modes of transport	Priority	4.1 Integrate energy efficiency standards in buildings
Linkage to Existing Policies/Plans	Environmental Strategy of the BD BiH 2022-2032: Measure 4.5.1. Creating an enabling environment for energy efficiency and reduced final energy consumption		
Strategic projects	/		
Description	<p>This measure aims to draft regulations/rulebooks for various aspects of the building sector. General areas of intervention are:</p> <ul style="list-style-type: none"> • Rulebook on Monitoring, Measurement, and Verification of Energy Savings. This rulebook determines the methodology encompassing the monitoring and calculating energy consumption indicators at the District level, calculating energy savings resulting from implementing energy efficiency measures, and energy savings resulting from applying energy services. It also outlines the procedure for verifying energy savings, issues regarding authorization or active access to the Information System, and the mandatory possession of an energy certificate. • Rulebook on the Model of Energy Efficiency Contracts. This Rulebook aims to achieve adequate energy performance of buildings and energy supply and to facilitate the functioning of the energy services market in the District. • The Rulebook on the Inspection of Heating and Air Conditioning Systems includes procedures and inspection intervals that may vary depending on the type of system and fuel used and may be increased as needed if there is an electronic monitoring and control system and authorized personnel for conducting inspections. • The Rulebook on Energy Labelling of Energy-related Products placed on the market or put into use within the District also contains a special technical provision that further defines requirements for certain classes of products. This enables citizens to choose more efficient appliances and reduce energy consumption. 		
Implementation duration	18 months, starting from 2025		
Implementation process and timeline	Step (subsequent)	Duration	
	Engaging with key stakeholders, including government officials and other	Two months	
	Drafting the Regulations/Rulebooks with the recommendations for the renovation of existing buildings	Eight months	
	Making necessary alignments with other primary and secondary legislation based on stakeholder and legal feedback	Four months	
	Adoption of the secondary legislation	Four months	
Action link to indicators	State indicators	Pressure indicator	
	8. Climate change and GHG emissions	18.	

Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Status of the Rulebook on Monitoring, Measurement, and Verification of Energy Savings	Not part of the local legislation	Development and adoption of the Rulebook
	Status of the Rulebook on the Model of Energy Efficiency Contracts	Not part of the local legislation	Development and adoption of the Rulebook
	Status of the Rulebook on the Inspection of Heating and Air Conditioning Systems	Not part of the local legislation	Development and adoption of the Rulebook
	Rulebook on Energy Labelling of Energy-related Products	Not part of the local legislation	Development and adoption of the Rulebook
The development effect and contribution of the measure	Drafting secondary legislation in building construction contributes to improving energy efficiency by mandating the adoption of energy-efficient technologies and practices. This would reduce energy consumption, carbon footprint, and greenhouse gas emissions, alleviate energy poverty, and promote innovation in the sector. This measure would support deploying renewable energy systems and ensure consistency with relevant energy performance standards and certification programs.		
The institution responsible for the implementation	Department for Communal Affairs		
Other stakeholders	Stakeholder Group	Stakeholder Group	
	Department for Public Affairs Independent Consultant	Consult Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	Enforcement of energy efficiency building codes will reduce GHG emissions	This measure is gender neutral and social inclusion targeted since accessibility for persons with disabilities in public buildings will be improved. Whenever possible, all data should be gender disaggregated	These rulebooks enhance smart maturity by establishing a data-driven regulatory framework and promoting energy efficiency through standardized practices (measurement, verification and reporting), regular inspections, and consumer empowerment.
CO₂ emission reduction / Environmental benefit	This is a soft measure whose impact cannot be precisely quantified; however, drafting other secondary legislation in building construction is crucial for enabling future investments in the sector.		
Indicative Project Costs	Cost (EURO / KM)		
	50,000/98,000		
Notes on cost estimates	Cost includes consultant engagement in the development of the Rulebook on Energy Audits		
Potential Financing Instruments and Sources	Instrument	Source	
	Grant (EU funds/EU4Energy) Own-source - District budget	50% / 25,000 50% / 25,000	

Action: 4.1.5. Study on Renewable Energy Potential in BDBiH Buildings		Type	Policy
Link with the strategic goal	4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorized and non-motorized modes of transport	Priority	4.1 Integrate energy efficiency standards in buildings
Linkage to Existing Policies/Plans	The Action Plan for Sustainable Energy Management and Adaptation to Climate Change (SECAP) of the BDBiH – Measure number RES – 1 Environmental Strategy of the BD BiH 2022-2032: Measure 4.6.1. Create an enabling environment for renewable energy sources		
Strategic projects	/		
Description	<p>The study aims to comprehensively evaluate the potential of renewable energy sources (RES) integration in the building sector of BDBiH. It will include:</p> <ol style="list-style-type: none"> 1. Discussions with utility companies to understand their current and future plans regarding RES integration. Through these discussions, the study aims to understand existing infrastructure, capacities, and any ongoing initiatives related to RES integration. Additionally, it aims to identify potential collaboration opportunities and synergies between utility companies and the district's broader renewable energy objectives. 2. analysis of consumption trends, market conditions, legislative framework, investment costs, and incentives for solar systems, heat pumps, and other RES, including assessment of gender-specific barriers to accessing these technologies. 3. assessing infrastructure requirements, technical feasibility, socio-economic, and environmental impacts, including necessary upgrades or changes to ensure the reliable performance of RES. This involves evaluating site-specific conditions, available space, and infrastructure requirements. Additionally, the socioeconomic and environmental impacts of RES deployment are analysed, considering aspects such as job creation, increased employment opportunities for women in the energy sector, energy affordability, and reduced greenhouse gas emissions. 		
Implementation duration	12 months, starting from 2025 Implementation from 2026 to 2035 (10 years)		
Implementation process and timeline	Step (subsequent)	Duration	
	Development of the ToR for the study and starting the tendering procedure.	Four months	
	Tender, evaluation and selection of the contractor/consultant for the development of the study.		
	Development of the study. Presenting the study and findings to stakeholders.	Six months	
	Finalization of the study	Two months	
	Implementation of the study ¹⁸	120 months	

¹⁸ The study will be partially implemented by action 4.1.6 for the public building sector. In contrast, the residential building sector could be financed/encouraged to be installed by citizens through various mechanisms: net metering, on-billing financing by power distributors/suppliers, green loans, etc.

Action link to indicators	State indicators		Pressure indicator
	8. Climate change and GHG emissions, 1. Air quality		15.4, 16
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Status of the completion of the Study	The potential of RES integration in the building sector of BDBIH is not evaluated	The potential of RES integration and measures identified for financing and implementation
The development effect and contribution of the measure	Enhancing the competitiveness of the economy by promoting the use of sustainable energy solutions, thereby reducing energy costs for businesses and households and fostering innovation and investment in renewable energy technologies		
The institution responsible for the implementation	Department for Communal Affairs		
Other stakeholders	Stakeholder Group	Stakeholder Group	
	Department for Public Affairs JP "Komunalno Brčko" Independent Consultant	Consult Empower Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	Shift to renewable energy sources would directly contribute to the reduction of GHG emissions and pollutants	In order to make the action gender responsive and to ensure social inclusion, it is needed to incorporate gender-specific analyses and considerations at each stage. This involves women in discussions with utility companies, ensuring their perspectives on RES integration are considered. In the analysis phase, assess how different demographic groups, including women, might be affected by changes in the energy sector, particularly regarding job creation and energy affordability. Consider the socio-economic impacts specifically on women, such as the potential for increased employment opportunities in the RES sector. Additionally, women and gender-focused organisations should be involved in assessing the environmental and social impacts to ensure that the benefits of RES integration are equitably distributed and that any gender-specific barriers to accessing these technologies are addressed.	/

CO₂ emission reduction / Environmental benefit	This is a soft measure whose impact cannot be precisely quantified; however, developing the Study and implementing it appropriately to achieve the planned results will reduce carbon emissions and green the energy mix.	
Indicative Project Costs	Costs (EURO / KM)	
	70,000/137,200	
Notes on cost estimates	The cost includes developing the study, data collection, analysis, and consultation with utility companies, experts, and stakeholders to assess the renewable energy potential in Brcko buildings.	
Potential Financing Instruments and Sources	Instrument	Source
	Grant - international funds Own source - District Budget	50% / 35,000 50% / 35,000

Action: 4.1.6 Installation of solar systems (PV and for the preparation of domestic hot water) in public institutions		Type	Investment
Link with the strategic goal	4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorized and non-motorized modes of transport	Priority	4.1 Integrate energy efficiency standards in buildings
Linkage to Existing Policies/Plans	The Action Plan for Sustainable Energy Management and Adaptation to Climate Change (SECAP) of the BDBiH – Measure numbers RES-1 and RES-2		
Strategic projects	/		
Description	<p>This measure aims to achieve significant savings in the consumption of electricity and heat energy obtained conventionally by installing solar collectors to produce electricity and preparing hot water in the system, which leads to significant savings.</p> <p>Furthermore, the aim is to assess the existing public buildings' electricity and heating generating and distributing infrastructure and determine whether upgrades or infrastructure changes are needed to ensure the reliable performance of the installed solar systems.</p> <p>Designs will be developed for selected buildings to precisely determine the necessary capacities for installing and optimising the solar system.</p> <p>The new installations will be integrated with the planned EMIS of the District (link with the 4.1.2 action)</p>		
Implementation duration	36 months, starting from 2026 (after finalization of the Study 4.1.5)		
Implementation process and timeline	Step (subsequent)	Duration	
	Development of the model with evaluation criteria and public call; Launch of the public call for the installation of solar systems in public institutions; Create documentation for public procurement and initiate the process of selecting prequalified firms for the installation of solar systems	Six months	
	Selection of public institutions based on evaluation criteria; selection of firms for project execution	Four months	
	For selected buildings, designs and bills of quantities of works are prepared and used for the tendering procedure for the selection of the companies for the installation of the solar systems	Eight months	
	Installation of solar systems	Eighteen months	

Action link to indicators	State indicators	Pressure indicator	
	8. Climate Change and GHG emissions, 1. Air quality	15.4., 16	
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Status of installed solar systems	Public institutions without solar systems	Solar systems are installed in selected public buildings
The development effect and contribution of the measure	Reducing reliance on conventionally sourced electricity and heat energy, decreasing carbon emissions, generating long-term savings and mitigating environmental impact.		
The institution responsible for the implementation	Office for Management of Public Assets		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department for Communal Affairs Department for Public Affairs JP "Komunalno Brčko" Independent Consultant	Consult Consult Empower Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	Shift to renewable energy sources would directly contribute to the reduction of GHG emissions and pollutants	The action is gender neutral, but benefits will be equal for women and men, boys and girls that are using or working in public institutions. Still, in order to make the action more gender responsive, additional criteria for service providers could be put in place in order to support equal employment opportunities for women and men, and women led business in the energy sector.	Combining the real-time monitoring of PV systems and proactive maintenance capabilities of EMIS (action 4.1.2) can ensure optimal performance, efficient energy production, and quick issue resolution, which are key aspects of Smart integration
CO₂ emission reduction / Environmental benefit	32 tCO ₂ /y		

Indicative Project Costs	CapEx (EURO / KM)	OpEx (EURO / KM)
	2,000,000/3,920,000	10,000/19,600
Notes on cost estimates:	<p>The CapEx of 2 million EUR is estimated based on the costs for the procurement, installation, and integration of solar PV systems and solar collectors for domestic hot water preparation in selected public institutions with an annual production of 3.35 GWh (installed on 14,240 m² roof area). The estimated price of the PV system used for calculations is around 650€/kW installed. The CapEx also includes expenses for equipment purchase, installation labour, engineering, and potential upgrades to existing infrastructure.</p> <p>OpEx is estimated for the annual operational expenses of the team that will implement the public call, evaluate, tender, and monitor works.</p>	
Potential Financing Instruments and Sources	Instrument	Source
	Own source - District budget)	40% / 80,000
	Grant - International funds)	30% / 60,000
	Loan	30% / 60,000

Action: 4.1.7 Installation of thermostatic sets and their smart metering in all buildings owned by BDBiH		Type	Investment
Link with the strategic goal	4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorized and non-motorized modes of transport	Priority	4.1 Integrate energy efficiency standards in buildings
Linkage to Existing Policies/Plans	The Action Plan for Sustainable Energy Management and Adaptation to Climate Change (SECAP) of the BDBiH – Measure number Z-7		
Strategic projects	/		
Description	<p>The measure aims to install thermostatic sets in all buildings owned by BDBiH (educational, health, administrative, and other types). Thermostatic valves are designed to control a room's temperature by changing the flow of hot water to the radiator.</p> <p>During the action implementation, public institutions are selected based on predefined evaluation criteria, considering factors such as building usage, energy consumption patterns, and potential for energy savings (heating energy savings with the implementation of this action are estimated to be up to 7% in all buildings). The action is based on launching a public call for installing thermostatic sets and smart metering systems in BDBiH-owned buildings, aiming to request bids from qualified firms interested in participating in the project. While the documentation for public procurement is created, selecting prequalified firms for installing thermostatic sets and smart metering systems is initiated simultaneously. Upon the completion of the tendering process, the selected firms proceed with the installation of thermostatic sets and smart metering systems in the designated buildings.</p> <p>The new installations will be integrated with the planned EMIS (action 4.1.2).</p>		
Implementation duration	36 months, starting from 2025		
Implementation process and timeline	Step (Subsequent)		Duration
	Launch of the public call for installation of the thermostatic sets and their smart metering in buildings owned by BD; Create documentation for public procurement and initiate the process of selecting prequalified firms for the installation of thermostatic sets and smart metering		Eight months
	Selection of public institutions based on evaluation criteria; selection of firms for project execution		Five months
	For pre-selected buildings, a bill of quantities and a preliminary estimate of works are prepared and used for the tendering procedure for the selection of the companies for the installation of the thermostatic sets and smart metering		Eight months
	Installation of thermostatic sets and smart metering		Fifteen months
Action link to indicators	State indicators		Pressure indicator
	8. Climate change and GHG emissions		18.3, 19.3

Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Status of buildings owned by BDBiH with installed thermostatic sets and smart metering	Buildings owned by BDBiH without thermostatic sets and smart metering	Thermostatic sets and smart metering are installed in all buildings owned by BD
The development effect and contribution of the measure to the achievement of priorities	Installing thermostatic sets and their smart metering in all buildings owned by BDBiH would contribute to improving energy efficiency by enabling precise control over heating and cooling systems, optimizing energy usage, and providing valuable data for monitoring and optimizing energy consumption.		
The institution responsible for the implementation	Office for Public Property Management		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department for Communal Affairs Department for Public Affairs JP "Komunalno Brčko" Independent Consultant	Consult Consult Empower Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart Maturity
	The action will directly contribute to GHG emissions reduction in BDBiH and potentially increase network resilience	The action is gender neutral, but benefits will be equal for women and men, boys and girls that are using or working in public institutions. Still, in order to make the action more gender responsive, additional criterions for service providers could be put in place in order to support equal employment opportunities for women and men, and women led business in the energy sector.	The smart Metering system collects data on energy consumption and provides a basic level of a smart system that can be used for data-driven planning; real-time monitoring is enabled, and the heating energy consumption can be controlled.
CO₂ emission reduction / Environmental benefit	Estimated energy savings: 197 MWh Estimated carbon emission reduction: 75 tCO ₂		

Indicative Project Costs	CapEx (EURO / KM)	OpEx (EURO / KM)
	60,000/117,600	3,000/5,880
Notes on cost estimates:	<p>The CapEx is estimated based on the costs of procuring and installing thermostatic sets and smart metering systems in all district-owned buildings. This includes expenses for purchasing thermostatic sets, installation labour, and smart metering infrastructure. As per the information from SECAP, total area of public buildings (owned by the District) is around 150,000m². Capex was calculated with 0.4 euro/m².</p> <p>OpEx is estimated based on the costs for annual operational expenses for the team that will work on implementing the public call, evaluating, tendering, and monitoring works.</p>	
Potential Financing Instruments and Sources	Instrument	Source
	Own source - District budget Grant - international funds	60% / 36,000 40% / 24,000

Action:4.1.8 Establishment of a legal framework for efficient energy management and the introduction of green public procurement criteria for the purchase of electrical appliances for buildings owned by BDBiH			Type	Policy
Link with the strategic goal	4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorized and non-motorized modes of transport	Priority	4.1 Integrate energy efficiency standards in buildings	
Linkage to Existing Policies/Plans	The Action Plan for Sustainable Energy Management and Adaptation to Climate Change (SECAP) of the BDBiH – Measure number Z-2			
Strategic projects	/			
Description	<p>Encouraging the purchase of energy-efficient electrical appliances for all buildings owned by BDBiH, including public buildings of public utilities and public enterprises, through the introduction of Green Public Procurement.</p> <p>Green public procurement can be a major driver of innovation, providing the industry with real incentives to develop green products and services. It also extends to purchasing energy-efficient products or products that save water, significantly reducing utility bills for public buildings and utilities. Criteria for procurement of appliances should be defined in advance and standardized by special Guidelines, and all new appliances should meet the defined criteria.</p> <p>The measure also includes preparing the Rulebook on energy management, which the Law on Energy Efficiency defines.</p>			
Implementation duration	24 months, starting from 2025			
Implementation process and timeline	Step (subsequent)	Duration		
	Conducting regulatory gap analysis	Two months		
	Conducting a preliminary review of current energy management and procurement practices; defining project objectives	Two months		
	Legal framework development: drafting, approving, and adopting the Rulebook on energy management	Eight months		
	Development of the Guidelines with criteria for procurement of appliances defined	Two months		
	Delivering training programs for public officials and procurement specialists;	Six months		
	Integration of GPP criteria into all public procurement processes	Four months		
Action link to indicators	State indicators	Pressure indicator		
	8. Climate change and GHG emissions	18.1, 18.2, 18.3		

Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Status of the legal framework for efficient energy management	No legal framework for energy efficient energy management	Legal framework established
	Green public procurement adoption rate	0% (no GPP criteria currently in place)	100% of procurement processes for electrical appliances in public buildings include GPP criteria
The development effect and contribution of the measure to the achievement of priorities	This action aims to cover energy management comprehensively, addressing not only public buildings but also public utilities and public enterprises, with a strong focus on sustainability and cost savings throughout the entire life cycle of contracts. Establishing a legal framework for efficient energy management and introducing GPP criteria for electrical appliances in BDBiH's public buildings will drive significant energy efficiency and cost savings, reduce the carbon footprint, and foster innovation and market growth in green products.		
The institution responsible for the implementation	Department of Communal Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department for Public Affairs Independent Consultant	Consult Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	Enforcement of energy efficiency measures will reduce GHG emissions	The action is gender neutral and green procurement and energy management projects may reinforce existing job segregation, with men more likely to occupy technical and higher-paid positions, including owners of the companies, while women may be concentrated in lower-paid administrative roles. Changes in energy management practices might inadvertently increase the workload of certain groups, such as female administrative staff or facility managers, without corresponding support or resources. To ensure gender responsiveness of the action, it is necessary to encourage and support women-owned businesses to participate in the supply chain for energy-efficient appliances and to secure acknowledgement and compensation (including positions and roles) for an increased workload. Ensure the availability of training and clearly define energy management obligations and roles for both women and men. A gender-sensitive assessment of the impact of the introduced changes on women and men in public buildings should be conducted, including monitoring of gender presentation among suppliers. Companies that promote gender equality and are socially responsible should be encouraged to participate. Additionally, the rules of procedures must ensure the participation of women and men in public procurement commissions.	/

CO₂ emission reduction / Environmental benefit	This is a soft measure whose impact cannot be precisely quantified; however, it is crucial to establish a legal framework for efficient energy management and introduce green public procurement criteria for purchasing electrical appliances for buildings to enable more investments in the building sector.	
Indicative Project Costs	Costs (EURO / KM)	
	25,000/49,000	
Notes on cost estimates:	Cost is justified by the need for expert services in drafting the legal framework and conducting comprehensive training programs.	
Potential Financing Instruments and Sources	Instrument	Source
	Own source – District Budget Grant – International funds	40% / 10,000 60% / 15,000

Action:4.1.9 Improvement of energy efficiency in buildings owned by BDBiH		Type	Investment
Link with the strategic goal	4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorized and non-motorized modes of transport	Priority	4.1 Integrate energy efficiency standards in buildings
Linkage to Existing Policies/Plans	BD BiH Environmental Strategy 2022-2032 – priority 4.5 – Measure 4.5.1 The Action Plan for Sustainable Energy Management and Adaptation to Climate Change (SECAP) of the BDBiH – Measure number Z-3		
Strategic projects	/		
Description	<p>Ensuring detailed energy audits and performing an analysis of the profitability of investments in energy efficiency and renewable energy renovation for 1/3 of the buildings owned by the BDBiH (thermal insulation of the external walls and roofs, replacement of the existing joinery and the installation/replacement of an energy-efficient heating/cooling systems, e.g. centralized/standalone heat pumps, solar systems, etc., is foreseen). Based on the established energy efficiency criteria, all buildings above EPC “D” should undergo retrofitting to improve their energy efficiency by at least one or two energy classes, thereby meeting the regulations on energy efficiency in buildings during the planning period. The analysis will indicate those buildings that can achieve a minimum threshold of 30% savings during renovation. Part of this action can be implemented through innovative mechanisms like renovation of the public buildings under the ESCO model through a district heating operator if a district heating system is established in the future period in BD. Additionally, the renovation will also include the installation of EV charging stations.</p> <p>In a period of 5 years, 1/3 of the buildings owned by BDBiH will be renovated. Second phase will include remaining 2/3 of buildings and tentative duration of this phase is 10 years, until 2040.</p>		
Implementation duration	60 months, starting from 2026		
Implementation process and timeline	Step (Subsequent)	Duration	
	<i>Development of a project plan, milestones and responsibilities</i>	<i>Two months</i>	
	<i>Conducting a profitability analysis of investments and identifying the top one-third of prioritized public buildings</i>	<i>Five months</i>	
	<i>Conducting baseline energy audits for 1/3 of buildings owned by BD</i>	<i>Ten months</i>	
	<i>Funding acquisition, securing funding sources and developing financial mechanisms; development of the renovation plan</i>	<i>Five months</i>	
	<i>Retrofitting public buildings in BDBiH & installation of EV charging stations</i>	<i>38 months</i>	
Action link to indicators	State indicators	Pressure indicator	
	8. Climate change and GHG emissions	18.3, 19.3	

Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Energy Performance Certificate (EPC) Ratings	Distribution of EPC ratings for 1/3 of the buildings owned by BDBiH before renovation (e.g., 30% EPC "E", 50% EPC "D", 20% EPC "C")	100% of the renovated buildings should achieve an improvement of at least one or two energy classes (e.g., buildings with EPC "D" should achieve at least EPC "C" or "B")
	Number of EV charging stations	0	Significant increase
The development effect and contribution of the measure to the achievement of priorities	Improvements in the energy efficiency of public buildings reduce energy consumption and GHG emissions, which translates into lower utility bills and cost savings. Financing mechanisms like the ESCO model can attract private investment. Integrating renewable energy solutions into building renovations supports the transition towards a more sustainable energy mix, which results in higher energy independence. Enhanced energy efficiency also reduces vulnerability to energy price fluctuations and supply disruptions.		
The institution responsible for the implementation	Department of Communal Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department for Public Affairs JP "Komunalno Brčko" Independent Consultant	Consult Empower Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	Increasing energy efficiency and shifting to renewable energy sources would directly reduce GHG emissions and pollutants.	The action is gender neutral with potential impact on gender equality and social inclusion, having in mind that women are significantly represented in public buildings, including schools, health centres, and public administration offices, and will benefit from the improved energy efficiency. It is important to ensure the participation of women in energy audits, which will increase employment opportunities for women and decrease job segregation in the energy sector. Therefore, additional supportive measures for licensing and promoting women as energy auditors and engaging both women and men as energy auditors are important to ensure the gender responsiveness of the action.	Integrating EE and RE measures with smart technologies (centralized energy consumption monitoring system on building level with the technical ability to measure and optimize the use of energy (heating and cooling/HVAC), water and lighting systems) aiming to further optimize energy usage and reduce costs. Moreover, solar/photovoltaic systems as a secondary source of energy on the building level should be well integrated and digitally managed by the building's user/responsible person for energy to reduce costs. Moreover, smart solutions on the public building level could also be linked with equipping buildings (if parking lots exist) with certain numbers of recharging points and ducting infrastructure (consisting of conduits for electric cables).

CO₂ emission reduction / Environmental benefit	Estimated energy saving (MWh): 2.321,13 MWh by 2030 Estimated Carbon emission reduction: 980.12 tCO ₂	
Indicative Project Costs	CapEx (EURO / KM)	OpEx (EURO / KM)
	13,000,000/25,480,000	50,000/98,000
Notes on cost estimates:	CapEx is justified by the renovations and energy efficiency improvements, including energy audits, insulation, joinery replacement, heating/cooling system upgrades, and renewable energy integration of 1/3 of public buildings in BDBiH with total area of 47.469 m ² . The average price of the renovation is estimated at 275 EUR/m ² . It also includes the experts' engagement in developing innovative financing mechanisms. OpEx is necessary for maintaining the efficiency and effectiveness of the new systems, as well as continuous monitoring and training programs to ensure the long-term success of the implemented energy efficiency measures.	
Potential Financing Instruments and Sources	Instrument	Source
	Grant – International funding Own source - District budget PPP	30% / 3,900,000 50% / 6,500,000 20% / 2,600,000

Action:4.1.10 Improvement of energy efficiency in residential buildings and residential family houses		Type	Investment
Link with the strategic goal	4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorized and non-motorized modes of transport	Priority	4.1 Integrate energy efficiency standards in buildings
Linkage to Existing Policies/Plans	BD BiH Environmental Strategy 2022-2032 – priority 4.5 – Measure 4.5.1 The Action Plan for Sustainable Energy Management and Adaptation to Climate Change (SECAP) of the BDBiH – Measure number Z-3		
Strategic projects	/		
Description	<p>Ensuring the implementation of energy audits that will point to specific activities required for each facility to achieve maximum energy savings and implementation of the energy efficiency and renewable energy measures on residential buildings (thermal insulation of the external walls, roofs, replacement of the existing joinery and the installation/replacement of an energy-efficient heating/cooling systems e.g., centralized/standalone heat pumps, solar systems, etc., is foreseen). The analysis will indicate those buildings that can achieve a minimum threshold of 30% savings during renovation.</p> <p>Part of this action can be implemented through innovative mechanisms like renovation of the MABs under the ESCO model through the district heating operator if the district heating system is established in the future period in BD.</p> <p>This action covers nearly 30% (27.8%) of residential buildings and the planned period for their renovation is 5 years. After that, the second phase of renovation continues with the tentative plan that by 2040 approximately 80% of residential buildings are renovated.</p>		
Implementation duration	60 months, starting from 2026		
Implementation process and timeline	Step (subsequent)	Duration	
	<i>Development of a project plan, milestones and responsibilities</i>	<i>Two months</i>	
	<i>Performing analysis of the profitability of investments and identifying the most cost-effective measures and technologies for the renovation</i>	<i>Five months</i>	
	<i>Conducting baseline energy audits for residential buildings and residential family houses</i>	<i>Ten months</i>	
	<i>Funding acquisition, securing funding sources and developing financial mechanisms; development of the renovation plan</i>	<i>Five months</i>	
	<i>Retrofitting residential buildings and residential family houses in BDBiH (an increase of 1,5% annually until 2030)</i>	<i>38 months</i>	
Action link to indicators	State indicators	Pressure indicator	
	8. Climate change and GHG emissions	18.3, 19.3	

Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Percentage of renovated residential buildings	0%	27.8% of the residential building sector will be renovated by 2030
The development effect and contribution of the measure to the achievement of priorities	Improvements in the energy efficiency of public buildings reduce energy consumption and GHG emissions, which translates into lower utility bills and cost savings. Financing mechanisms like the ESCO model can attract private investment. Integrating renewable energy solutions into building renovations supports the transition towards a more sustainable energy mix, which results in higher energy independence. Enhanced energy efficiency also reduces vulnerability to energy price fluctuations and supply disruptions.		
The institution responsible for the implementation	Department of Communal Affairs		
Other stakeholders	Stakeholder Group		Engagement (Inform, Consult, Involve, Collaborate, Empower)
	Department for Public Affairs JP "Komunalno Brčko" Independent Consultant NGOs and community	Consult Empower Collaborate Involve	

Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart Component
	Increasing energy efficiency and shifting to renewable energy sources would directly reduce GHG emissions and pollutants.	The action is gender neutral, with specific benefits for women. Women, particularly those who spend more time in residential buildings (e.g., homemakers and caregivers), will directly benefit from reduced energy costs and improved comfort from energy efficiency measures. It is necessary to ensure that women have equal opportunities to be engaged as energy auditors, meaning that they should also offer support to obtain the necessary certifications and licenses required to perform energy audits and implement energy efficiency measures. Training programs on energy efficiency and renewable energy technologies must be accessible to both men and women from households and not only representatives of buildings (usually males). Ensure that financial incentives, grants, or loans for energy efficiency improvements are equally accessible to men and women. This might include targeted financial support for female-headed households, specifically single-parent households and elderly single-headed households, and women entrepreneurs. Data about all users of financial mechanisms need to be available according to age and gender, the number of household members and other additional variables. Baseline study on energy consumption – gender audits need to cover gender differences and also energy poverty. Women and men should be engaged in consultations about programme design, and their needs in the commercial and residential sectors must be considered.	All interventions into EE and RE measures should take into account a centralized energy consumption/monitoring system on the building and apartment level with the technical ability to measure and optimize the use of energy (heating and cooling) aiming to further optimize energy usage and reduce costs. If solar/photovoltaic systems and/or heat pumps are applied as a secondary source of energy on the building level they should be well integrated and digitally managed by the building's user to optimize its produced energy and reduce costs. Moreover, smart solutions on the building level could also be linked with equipping buildings (especially MABs, if parking lots exist) with certain numbers of EV recharging points and ducting infrastructure (consisting of conduits for electric cables).
CO₂ emission reduction / Environmental benefit	Estimated energy saving (MWh): 42.519,53 MWh until 2030 Estimated Carbon emission reduction: 16.216 tCO ₂		
Indicative Project Costs	CapEx (EURO / KM)		OpEx (EURO / KM)
	182,000,000/356,720,000		50,000/98,000
Notes on cost estimates:	The estimated costs include all EE measures on the external envelope of the building and the installation/replacement of an energy-efficient heating/cooling system. The proposed amount is given under the assumption that the Government of BDBiH will annually allocate 50% of the funds needed for the renovation of the housing stock until 2030. The calculated CapEx include the renovation of 812,688 m ² residential objects in BD. OpEx is necessary for maintaining the efficiency and effectiveness of the new systems, as well as continuous monitoring and training programs to ensure the long-term success of the implemented energy efficiency measures.		
Potential Financing Instruments and Sources	Instrument		Source
	Own source - District budget Funds (EU Funds, Funds of citizens)		50% / 91,000,000 50% / 91,000,000

Action: 4.1.11 Improvement of energy efficiency in commercial and service buildings owned by BDBiH		Type	Investment
Link with the strategic goal	4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorized and non-motorized modes of transport	Priority	4.1 Integrate energy efficiency standards in buildings
Linkage to Existing Policies/Plans	BD BiH Environmental Strategy 2022-2032 – priority 4.5 – Measure 4.5.1 The Action Plan for Sustainable Energy Management and Adaptation to Climate Change (SECAP) of the BDBiH – Measure number Z-1		
Strategic projects	/		
Description	<p>Ensuring the implementation of energy audits will point to specific activities required for each facility to achieve maximum energy savings.</p> <p>The implementation of energy efficiency measures in commercial and service buildings can result in improvements and benefits, such as financial savings that contribute to reducing operating costs, operational benefits that improve the management of production processes and generally increase productivity, and the reduction of CO₂ emissions or other harmful gases to the environment. The analysis will indicate those buildings that can achieve a minimum threshold of 30% savings during renovation.</p> <p>In a period of 5 years, 1/3 of the commercial and service facilities owned by BDBiH will be renovated, and after that, the second phase of renovation will continue, which will include the remaining buildings.</p>		
Implementation duration	60 months, starting from 2026		
Implementation process and timeline	Step (Subsequent)	Duration	
	<i>Development of a project plan, milestones and responsibilities</i>	<i>Two months</i>	
	<i>Performing analysis of the profitability of investments and identifying the most cost-effective measures and technologies for the renovation</i>	<i>Five months</i>	
	<i>Conducting baseline energy audits for commercial and service buildings</i>	<i>Ten months</i>	
	<i>Funding acquisition, securing funding sources and developing financial mechanisms; development of the renovation plan</i>	<i>Five months</i>	
	<i>Retrofitting commercial and service buildings</i>	<i>38 months</i>	
Action link to indicators	State indicators	Pressure indicator	
	8. Climate change and GHG emissions	18.3, 19.3	

Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Reduction in Energy consumption	Current energy consumption	Significant reduction
The development effect and contribution of the measure to the achievement of priorities	Improving energy efficiency in commercial and service buildings reduces energy consumption and GHG emissions, which translates into lower utility bills and cost savings. Energy efficiency improvements also enhance the operational efficiency of commercial and service buildings. This includes better heating, cooling, and lighting management, which contributes to a more efficient and comfortable working environment.		
The institution responsible for the implementation	Department of Communal Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department for Public Affairs JP “Komunalno Brčko” Independent Consultant NGOs and community	Consult Empower Collaborate Involve	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	Increasing energy efficiency and shifting to renewable energy sources would directly contribute to the reduction of GHG emissions and pollutants	The action is gender neutral and in order to ensure positive impact to gender equality and social inclusion, financial support for energy efficiency measures should be equally accessible to women and men, both in business and as users—employees and visitors of commercial and service buildings. Gender awareness should be ensured at the project planning stage, defining women's engagement as energy auditors and ensuring gender audits are available for women-led businesses and SMEs. Funding should also be accessible and available for women-led businesses, and gender analysis of the programs should be conducted annually. Additionally, a meta-analysis of gender audits should be undertaken to identify trends in energy consumption in commercial and service buildings. Gender awareness and social responsibility of service and work providers (including construction) should be promoted	All interventions into EE and RE measures should take into account a centralized energy consumption/ monitoring system on the building level with the technical ability to measure and optimize the use of energy (heating and cooling/HVAC), water and lighting systems aiming to further can optimize energy usage and reduce costs. If solar/photovoltaic systems and/or heat pumps are applied as a secondary source of energy on the building level they should be well integrated and digitally managed by the building's user to optimize its produced energy and reduce costs – optimized to buildings' user pattern. Moreover, smart solutions on the building level could also be linked with equipping buildings (especially MABs, if parking lots exist) with certain numbers of EV recharging points and ducting infrastructure (consisting of conduits for electric cables).

CO₂ emission reduction / Environmental benefit	Estimated energy saving (MWh) until 2030: 13.107.97 MWh Estimated Carbon emission reduction: 9,288 tCO ₂	
Indicative Project Costs	CapEx (EURO / KM)	OpEx (EURO / KM)
	71,000,000/139,160,000	50,000/98,000
Notes on cost estimates:	CapEx is justified by the renovations and energy efficiency improvements, including energy audits, insulation, joinery replacement, heating/cooling system upgrades, and renewable energy integration for 1/3 of commercial buildings in BD. It also includes the engagement of experts to develop innovative financing mechanisms. OpEx is necessary for maintaining the efficiency and effectiveness of the new systems, as well as continuous monitoring and training programs to ensure the long-term success of the implemented energy efficiency measures.	
Potential Financing Instruments and Sources	Instrument	Source
	Own source - District budget Funds (EU Funds, Funds of citizens)	50% / 35,500,000 50% / 35,500,000


4.5 Energy Actions

Five priority actions have been selected in the energy sector. Two actions relate to improving the policy of the existing Law on the Energy of BDBiH, and the remaining three focus on the construction process of an independent district heating system.

Considering that the planning of the District heating system is in the initial phase, the

actions foreseen during the GCAP duration represent a prerequisite and the definition of the necessary infrastructure. Action refers to constructing a District heating plant planned for 2029 to 2032, with an estimated investment of 95,000,000 EUR. The Feasibility Studies planned in this document will specify the capacities, technology, and exact investment required for the plant's construction.

Table 21 – Timeline for energy sector actions

Sector	Action title	Duration						
		2025	2026	2027	2028	2029	2030	2031 - 2040
 Energy	2.1.1 Establishment of energy data collection							
	2.1.2 Development of by-laws related to the energy sector							
	2.1.3 Development of a feasibility study for the construction of a cogeneration plant in Brčko District							
	2.1.4 Development of a feasibility study for the construction of a district heating system for the District of Brčko							
	2.1.5 Construction of a cogeneration plant							Construction and operationalization of the plant

Action: 2.1.1 Establish energy data collection		Type	Policy
Link with the strategic goal	2. To improve air quality by applying energy resource-efficient technologies with reduced environmental impacts, introduction of low carbon emissions transport policies	Priority	2.1 Establish energy supply system
Linkage to Existing Policies/ Plans	Environment Protection Strategy BDBiH, 2022-2032 Priority 4.1. 4.1.2, 4.5. 4.5.1 4.5.2. 4.6. 4.6.1.		
Strategic projects	/		
Description	<p>The prerequisite for any planning in the energy sector is the collection of data concerning the production and consumption of electricity and thermal energy in the territory of BDBiH. It will be necessary to establish horizontal and vertical communication between all stakeholders in the process: within the administration itself, as well as industry and citizens, and to provide a single point in the BDBiH where energy data would continuously flow and be processed, and in parallel to be available to all those who need them. Without this, any long-term planning or establishment of an energy management system will not be feasible.</p> <p>All energy distribution lines (main lines and access to consumers) should be mapped and filled out in the GIS as part of integral underground and in-air (if it exists) infrastructure in separate layers for each type of energy distribution and segmentation between main lines and lines to consumers.</p>		
Implementation duration	<i>12 months, starting from 2025</i>		
Implementation process and timeline	Step (Subsequent)	Duration	
	<i>Engagement with key stakeholders, including government officials and the other related to energy data production</i>	<i>Two months</i>	
	<i>Draft the Rulebook on Energy Data Collection based on the statistical standards</i>	<i>Four months</i>	
	<i>Adoption of the Rulebook on Energy Data Collection</i>	<i>One month</i>	
	<i>Establishment of the Energy Data Collection Office with adequate hardware and software and employment of one person who will be in charge of data collection, treatment and reporting</i>	<i>Five months</i>	
	<i>Implementation of the measures</i>	<i>Continuity</i>	
Action link to indicators	State indicators	Pressure indicator	
	1. Air quality; 8. Climate change (8.1)	14., 14.1, 14.2, 14.3, 15., 15.1, 15.2, 15.3, 15.4	

Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Status of the Energy Data Rulebook	The Energy Data Rulebook is not a part of the District legislation	Energy Data Rulebook developed and adopted.
	Status of the Energy Data reports	No energy data reports	Monthly and annual energy data reports
The development effect and contribution of the measure	Establishing the energy data collection and reporting system will help better plan and prioritize energy production and consumption activities.		
The institution responsible for the implementation	Department of Communal Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department for Public Affairs Elektrodistribucija Brcko JP Komunalno Brcko Independent Consultant	Consult and involve Empower Consult Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	The action will set up a framework for efficient management and planning of energy-related data, a prerequisite for modernizing the electric grid, implementing renewable energy sources in the long term, and reducing electricity consumption and CO ₂ emissions.	To ensure gender and social inclusion responsiveness the action, data collection should ensure capturing energy poverty issues and energy consumption, including single-headed households, mostly older women. Women-led businesses and energy consumption and savings should also be considered. Increasing women's capacity and roles in energy management positions is relevant to enhancing gender equality.	Energy systems and infrastructure presented in the GIS as digital and machine-readable data
CO₂ reduction / Environmental benefit	The action will not directly impact emission reduction, but implementation will affect the reduction of pollutants (CO ₂ , SO ₂ , NOx, etc.).		
Indicative Project Costs	Cost (EURO / KM)		
	70,000/137,200		
Notes on cost estimates:	The cost includes consultant engagement in developing the secondary legislation, the involvement of stakeholders in the process, and the purchase of the needed equipment.		
Potential Financing Instruments and Sources	Instrument	Source	
	International funding - Grant Own source revenue	90% / 63,000 10% / 7,000	

Action: 2.1.2 Development of by-laws related to energy sector			Type	Policy
Link with the strategic goal	2. To improve air quality by applying energy resource-efficient technologies with reduced environmental impacts, introduction of low carbon emissions transport policies	Priority	2.1 Establish energy supply system	
Linkage to Existing Policies/Plans	Environment Protection Strategy BDBiH, 2022-2032 Priority 4.1. 4.1.2, 4.5. 4.5.1 4.5.2. 4.6. 4.6.1.			
Strategic projects	/			
Description	Implementing by-laws is necessary for the full applicability of the provisions of the entire energy law package. Thus, drafting and adopting those regulations should start as soon as possible. In parallel with that, the body responsible for implementing the measures from the by-laws should be determined and set up. This action will include important issues related to energy citizenship, energy cooperatives (prosumers), and the definition of indicators related to energy poverty. According to the Law on Renewable Sources and Efficient Co-generation of BDBiH, article 71, it is necessary to adopt the Rulebook on Subsidies of Energy Production from Renewable Energy Sources, Rulebook on Methodology for determining the guaranteed purchase price and premium for small plants, Rulebook on auctions, Rulebook on Participation of Renewable Energy Sources in Transport, Rulebook on Buyers – Producers and Communities of Renewable Energy.			
Implementation duration	Total duration 12 months + 12 months implementation, starting from 2025			
Implementation process and timeline	Step (Subsequent)			Duration
	Engagement with a key stakeholder, including government officials and others			One month
	Drafting the by-laws related to the energy sector			Four months
	Making necessary alignments with other primary and secondary legislation based on stakeholder and legal feedback			Three months
	Designation of a body that will be responsible for the implementation			Two months
	Adoption of the by-laws			Two months
	Implementation of agreed measures			Twelve months
Action link to indicators	State indicators	Pressure indicator		
	1. Air quality; 8. Climate change (8.1)	14., 14.1, 14.2, 14.3, 15., 15.1, 15.2, 15.3, 15.4		
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values	
	Status of the Energy by-laws	The energy by-laws are not a part of the local legislation	Energy by-laws developed and adopted.	
	Status of a body that will be responsible for the implementation of the energy by-laws	No designated body is entitled	By-laws implemented in practice.	

The development effect and contribution of the measure	Adopting the energy by-laws and designation of the implementation body will ensure conditions for implementing energy projects, particularly RES-related projects.		
The institution responsible for the implementation	Department for communal affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department for Public Affairs Elektrodistribucija Brcko JP Komunalno Brcko Independent Consultant NGOs and the community	Consult and involve Empower Consult Collaborate Consult	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	The action will set up a framework for better management of energy infrastructure, which is a prerequisite for the modernization of the electric grid and instalment of renewable energy sources in the long term and reduction in electricity consumption and CO ₂ emissions	In order to make the action gender responsive, women's participation in decision-making and equal interest and information levels for men and women in the responsible body and actions should be ensured.	/
CO₂ reduction / Environmental benefit	The action will not directly impact emission reduction, but implementation will affect the reduction of pollutants (CO ₂ , SO ₂ , NO _x , etc.).		
Indicative Project Costs	Cost (EURO / KM)		
	100,000 / 196,000		
Notes on cost estimates:	Cost includes consultant engagement in the development of the secondary legislation		
Potential Financing Instruments and Sources	Instrument	Source	
	International funding - Grant Own source revenue	90% / 90,000 10% / 10,000	

Action: 2.1.3. Development of a feasibility study for the construction of a cogeneration plant in BDBiH			Type	Policy
Link with the strategic goal	2. To improve air quality by applying energy resource-efficient technologies with reduced environmental impacts, introduction of low carbon emissions transport policies	Priority	2.1 Establish energy supply system	
Linkage to Existing Policies/Plans	Environment Protection Strategy BDBiH, 2022-2032. Priority 4.1. 4.1.2, 4.5. 4.5.1 4.5.2. 4.6. 4.6.1. The Action Plan for Sustainable Energy Management and Adaptation to Climate Change (SECAP) of the BDBiH, Measure RSE4			
Strategic projects	/			
Description	<p>Currently, space heating in BDBiH is carried out through several small individual heating devices, while local central heating systems are present in many residential and most public buildings. Fossil fuels and electricity are used for heating in most public buildings; the same is true in the housing sector. Electricity is procured from the electrical power plants of the Republic of Srpska (Federation of Bosnia and Herzegovina). Considering the high level of pollution in the winter season (especially PM particles), constructing a centralized system will reduce that impact, as it will eliminate many house stoves and reduce the total GHG emission.</p> <p>This study would confirm the justification for the construction of a suitable cogeneration plant in BDBiH, possible locations of this plant, approximate electrical and thermal power, fuel, approximate route of the heat transmission line and all other necessary equipment and facilities, including power distribution equipment upgrade and adaptation, as well as an estimation of construction costs. The implementation of this study should begin in 2025 so that, based on this study, the project documentation and cogeneration plant will be built in the next step. Since biomass was the preferred energy source in previous studies and documents that mention the cogeneration plant, special attention should be paid to biomass supply chains in the study.</p>			
Implementation duration	<i>Total duration: 24 months, starting from 2025</i>			
Implementation process and timeline	Step (Subsequent)		Duration	
	<i>Determination and agreement on the scope of the feasibility study</i>		<i>Four months/ completed</i>	
	<i>Development of the ToR for the Study and start of the tendering procedure; evaluation and selection of the contractor/consultant for the study's development</i>		<i>Four months</i>	
	<i>Development of the study; Presenting the study and findings to stakeholders; Finalization of the Study.</i>		<i>12 months</i>	
<i>Mobilization of resources, including funding and personnel for the implementation phase.</i>		<i>Four months</i>		
Action link to indicators	State indicators	Pressure indicator		
	1. Air quality; 8. Climate change (8.1)	14., 14.1, 14.2, 14.3, 15., 15.1, 15.2, 15.3, 15.4		
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values	
	<i>Status of completion of the Study</i>	<i>Potential co-generation system is not defined, except for very rough estimation in previous studies</i>	<i>A co-generation system is defined by technical, environmental, economic and financial aspects.</i>	

The development effect and contribution of the measure	Finalizing the feasibility study related to the co-generation system will allow stakeholders to select the optimal solutions from technical (heat and electric power production, type of fuel, technology selection), environmental, economic and financial aspects, which are preconditions for the realization.		
The institution responsible for the implementation	Department for communal affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department for Public Affairs Elektrodistribucija Brcko JP Komunalno Brcko Citizens Business Public companies Independent Consultant	Consult and involve Empower Consult Involve Involve Consult Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	This action will directly reduce GHG emissions by reducing energy intensity and inefficiencies in the heating system.	In order to make study gender sensitive and ensure further gender sensitive and socially inclusive decision making the study needs to cover gender and social inclusion assessment. Energy consumption, including heating, is not gender-neutral. Women, especially older people, are more vulnerable to energy poverty, and they are also underrepresented in professions related to energy use and heating systems. This plan should be an opportunity to increase the participation of female workers in non-traditional sectors and to address the risks and vulnerabilities of energy poverty	/
CO₂ reduction / Environmental benefit	This action has no direct outcomes but is needed to implement all energy sector-related measures that result in RES penetration, energy savings, air pollution reduction, and CO ₂ emission reduction.		
Indicative Project Costs	Cost (EURO / KM)		
	250,000 EUR / 490,000 KM		
Notes on cost estimates:	Cost is estimated based on the values of a similar project realized in the region		
Potential Financing Instruments and Sources	Instrument	Source	
	Own resources – District Budget Transfer from the national government International funding - Grant	10% / 25,000 20% / 50,000 70% / 175,000	

Action: 2.1.4. Development of a feasibility study for the construction of a district heating system for the District of Brčko			Type	Policy
Link with the strategic goal	2. To improve air quality by applying energy resource-efficient technologies with reduced environmental impacts, introduction of low carbon emissions transport policies		Priority	2.1 Establish energy supply system
Linkage to Existing Policies/Plans	Environment Protection Strategy BDBiH, 2022-2032 Priority 4.1. 4.1.2, 4.5. 4.5.1 4.5.2. 4.6. 4.6.1.			
Strategic projects	/			
Description	Based on the results obtained from the feasibility study for constructing a cogeneration plant in BDBiH, it is necessary to create a feasibility study for constructing a district heating system. The feasibility Study should also analyse the possibility of using other potential heat sources for district heating (e.g. waste heat from industry, large-scale heat pumps utilizing the River Sava as a heat source, etc.). The feasibility Study should determine the network of the district heating system (central power plant and/or regional boiler houses) and type and configuration (annular or branched) adequate to the needs of the BDBiH and the basic elements of the network. District heating networks should be designed to operate at lower temperatures to ease the integration of renewable or waste heat sources.			
Implementation duration	<i>Total duration 24 months, starting from 2027</i>			
Implementation process and timeline	Step (Subsequent)			Duration
	<i>Determination and agreement on the scope of the feasibility study</i>			<i>Four months/completed</i>
	<i>Development of the ToR for the Study and start of the tendering procedure; tender, evaluation, and selection of the contractor/consultant for the study's development.</i>			<i>Four months</i>
	<i>Development of the study; Presenting the study and findings to stakeholders; Finalization of the Study.</i>			<i>12 months</i>
Action link to indicators	State indicators			Pressure indicator
	1. Air quality; 8. Climate change (8.1)			15., 15.1, 15.2, 15.3, 15.4
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values	
	<i>Status of completion of the Study</i>	<i>The potential district heating system is not defined</i>	<i>District heating systems are defined from technical, configuration, economic and financial aspects.</i>	
The development effect and contribution of the measure	Finalization of the feasibility study related to the district heating system will allow stakeholders to select the optimal solution from technical, economic, and financial aspects, as well as the system's heating capacity, district heating network configuration, space distribution of the heat exchange substation, and temperature regimes for the primary and secondary networks, which is a precondition for realization.			

The institution responsible for the implementation	Department for communal affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department for Public Affairs Elektrodistribucija Brcko JP Komunalno Brcko Citizens Business Public companies Independent Consultant	Consult and involve Empower Consult Involve Involve Consult Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	The action will directly contribute to the reduction of GHG emissions by reducing energy intensity and inefficiencies in the heating system	It is necessary to ensure that both action 2.1.3 and 2.1.4 include gender and social impact assessment to ensure equal benefits to various groups within the population of the District and to address energy poverty.	FS will be the occasion to consider smart technologies to be integrated in the district heating system.
CO₂ reduction / Environmental benefit	Reduction of pollutants (CO ₂ , SO ₂ , NOx, etc.) This action has no direct outcomes but is needed to implement all energy sector-related measures that result in RES penetration, energy savings, air pollution reduction, and CO ₂ emission reduction.		
Indicative Project Costs	Cost (EURO / KM)		
	200,000 EUR / 392,000 KM		
Notes on cost estimates:	Cost is estimated on the base of the values of the similar project realized in the region		
Potential Financing Instruments and Sources	Instrument	Source	
	Own resources – District Budget Transfer from the national government International funding - Grant	10% / 20,000 20% / 40,000 70% / 140,000	

Action: 2.1.5. Construction of a cogeneration plant		Type	Investment
Link with the strategic goal	2. To improve air quality by applying energy resource-efficient technologies with reduced environmental impacts, introduction of low carbon emissions transport policies	Priority	2.1 Establish energy supply system
Linkage to Existing Policies/Plans	Environment Protection Strategy BDBiH, 2022-2032. Priority 4.1. 4.1.2, 4.5. 4.5.1 4.5.2. 4.6. 4.6.1. The Action Plan for Sustainable Energy Management and Adaptation to Climate Change (SECAP) of the BDBiH, Measure RSE4		
Strategic projects	/		
Description	<p>BDBiH does not have a city heating plant, and the issue of district heating has not been resolved yet. According to the Energy Sustainable Development Action Plan adopted by the Government of the BDBiH in 2015, the construction of a cogeneration plant and the development of a heating system are foreseen. This measure is also foreseen in the SECAP plan of the BDBiH. Considering existing infrastructure, several locations for constructing a cogeneration plant are favourable in terms of energy transport and access and could provide a source of cooling water. According to the current needs of the BDBiH and future development projections, it is considered that two units with a capacity of 2x20 MWe and 2x40 MWt would ensure the delivery of 220 GWhe and 180 GWht of energy and cover all the needs of the BDBiH. In addition, there is a possibility of using the residues from the wood industry and burning part of the urban waste for energy purposes and/or a possible centralized heat pump solution via district heating (both additional options need to be investigated further in detail, based on the exact location of the future plant, heat density of settlements, total heat load and proximity of the river or wastewater treatment plant, etc.). The estimated construction time of the mentioned cogeneration plant is four years, and in that time, it is necessary to develop the heating system and the biomass plantations needed as a source of energy.</p> <p>Due to the value of the investment and the fact that the studies (2.1.3, 2.1.4) will determine the scope of the plant more precisely, it is assumed that its construction will include several phases. This assumption is also based on the fact that identification of buildings or consumers, as well as the period for phase connection to the system, takes time too. Therefore, the period of 4 years includes only the plant construction project, but its full implementation will require a longer period, roughly estimated until 2040.</p>		
Implementation duration	<i>Total duration 48 months, starting from 2029</i>		
Implementation process and timeline	Step (Subsequent)	Duration	
	<i>Definition of the evaluation criteria and public call, based on the feasibility studies results;</i>	<i>6 months</i>	
	<i>Launch of the public call and tendering procedure for constructing the co-generation systems, all phases.</i>		
	<i>Selection of the companies or consortiums for project execution</i>	<i>Four months</i>	
	<i>Realization of the project including all phases.</i>	<i>24 months</i>	
	<i>Test work of the plant</i>	<i>Six months</i>	
	<i>Final acceptance of the project</i>	<i>Eight months</i>	


Action link to indicators	State indicators	Pressure indicator	
	1. Air quality 8. Climate change (8.1)	14., 14.1, 14.2, 14.3, 15., 15.1, 15.2, 15.3, 15.4	
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Quantity of electricity delivered to the network from the own source	No own electricity production	Electricity is produced from its sources (To be defined by feasibility study)
	Quantity of heat delivered to the consumers from their source	No centralized heat production	Heating is produced from own sources
The development effect and contribution of the measure	Realization of the project will improve air quality in BDBiH because large quantity of the spot pollution sources will be eliminated.		
The institution responsible for the implementation	Department for communal affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Department for Public Affairs Elektrodistribucija Brcko JP Komunalno Brcko Citizens Business Public companies Independent Consultant	Consult and involve Empower Consult Involve Involve Consult Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	The action will directly contribute to the reduction of GHG emissions by reducing energy intensity and inefficiencies in the heating system	The action is gender neutral, and women are underrepresented in the energy industry, public utility companies, and the wood or waste management sectors. Therefore, public investments should apply a gender transformative approach to increasing the number of engaged women and further increasing their capacities in the given sectors	Construction of district heating plant will include all available and affordable new technologies, including the digital one. FS will detail which one.
CO₂ reduction / Environmental benefit	31,720 CO ₂ /y		

Indicative Project Costs	CapEx (EURO / KM)		OpEx (EURO / KM)
	95,000,000 / 186,200,000		19,250,000 / 37,730,000
Notes on cost estimates:	<p>The Capex is estimated based on the assumption that this will be biomass plant with a capacity to up to 20,000 households (up to 40 MW heat & 15 MW electricity) ⇒ 1.5 Mill € per MW capacity = 60,000,000 EUR. In addition, the costs include the construction of distribution network and for Brcko which is 20km² and assuming 50% will be served with district heating, costs will be 35,000,000 EUR.</p> <p>The OpEx depend on the type of plant, the heat sources, load management, etc., and could be estimated in the range of 40 – 100 Euro/MWh. Thus, the above mentioned OpEx was calculated with 70 Euro/MWh and 5,000 full load hours.</p>		
Potential Financing Instruments and Sources	Instrument	Source	
	Own resources – District Budget	10% / 9,500,000	
	Transfer from the national government	10% / 9,500,000	
	Loan (EBRD, EIB, KfW)	80% / 76,000,000	

4.6 Solid Waste Actions

In the process of creating the GCAP, three measures from the waste sector were included in the list of priority measures. All three measures are short-term and provide an opportunity for the development of new measures in this area..

Table 22 – Timeline for solid waste sector actions

Sector	Action title	Duration	
		2025	2026
 Solid waste	3.2.1 Improvement of the system of records and reporting on waste		
	3.2.2 Study on possibilities of waste prevention, treatment, and recycling		
	3.2.3 Collection infrastructure for mixed (residual) and recyclable waste		

Action: 3.2.1 Improvement of the system of records and reporting on waste			Type	Policy
Link with the strategic goal	3. Improve soil quality throughout the District by reducing solid waste pollution, and implementing standards that will protect the environment and the community		Priority	3.2 Strengthen waste management system
Linkage to Existing Policies/Plans	Environmental Strategy of the BD BiH 2022-2032: Measure 2.5.1. Strengthening the system of records and reporting on waste			
Strategic projects	/			
Description	<p>The activity aims to analyze legal obligations regarding waste recording and data collection, envisaging the gaps in implementation. Action will determine gaps and needed activities for upgrading the system of reporting on waste by defining solutions for different waste generators: households => waste collectors/operators of municipal solid waste, industries, commerce per different waste streams, waste types (municipal solid waste, industrial waste, hazardous wastes etc.).</p> <p>Potential obligations of Extended Producer Responsibility (EPR) schemes shall be analysed.</p> <p>The outcome of the action will lead to the establishment of an integral information system for waste management, which will obtain reliable data on waste and enable better strategic planning and investment in the field of waste management.</p>			
Implementation duration	24 months, starting from 2025			
Implementation process and timeline	Step (Subsequent)			Duration
	Analysis of legal obligations on waste recording and collecting data envisaging the gaps in implementation			Four months
	Development of the ToR for the integral information system for waste management starting the tendering procedure.			Two months
	Tender, evaluation, and selection of the contractor/consultant to develop the information system for waste management data.			Four months / completed
	Launch the public call, create documentation for public procurement and initiate the process of selecting prequalified offers.			
	Development and installation of selected informatics solution/database sets and smart metering			Ten months
Training program related to the use of the informatics solution/database.			Four months	
Action link to indicators	State indicators		Pressure indicator	
	4. Soil quality		29., 30.1	
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values	
	Information system status	The information system is not established	Established information system, new users register in the system, training is conducted regularly	

The development effect and contribution of the measure to the achievement of priorities	This measure aims to improve the system of records and reporting on waste to obtain reliable data and improve strategic planning, which will make future investments in the waste management system sector sustainable.		
The institution responsible for the implementation	Department for Communal Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	JP „Komunalno Brčko“ d.o.o. Independant Consultant	Involve Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	Establishing an integral information system for waste management will enable the implementation of policies for the reuse and recycling of waste, thus avoiding CO ₂ emissions from the use of virgin materials	By addressing socio-economic disparities and promoting inclusive waste management practices, efforts to improve waste recording and data collection can contribute to more equitable and sustainable communities	Development of the information system for waste management data recycling operations and waste separation should be based on digital technology solutions.
CO₂ reduction / Environmental benefit	This action will not have a direct impact on the environment and emission reduction, but without improvement in waste management, there could remain a localised negative environmental impact on soil, water and air quality		
Indicative Project Costs	Cost (EURO / KM)		
	55,000 EUR/107,800 KM		
Notes on cost estimates:	Cost is estimated as per the costs for the establishment of a system of records and reporting on waste management		
Potential Financing Instruments and Sources	Instrument	Source	
	International funding - Grant Own-source – District Budget	50% / 27,500 50% / 27,500	

Action: 3.2.2 Study on possibilities of waste prevention, treatment, and recycling			Type	Investment
Link with the strategic goal	3. Improve soil quality throughout the District by reducing solid waste pollution and implementing standards that will protect the environment and the community	Priority	3.2 Strengthen waste management system	
Linkage to Existing Policies/Plans	Environmental Strategy of the BD BiH 2022-2032: Measure 2.4.1. Creation of conditions for adequate collection and disposal of special categories of waste; Measure 2.4.3. Program to reduce the amount of municipal waste disposed of at the landfill			
Strategic projects	/			
Description	<p>This action consists of two components, the first is a study which identify infrastructure needed for waste processing, while second component focuses on the implementation of the pilot project / program for biodegradable waste composting.</p> <p>Depending on the annual quantities and types of waste, the study should consider the economic and environmental aspects of available technical solutions for waste processing from the district area to achieve self-sufficiency, considering waste prevention, reuse, collection, recycling, waste treatment and disposal. The study shall envisage the necessary infrastructure for waste collection (bins/containers/vehicles/recycling yards) and transportation, waste and recyclables processing, treatment, and disposal of municipal solid waste and other selected waste streams (biodegradable waste, recyclable waste etc.). Set objectives shall be adjusted with national/ regional waste management strategies (i.e., Waste management strategy of BDBiH as part of the Environmental Strategy of the BDBiH for the period 2022–2032) and its targets (i.e. waste recycling targets, landfill and biowaste diversion targets).</p> <p>Multi-criteria analysis for collection infrastructure and the necessary subsequent treatment/processing facilities (i.e. Mechanical biological treatment (MBT) of municipal solid waste (MSW) and material recovery facilities (MRFs) should compare different technical options by assessing their effects, performance, impacts on landfilling activities, and the need for disposal infrastructure. A combined MBT/MRF solution could lead to an increase in waste recycling rates in the future. The biological treatment step should consider composting of source-separated biowaste.</p> <p>The study should consider the infrastructure necessary for the collection of mixed (residual) waste, biodegradable waste and source-separation of dry collection systems in different areas of Brčko, as well as infrastructure needs for a material recovery facility (for post-sorting of source-separated recyclables) and potentially a mechanical-biological treatment plant (MBT) where different configurations could be assessed. The study should envisage pilot program for biodegradable waste composting (home-garden composting in residential area with homes/gardens) and biodegradable waste collection from selected urban part of the city. The outcome of the implementation of the pilot program should give inputs on citizens behaviour, amounts of collected/composed biodegradable waste, content of biodegradable waste and assessment of the necessary equipment for application in the entire area of the district and input feasibility study. By measuring the amount of composted waste and the remaining municipal waste, it is necessary to determine the expected reduction in the amount of mixed municipal waste, and at the same time the reduction of waste destined for landfill.</p> <p>The study's technical due diligence/ feasibility part should lead to investment in needed waste management infrastructure projects (waste collection, waste separation, home composting, treatment of recyclable waste, biodegradable waste).</p>			
Implementation duration	12 months, starting from 2025			

Implementation process and timeline	Step (Subsequent)		Duration
	<i>Development of the ToR for the study and starting the tendering procedure.</i>		<i>One month</i>
	<i>Tender, evaluation and selection of the contractor/consultant for the development of the study.</i>		
	<i>Capacity assessment of waste management capabilities and needs</i>		<i>Three months</i>
	<i>Pilot program for biodegradable waste composting (home-garden composting in residential area with homes/gardens) and biodegradable waste collection from selected urban part of the city.</i>		<i>Two months</i>
	<i>Feasibility study and technical due diligence confirming technical requirements and solutions tailored to a more detailed scale</i>		<i>Six months</i>
Action link to indicators	State indicators		Pressure indicator
	4. Soil quality		30.1
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Status of the completion of the Study	Potential for waste prevention, treatment, and recycling not evaluated	Waste prevention, treatment and recycling measures identified for financing and implementation
The development effect and contribution of the measure	This measure aims to improve the collection and disposal system of special categories of waste and reduce the total amount of waste disposed at the landfill.		
The institution responsible for the implementation	Department for Communal Affairs		
Other stakeholders	Stakeholder Group		Engagement (Inform, Consult, Involve, Collaborate, Empower)
	JP „Komunalno Brčko“ d.o.o. Independent Consultant		Involve Collaborate

Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	Action will enable the implementation of policies for waste prevention (reuse and recycling of waste) and avoiding CO ₂ emissions from the use of virgin materials and by diverting waste from landfilling	In order to make the action, and following decision-making gender and social responsive, the study and related assessments, should assess how waste management solutions may impact women differently, considering their workload, health risks, and access to waste management services. The participation of women and marginalized groups needs to be ensured in the study development and related consultations.	Recycling operations and waste separation should be based on digital tech solutions. A gamification and awarding system for citizens and businesses that follows the new waste policy and practice is recommended. A basic level of smart elements is expected to be part of the system.
CO₂ reduction / Environmental benefit	This action will not have a direct impact on the environment and emission reduction, but without improvement in waste management, there could remain a localised negative environmental impact on soil, water and air quality		
Indicative Project Costs	Cost (EURO / KM)	CapEx (EURO / KM)	
	200,000 EUR/392,000 KM	80,000/156,800	
Notes on cost estimates:	The cost of study is estimated to 200,000 EUR which includes study data collection, analysis, and multi-criteria analysis for the identification of suitable collection infrastructure and the necessary subsequent treatment/processing facilities. Additional 80,000 is rough estimation for the pilot project.		
Potential Financing Instruments and Sources	Instrument	Source	
	Own-source – District Budget National government (fund) contribution International funding - Grant	20% / 56,000 20% / 56,000 60% / 168,000	

Action: 3.2.3 Collection infrastructure for mixed (residual) and recyclable waste			Type	Investment
Link with the strategic goal	3. Improve soil quality throughout the District by reducing solid waste pollution, and implementing standards that will protect the environment and the community		Priority	3.2 Strengthen waste management system
Linkage to Existing Policies/Plans	Environmental Strategy of the BD BiH 2022-2032: 2.3.2. Procurement of equipment and construction of infrastructure for municipal waste management			
Strategic projects	/			
Description	<p>Currently, there is no waste separation in Brčko, and almost all municipal waste collected is landfilled. Implementing source segregation and separate collection of recyclable waste would improve recycling rates.</p> <p>Once the feasibility and relevant due diligence studies are complete, the proposed citywide system will be implemented, including the development of a sorting and separation system, investment in physical infrastructure, and the identified material recovery facility and systems for processing and waste recovery.</p> <p>Establishing a recycling yard is the first step in establishing a waste separation and reduction system. The project's purpose is to increase the level of separated, collected municipal waste and contribute to reducing the amount of waste disposed of at the landfill. It should also have an educational character for the local population and serve in preparing the establishment of a long-term and comprehensive waste separation system in the District.</p>			
Implementation duration	24 months, starting from 2025			
Implementation process and timeline	Step (Subsequent)		Duration	
	<i>Preparation of the list of needed equipment and implementation of the public procurement for the procurement of a mobile unit</i>		<i>One month</i>	
	<i>Procurement of contractor for bins/containers/vehicles/recycling yard etc.</i>		<i>Six months</i>	
	<i>Implement system for source separation of waste and recycling of solid waste.</i>		<i>Fourteen months</i>	
	<i>Educational and informative activities related to the waste separation and use of the recycling yard with the aim of informing and reaching as many users/participants.</i>		<i>Three months</i>	
Action link to indicators	State indicators			Pressure indicator
	7. Availability of resources-biodiversity and ecosystems; 9. Adaptation Resilience			30.1
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values	
	Amount of separately collected waste	0% amount of separately collected waste (2020)	Min. 35% of the amount of collected waste (2032)	
	Capacities for processing and disposal of waste (buildings)	Number of recycling yards for separate collection of species from municipal waste: 0	Increased processing capacities for waste recovery/ disposal in relation to the base year (2032) – 5%	


The development effect and contribution of the measure	This measure aims to minimise negative impacts on the environment and improve the provision of services to citizens and industries from municipal waste management, separation and recycling.		
The institution responsible for the implementation	Department for Communal Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	JP „Komunalno Brčko“ d.o.o. Independent Consultant NGOs Citizens Industry	Involve Collaborate Involve Consult Consult	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	Recycling indirectly impacts and reduces greenhouse gas emissions by reducing energy consumption needed for virgin materials.	The action is gender neutral, but the establishment of a recycling yard creates opportunities for the employment of informal waste pickers, both women and men and overall employment. Considering the role of women in the waste management at the household level, the wide participatory process on sorting islands locations, operations etc. needs to be conducted to ensure its adjustment with citizens' needs and possibilities.	/
CO₂ reduction / Environmental benefit	The collection and separation of waste have no direct impact on the environment or emission reduction but will lead to new solutions for recycling, corresponding to a reduction in waste being sent to landfills.		
Indicative Project Costs	CapEx (EURO / KM)	OpEx (EURO / KM)	
	2,000,000 EUR/ 3,920,000 KM	60,000 EUR/117,600 KM	
Notes on cost estimates:	The CapEx of 2,000,000 EUR is estimated as per the costs for the establishment of a system for source separation of waste and recycling in District Brčko. OpEx is estimated at 3% of Capex.		
Potential Financing Instruments and Sources	Instrument	Source	
	Own-source – District Budget Loan (EBRD, EIB, WB)	10% / 200,000 90% / 1,800,000	

4.7 Land Use Actions

Seven priority measures in the land use sector are included in the GCAP. The measures focus on improving the policy of this sector, as this is a prerequisite for adequate planning of development and investment in other sectors, such as transport, construction, energy, water supply and wastewater, as well as waste management.

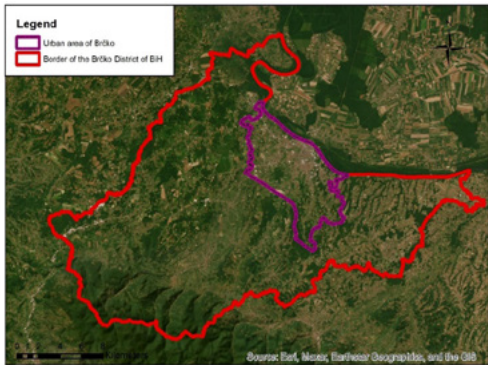
A spatial and urban plan should be created as soon as possible while strengthening the capacity for their implementation. All planned actions are short-term but require the integral cooperation and participation of all relevant institutions in the Brčko District.

Table 23 – Timeline for land use sector actions

Sector	Action title	Duration			
		2025	2026	2027	2028
 Land use	5.1.1 Completion of the Spatial Plan of the BDBiH				
	5.1.2 Drafting and adoption of the new Urban Plan of the town of BDBiH				
	5.1.3 Strengthening the mechanism for adopting detailed spatial planning documents				
	5.1.4 Preparation of the Study of Protected Nature Areas in BDBiH				
	5.2.1 Establishment of new public parks and green infrastructure in the narrower urban area of BDBiH				
	3.1.1 Establishment of soil quality monitoring in the BDBiH				
	3.1.2 Development of a unique GIS of the BDBiH				

Action: 5.1.1 Completion of the Spatial Plan of the BDBiH			Type	Policy
Link with the strategic goal	6. Improve the land use sector through appropriate strategic and legislative policies that will integrate all sectors considering the improvement of environmental assets and the reduction of urban development pressure	Priority	6.1 Enable sustainable strategic planning	
Linkage to Existing Policies/Plans	Development Strategy of the BDBiH 2021-2027 3.2 Improvement of the state of communal infrastructure and responsible territorial management 3.2.1.2 Drafting and adoption of the Spatial Plan of the BDBiH			
Strategic projects	/			
Description	The existing Spatial Plan of the BDBiH was adopted 17 years ago, and its planning period expired in 2018. That is why it is necessary to complete the drafting of the new Spatial Plan of the BDBiH, which began in 2019. This strategic spatial planning document should develop the basic guidelines defined in the Spatial Development Strategy of the BDBiH from 2022, primarily regarding the essential planned land use, the system of centres, the development of infrastructure systems and public services, and the protection of natural and cultural-historical values, with reducing the risk of natural disasters. The main challenges are highway and gas pipeline corridors, the spatial organization of the economy (location of business zones), and the coverage of protected nature areas. This document will serve as a basis for planning for lower-level spatial planning documents, primarily for urban plans. GIS database should be a mandatory part of the plan.			
Implementation duration	12 months, starting from 2025			
Implementation process and timeline	Step (subsequent)	Duration		
	Analysis and assessment of the existing situation	Four months/completed		
	Determination of goals	One month		
	Draft of the Spatial Plan	Two months		
	Public debate	Three months		
	Acceptance of the proposal of the Spatial Plan	One month		
	Adoption of the Spatial Plan	One month		
Action link to indicators	State indicators		Pressure indicator	
	4 Soil quality; 7. Biodiversity and ecosystems; 7.2 Forest and seminatural areas change		33., 33.1, 33.2, 33.3, 35.1	
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values	
	Status of the spatial plan	The existing spatial plan has expired	The new spatial plan was approved	

The development effect and contribution of the measure	The development of the Spatial Plan of the BDBiH enables a more balanced spatial development of the entire territory of the BDBiH. Its adoption creates conditions for more sustainable use of natural resources, construction of capital infrastructure, establishment of business zones, improvement of public services and environmental protection.		
The institution responsible for the implementation	Department for Spatial Planning, Property and Legal Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Institute for planning, design and development, JP "Komunalno Brčko", wider public, NGOs Independent Consultant	Collaborate Involve Consult Consult Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	Improvements in land management and development control support more efficient development models for protecting urban green space. These models include maintaining/promoting connectivity with urban green space and helping mitigate and adapt to the impacts of climate change.	This action could ensure equitable access to public services and infrastructure for various groups, including transportation, healthcare facilities, and educational institutions. Additionally, the plan could prioritize the safety and security of women and marginalized groups by incorporating measures to address issues such as street lighting, safe transportation routes, and providing inclusive and welcoming public spaces to all and accessible to persons with disabilities. By incorporating a gender perspective into spatial planning, the new Spatial Plan of the BDBiH can contribute to creating more inclusive, equitable, and safe urban environments for all residents.	The BDBiH's spatial plan is expected to be filled in the GIS system with digital, machine-readable information.
CO₂ reduction / Environmental benefit	/		
Indicative Project Costs	Cost (EURO / KM)		
	75,000 EUR/147,000 KM		
Notes on cost estimates:	The cost is estimated on indicative cost from the Development Strategy of the BDBiH 2021-2027 + inflation rate.		
Potential Financing Instruments and Sources	Instrument		Source
	Own-source – District budget		100% / 75,000

Action: 5.1.2 Drafting and adoption of the new Urban Plan of the town of Brčko		Type	Policy
Link with the strategic goal	6. Improve the land use sector through appropriate strategic and legislative policies that will integrate all sectors considering the improvement of environmental assets and the reduction of urban development pressure	Priority	6.1 Enable sustainable strategic planning
Linkage to Existing Policies/Plans	Development Strategy of the BDBiH 2021-2027 - 3.2 Improvement of the state of communal infrastructure and responsible territorial management 3.2.1.3 Drafting and adoption of the Urban Plan		
Strategic projects	/		
Description	 <p>The existing Urban Plan of Brčko was adopted 17 years ago, and its planning period expired in 2018. That is why it is necessary to prepare a new Urban Plan for Brčko for the urban area of Brčko with a surface area of about 56 km² and about 45,000 inhabitants. This planning document should, following the Spatial Plan of the BDBiH, define the primary organization of territory (boundaries of construction, agricultural, water and forest land); border of narrower urban area; conditions for equipping urban construction land; land use conditions in protective zones; traffic, water, energy and utility infrastructure zones; social infrastructure zones; guidelines for the protection of architectural and natural heritage; environmental protection measures; measures for the safety of people with disabilities; measures to protect residents and material assets from natural and other disasters; obligations to create detailed spatial planning documents. This document will serve as a basis for planning for lower-level spatial planning documents, primarily for zoning and regulatory plans. GIS database should be a mandatory part of the plan.</p>		
Implementation duration	24 months, starting from 2025		
Implementation process and timeline	Step (subsequent)	Duration	
	Analysis and assessment of the existing situation (with the development of Transport study of urban area of BDBiH)	12 months/completed	
	Determination of goals	Two months	
	Draft of the Urban Plan	Four months	
	Public debate	Three months	
	Acceptance of the proposal of the Urban Plan	Two months	
Adoption of the Urban Plan	One month		
Action link to indicators	State indicators	Pressure indicator	
	4 Soil quality; 6 Green spaces; 6.1. Share of green space areas within urban limits; 7.2 Forest and natural areas change	33., 33.1, 33.2, 33.3, 34., 34.1, 35, 35.1	


Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Status of the urban plan	The existing urban plan has expired	The new urban plan was approved
The development effect and contribution of the measure	<p>The Urban Plan of the town of Brčko is the most important strategic spatial planning document for the spatial development of the urban area of Brčko.</p> <p>Its adoption creates conditions for reducing the level of illegal construction, protecting high-quality agricultural land, revitalizing brownfield locations, and increasing the share of open green space areas.</p>		
The institution responsible for the implementation	Department for Spatial Planning, Property and Legal Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Institute for planning, design and development, JP "Komunalno Brčko", wider public, NGOs, Independent Consultant	Collaborate Involve Consult Consult Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	
	Improvements in land management and development control support more efficient development models for protecting urban green space. These models promote connectivity with urban green space and help mitigate and adapt to climate change impacts.	In order to be gender responsive, the plan could prioritize the safety and security of women and marginalized groups by incorporating measures to address issues such as street lighting, safe transportation routes and providing inclusive and welcoming public spaces to all and accessible to persons with disabilities, since safety issues are different for women and men, boys and girls, while public spaces are not equality accessible to all. By incorporating a gender perspective into spatial planning, the new Spatial Plan of the BDBiH can contribute to creating more inclusive, equitable, and safe urban environments for all residents.	
CO₂ reduction / Environmental benefit	/		
Indicative Project Costs	Costs (EURO / KM)		
	200,000 EUR/392,000 KM		
Notes on cost estimates:	The cost is estimated based on expert judgment and surface area (ha) benchmarking.		
Potential Financing Instruments and Sources	Instrument		Source
	Own-source – District Budget		100% / 200,000

Action: 5.1.3 Strengthening the mechanism for adopting detailed spatial planning documents		Type		Policy	
Link with the strategic goal	6. Improve the land use sector through appropriate strategic and legislative policies that will integrate all sectors considering the improvement of environmental assets and the reduction of urban development pressure			Priority	6.1 Enable sustainable strategic planning
Linkage to Existing Policies/Plans	Development Strategy of the BDBiH 2021-2027 3.2 Improvement of the state of communal infrastructure and responsible territorial management Environmental Protection Strategy of the BDBiH for the period 2022 – 2032 7.4 Ensuring a high level of public awareness of the importance of environmental protection and a greater degree of public involvement in the decision-making process				
Strategic projects	/				
Description	Planning training and workshops will help improve the capacities for detailed urban planning in the BDBiH. The main actors should be local communities, the Assembly of BDBiH and the NGO sector. The Estimated number of users is 550. As a result, priorities in developing detailed spatial planning documents will be identified more efficiently, and their adoption by the Assembly of BDBiH will be enabled. Also, better participation of citizens will be enabled through greater involvement of representatives of local communities and NGOs. Training will promote the continuous professional development of the leadership of local communities and representatives of the Assembly of BDBiH in implementation planning.				
Implementation duration	12 months, starting from 2025				
Implementation process and timeline	Step (subsequent)	Duration			
	Detailed identification of training users	Three months/completed			
	Creation of a training program	Three months			
	Implementation of training and online platform	Six months			
Action link to indicators	State indicators	Pressure indicator			
	All state indicators	Transport, water and land use indicators			
Indicators/s for measure monitoring	Indicators	Baseline values		Targeted values	
	Number of trained persons	0		550 trained persons	

The development effect and contribution of the measure	Better training of members of the Assembly of BDBiH and local community leaders will speed up the process of adopting detailed spatial planning documents, which will create conditions for reducing negative environmental impacts of the land use sector.		
The institution responsible for the implementation	Department for Spatial Planning, Property and Legal Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Institute for planning, design and development, JP "Komunalno Brčko", wider public, NGOs Independent Consultant	Collaborate Involve Consult Consult Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	
	Improvements in land management and development control support more efficient development models for protecting urban green space, promoting connectivity with urban green space, and helping mitigate and adapt to the impacts of climate change.	The action is gender neutral and in order to make it gender responsive, it is necessary to ensure the meaningful engagement of local women's NGOs and groups, including older women and those from marginalized communities, in planning training and workshops. By actively involving these groups, the planning process can better address women's specific needs and perspectives, particularly those who may face additional barriers or discrimination. This inclusive approach helps ensure that capacity-building efforts effectively consider gender-related issues and promote women's empowerment as key stakeholders in urban planning processes. Additionally, providing opportunities for continuous professional development tailored to the needs of women leaders and officials can enhance their skills and effectiveness in decision-making roles within the local government and community structures.	
Smart component	The stakeholder engagement process will result in an online platform for sharing and collecting information (BDBiH web portal).		
CO₂ reduction / Environmental benefit	/		
Indicative Project Costs	Cost (EURO / KM)		
	15,000 EUR/29,400 KM		
Notes on cost estimates:	The cost is estimated based on expert judgment and benchmarking of similar activities.		
Potential Financing Instruments and Sources	Instrument	Source	
	Own-source – District Budget International funding - Grant	50% / 7,500 50% / 7,500	

Action: 5.1.4 Preparation of the Study of Protected Nature Areas in BDBiH			Type	Policy
Link with the strategic goal	5. Improve the state of the natural surroundings and resources through adequate and integral land use planning and enhance the district's resilience to climate change and natural hazards		Priority	5.1 Strengthen nature protection
Linkage to Existing Policies/Plans	Environmental Protection Strategy of the BDBiH for the period 2016 – 2026 3.5. Territorial connection of ecologically significant areas into an ecological network on the surface of 17% of the territory of the BDBiH			
Strategic projects	/			
Description	There are no formally protected nature areas in BDBiH, although the Spatial Development Strategy has identified specific areas without defining their boundaries. Most of these areas are located in the southern, hilly, mountainous territory. Creating an appropriate study would accurately identify and map protected nature areas and determine their categorization and protection regimes, which would be the basis for their official declaration by competent institutions.			
Implementation duration	12 months, starting from 2025			
Implementation process and timeline	Step (subsequent)		Duration	
	Analysis and assessment of the existing situation of natural areas		Six months/completed	
	Determination of coverage of protected nature areas		Two months	
	Categorization of protected nature areas		Two months	
	Categorization of protection regimes		Two months	
Action link to indicators	State indicators		Pressure indicator	
	7 Biodiversity and ecosystems; 8 Climate change and GHG emissions		/	
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values	
	Status of the Study of Protected Nature Areas	Study of Protected Nature Areas is not prepared	Study of Protected Nature Areas is developed	
The development effect and contribution of the measure	Preparation of the Study of Protected Nature Areas in the BDBiH will create the conditions for their official declaration by the Assembly and the Mayor. In this way, biological and landscape diversity will be improved, and this territory's most valuable part of the natural environment will be preserved.			

The institution responsible for the implementation	Department for Spatial Planning, Property and Legal Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Institute for planning, design and development NGOs Citizens Independent consultant	Involve Consult Consult Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	The green conservation and upgrading of areas offer the opportunity for integrating nature-based solutions and green infrastructure to support climate mitigation and adaptation.	The action is gender neutral and gender and social inclusion component should be integrated in the study development in order to ensure that gender and social issues in protection of protected areas are ensured, including potential benefits for various groups.	Protected areas will be mapped on a GIS, and the information will be shared publicly (on the Web GIS platform).
CO₂ reduction / Environmental benefit	Studying nature-protected areas and their further protection will ensure the safeguarding of biodiversity, prevent the spread of disease, improve local economics, ensure water security, and build resilience against climate change.		
Indicative Project Costs	Cost (EURO / KM)		
	50,000 EUR/98,000 KM		
Notes on cost estimates:	The cost is estimated based on expert judgment and benchmarking of similar studies.		
Potential Financing Instruments and Sources	Instrument	Source	
	Own-source – District Budget International funding - Grant	70% / 35,000 30% / 15,000	

Action: 5.2.1 Establishment of new public parks and green infrastructure in the narrower urban area of Brčko		Type	Investment
Link with the strategic goal	6. Improve the land use sector through appropriate strategic and legislative policies that will integrate all sectors considering the improvement of environmental assets and the reduction of urban development pressure	Priority	6.2 Strengthen green infrastructure
Linkage to Existing Policies/Plans	Environmental Protection Strategy of the BDBiH for the period 2016 – 2026 3. Preservation of biological and landscape diversity		
Strategic projects	/		
Description	 <p>The existing Urban Plan of the town of Brčko envisaged the formation of two larger public green areas (a total area of about 13 ha) in the peripheral part of the narrower urban area of Brčko. The first planned public green area (about 10 ha) is located in the southern part of the narrower urban area (between Grčica and Dizdaruša). The second planned public green area (about 3 ha) is located in the western part of the narrower urban area (between Kukavica stream and Ivici). These new public parks should be connected with the existing public green areas through tree rows and green areas along traffic roads and water protection greenery.</p>		
Implementation duration	36 months, starting from 2026		
Implementation process and timeline	Step (subsequent)	Duration	
	Preparation of planning and technical documentation	Eight months/completed	
	Purchase of land	Six months	
	Infrastructure building	Ten months	
	Creation of green areas (landscaping and planting)	12 months	
Action link to indicators	State indicators	Pressure indicator	
	6 Green spaces	33, 34	

Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Open green space area in the urban area of BDBiH	84 ha of open green space area in the urban area of BDBiH	100 ha of open green space area in the urban area of BDBiH
The development effect and contribution of the measure	New public parks will improve the quality of life in the urban area of BDBiH, primarily by reducing the distance to public green areas for the population in the peripheral part of the narrower urban area.		
The institution responsible for the implementation	Department for Public Affairs		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Institute for planning, design and development, JP "Komunalno Brčko", wider public, NGOs, Independent Consultant	Collaborate Involve Consult Consult Collaborate	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	
	The green conservation and upgrading of areas offer the opportunity for integrating nature-based solutions and green infrastructure to support climate mitigation and adaptation.	The action is gender neutral and in order to make it more inclusive, the design and accessibility features of these green areas should consider women's and girls' needs, such as well-lit pathways, seating areas, and facilities like restrooms, to ensure inclusivity and comfort for all residents. Improving access to public green spaces, especially in peripheral areas, can enhance women's sense of security and encourage their participation in outdoor activities.	
Smart component	/		
CO₂ reduction / Environmental benefit	CO ₂ sequestration of new public parks and green infrastructure – 100 tCO ₂ /year		
Indicative Project Costs	CapEx (EURO / KM)	OpEx (EURO / KM)	
	1,500,000 EUR/2,940,000 KM	37,500 EUR/75,000 KM	
Notes on cost estimates:	The CAPEX is based on expert judgement and benchmarking of similar activities. It includes the preparation of planning and technical documentation (25,000 EUR), purchase of 4 ha of land (250,000 EUR), creation (building) of two new public parks with an area of 13 ha (1,100,000 EUR), and 6 km of tree lines (125,000 EUR) in the narrower urban area of BDBiH. The OPEX is based on benchmarking of park maintenance (2.5% of CAPEX).		
Potential Financing Instruments and Sources	Instrument		Source
	Own-source – District Budget International funding - Grant		50% / 750,000 50% / 750,000

Action: 3.1.1 Establishment of soil quality monitoring in the BDBiH		Type	Policy
Link with the strategic goal	3. Improve soil quality throughout the District by reducing solid waste pollution and implementing standards that will protect the environment and the community	Priority	3.1 Build a system for improving the quality of land
Linkage to Existing Policies/Plans	Development Strategy of the BDBiH 2021-2027: 3.1 Improvement of the existing state of nature, soil, water and air protection; 6.5 Improvement of the legal, strategic and institutional framework for sustainable management of land resources Environmental Protection Strategy of the BDBiH 2022-2032		
Strategic projects	/		
Description	To establish soil quality monitoring, five stations in different agroecological zones of the BDBiH must be established. These stations would primarily serve to monitor the presence of heavy metals and organic pollutants in the future since the last study on soil quality was done 17 years ago. The average plot size for the station is 750 m ² . Each station should have real-time equipment for monitoring basic parameters (temperature, humidity, PH value). Sampling and processing would be done every third year.		
Implementation duration	12 months, starting from 2025		
Implementation process and timeline	Step (subsequent)	Duration	
	Determination of agroecological zones	Five months/completed	
	Identification of sites	Two months	
	Purchase of land	Three months	
	Installing essential equipment and software	Two months	
	Monitoring and reporting	Continuously	
Action link to indicators	State indicators	Pressure indicator	
	4 Soil quality	22, 23	
Indicators/s for measure monitoring	Indicators	Baseline values	Targeted values
	Status of soil quality monitoring	Soil quality monitoring is not established	Soil quality monitoring is fully established
The development effect and contribution of the measure	More rational use and protection of land. Contributing to security, reducing poverty in rural areas, and removing obstacles to tourism development and the sustainable use of other natural resources.		

The institution responsible for the implementation	Department for Agriculture, Forestry and Water management		
Other stakeholders	Stakeholder Group	Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Wider public, NGOs	Consult Consult	
Cross-cutting themes / benefits	Climate Action	Gender and Social inclusion	Smart component
	Soil quality monitoring program will improve the conservation, enhancement, and efficient use of land, setting up a framework for opportunities in the reduction of greenhouse gas emissions and strengthening resilience to climate change and disaster risks	The action is gender neutral and both women and men will equal benefit from the action. It is important to ensure adequate informing to various groups, especially those engaged in agriculture, about the soil quality.	Soil quality monitoring and sensors should collect information, transmit it, and store it in an information system. The information could be shared publicly (Web GIS platform).
CO₂ reduction / Environmental benefit	Monitoring and enhancing soils will tackle climate protection and sustainable development and ensure better land planning.		
Indicative Project Costs	Cost (EURO / KM)		
	22,000 EUR/43,120 KM		
Notes on cost estimates:	The cost is estimated based on expert judgment, mainly on benchmarking of sampling and processing.		
Potential Financing Instruments and Sources	Instrument	Source	
	Own-source – District Budget	100% / 22,000	

Action: 3.1.2 Development of a unique GIS of the BDBiH		Type	Policy
Link with the strategic goal	3. Improve soil quality throughout the District by reducing solid waste pollution and implementing standards that will protect the environment and the community	Priority	3.1 Build a system for improving the quality of land
Linkage to Existing Policies/Plans	<p>Development Strategy of the BDBiH 2021-2027</p> <p>3.1 Improvement of the existing state of nature, soil, water and air protection</p> <p>3.2.1.1 Creation of a unique information system about the territory of the BDBiH for planning, use and protection of the territory of the BDBiH</p> <p>Environmental Protection Strategy of the BDBiH for the period 2016 – 2026</p> <p>6.5 Improvement of the legal, strategic and institutional framework for sustainable management of land resources</p>		
Strategic projects	/		
Description	<p>Article 43 of the Law on Spatial Planning prescribes the obligation to establish a unique information system about the territory of the BDBiH (unique Geographic Information System of the BDBiH). According to the article, <i>“the tasks of designing, creating and managing the unique geographic information system (hereinafter: GIS) of the Government are managed by the Public Register Department, and these are tasks of special interest to the Government”</i>. The unique GIS system is a system that is composed of GIS subsystems that are located in the Government of the BDBiH and which together represent one complex whole. GIS databases of Spatial and Urban Plan are the most important part of the GIS subsystem of spatial planning. At this moment, the beginnings of the GIS subsystems exist in the Institute for planning, design and development BD BiH and JP “Komunalno Brčko”.</p>		
Implementation duration	12 months, starting from 2025		
Implementation process and timeline	Step (subsequent)	Duration	
	<i>Analysis and assessment of the existing situation (screening)</i>	<i>One month /completed</i>	
	<i>Acquisition of software</i>	<i>One month</i>	
	<i>Creation of missing GIS registers of spatial data</i>	<i>Five months</i>	
	<i>Setting up a GIS portal and connecting relevant digital registers of public institutions</i>	<i>Five months</i>	
	<i>Monitoring and reporting</i>	<i>Continuously</i>	
Action link to indicators	State indicators	Pressure indicator	
	4 Soil quality; 6 Green space	22, 23, 34.1	

Indicators/s for measure monitoring	Indicators	Baseline values		Targeted values
	Status of unique GIS of the BDBiH	Unique GIS of the BDBiH is not developed		Functional and sustainable unique GIS of the BDBiH is developed
The development effect and contribution of the measure	Developing a unique GIS of the BDBiH will improve the sustainable management of all environmental assets, particularly land resources.			
The institution responsible for the implementation	Public Register Department			
Other stakeholders	Stakeholder Group		Engagement (Inform, Consult, Involve, Collaborate, Empower)	
	Institute for planning, design and development Other governmental departments JP "Komunalno Brčko" NGOs Citizens Independent Consultant		Involve Involve Consult Consult Inform Collaborate	
Cross-cutting themes / benefits	Climate Action		Gender and Social inclusion	Smart component
	Improvements in land management and development control support more efficient development models for protecting peri-urban green spaces and help mitigate and adapt to the impacts of climate change.		The action is gender neutral, but it can be gender responsive if all data about the land plots ownership and other objects are sex disaggregated, meaning that gender statistics could be additionally developed within the GIS establishment.	The information from the unique GIS of the BDBiH will be shared publicly (Web GIS platform).
CO ₂ reduction / Environmental benefit	Creating the GIS for Brcko will facilitate scenario planning, allowing environmental modelling of different project scenarios and their potential impacts. This will ensure that decision-makers evaluate various options and choose the most environmentally responsible action.			
Indicative Project Costs	Cost (EURO / KM)			
	170,000 EUR/333,200 KM			
Notes on cost estimates:	The cost is estimated based on external expert judgement, including the maintenance of this complex system.			
Potential Financing Instruments and Sources	Instrument			Source
	Own-source – District budget International finding - Grant			70% / 119,000 30% / 51,000

Indicative Financial Framework

Table 24 – indicative financial framework for the period of validity of the strategic document

Number of Item	Financing structure (%)	Total KM	Budget Brčko District BiH (KM)	Other resources	
				(KM)	Source of funding
Strategic objective 1.Ensure water resources sustainability through planning and construction of water supply and wastewater infrastructure, supported by an operationally viable tariff system	8.79%	227,458,000	27,606,600	199,851,400	
Priority 1.1 Improve regulatory policy in the field of water management	0.73%	1,666,000	597,800	1,068,200	
1.1.1. Preparation of a master plan for the area of water supply and wastewater drainage		1,176,000	352,800	823,200	Donors (Grant)
1.1.2 Establishment of sanitary protection zones		196,000	98,000	98,000	Donors (Grant)
1.1.3 Water management legal framework development		294,000	147,000	147,000	Donors (Grant)
Priority 1.2. Extend and modernise water supply system	69.19%	157,388,000	19,345,200	138,042,800	
1.2.1. Improvement of the drinking water treatment process		980,000	98,000	882,000	Loan (EBRD, EIB, WB)
1.2.2 Reconstruction and extension of the water supply network and the reduction of non-revenue water		19,600,000	3,920,000	15,680,000	Donors, Loan
Priority 1.3 Establish wastewater treatment system	29.94%	68,110,000	7,399,000	60,711,000	
1.3.1 Feasibility Study about current and future wastewater treatment		1,470,000	735,000	735,000	Donors (Grant)
1.3.2 Construction of the sewage network: expansion, rehabilitation, and construction of new sections		19,600,000	1,960,000	17,640,000	Donors, Loan
1.3.3 Construction of a wastewater treatment plant - WWTP		47,040,000	4,704,000	42,336,000	Donors, Loan
Priority 1.4 Empower water management monitoring and planning	0.13%	294,000	264,600	29,400	

Number of Item	Financing structure (%)	Total KM	Budget Brčko District BiH (KM)	Other resources	
				(KM)	Source of funding
1.4.1 Modernisation and digitalisation in water management		294,000	264,600	29,400	Donors (Grant)
Strategic objective 2. To improve air quality by applying energy resource-efficient technologies with reduced environmental impacts, introduction of low carbon emissions transport policies emisijama ugljenika	8.46%	218,873,200	22,274,420	196,598,780	
Priority 2.1. Strengthen energy supply system	85.63%	187,415,200	18,741,520	168,673,680	
2.1.1. Establish energy data collection		137,200	13,720	123,480	Donors (Grant)
2.1.2 Development of by-laws related to the energy sector		196,000	19,600	176,400	Donors (Grant)
2.1.3 Development of a feasibility study for the construction of a cogeneration plant in Brčko District		490,000	49,000	441,000	Donors
2.1.4 Development of a feasibility study for the construction of a district heating system for the District of Brčko		392,000	39,200	352,800	Donors
2.1.5 Construction of a cogeneration plant		186,200,000	18,620,000	167,580,000	Loan (EBRD, EIB, WB)
Priority 2.2. Introduce low-emission transport	14.37%	31,458,000	3,532,900	27,925,100	
2.2.1. Development of a data collection program for the entire city and a multimodal transport model		1,568,000	470,400	1,097,600	Donors (Grant)
2.2.2 Develop low-emission transport policies		196,000	49,000	147,000	Donors (Grant)
2.2.3 Prepare a feasibility study of the rapid (fast) public transport system corridor		294,000	73,500	220,500	Donors
2.2.4 Implementation of bus operation reform		29,400,000	2,940,000	26,460,000	Donors, Loan
Strategic objective 3. Improve soil quality throughout the District by reducing solid waste and implementing land quality monitoring	62.11%	1,606,415,020	798,423,150	807,991,870	
Priority 3.1. Build a system for improving the quality of land	0.02%	376,320	276,360	99,960	
3.1.1 Establishment of soil quality monitoring in the Brčko District		43,120	43,120		
3.1.2 Development of a GIS database of contaminated sites in the Brčko District		333,200	233,240	99,960	Donors (Grant)
Priority 3.2. Strengthen waste management system	99.98%	1,606,038,700	798,146,790	807,891,910	

Number of Item	Financing structure (%)	Total KM	Budget Brčko District BiH (KM)	Other resources	
				(KM)	Source of funding
3.2.1 Improvement of the system of records and reporting on waste		107,800	53,900	53,900	Donors (Grant)
3.2.2 Study on possibilities of waste prevention, treatment, and recycling		548,800	109,760	439,040	Donors (Grant)
3.2.3 Collection infrastructure for mixed (residual) and recyclable waste		3,920,000	392,000	3,528,000	Loans (EBRD, EIB, WB)
Strategic objective 4. Reduce greenhouse gas emissions by applying efficient energy management and introducing motorised and non-motorised modes of transport	20.50%	530,214,300	263,771,410	266,442,890	
Priority 4.1 Integrate energy efficiency standards in buildings	99.21%	526,029,700	262,617,460	263,412,240	
4.1.1 Definition of nearly zero energy buildings (nZEB) through primary energy indicators (kWh/m ²) and the minimum share of RES use (%)		34,300	34,300		
4.1.2 Introduction of energy management in public buildings		294,000	117,600	176,400	Donors (Grant)
4.1.3 Rulebook on Energy Audits		19,600	9,800	9,800	Donors (Grant)
4.1.4 Drafting of other secondary legislation in the field of building construction		98,000	49,000	49,000	Donors (Grant)
4.1.5 Study on Renewable Energy Potential in Brčko District Buildings		137,200	68,600	68,600	Donors (Grant)
4.1.6 Installation of solar systems (PV and for the preparation of domestic hot water) in public institutions		3,920,000	1,568,000	2,352,000	Donors, Loan
4.1.7 Installation of thermostatic sets and their smart metering in all buildings owned by Brcko District		117,600	70,560	47,040	Donors (Grant)
4.1.8 Establishment of a legal framework for efficient energy management and the introduction of green public procurement criteria for the purchase of electrical appliances for buildings		49,000	19,600	29,400	Donors (Grant)
4.1.9 Improvement of energy efficiency in buildings owned by Brcko District		25,480,000	12,740,000	12,740,000	PPP, Donors (Grant)
4.1.10 Improvement of energy efficiency in residential buildings and family houses		356,720,000	178,360,000	178,360,000	Donors
4.1.11 Improvement of energy efficiency in commercial and service buildings		139,160,000	69,580,000	69,580,000	Donors

Number of Item	Financing structure (%)	Total KM	Budget Brčko District BiH (KM)	Other resources	
				(KM)	Source of funding
Priority 4.2 Build a sustainable transport system and its infrastructure	0.79%	4,184,600	1,153,950	3,030,650	
4.2.1 Sustainable Urban Mobility Plan (SUMP) for Brčko District		196,000	58,800	137,200	Donors (Grant)
4.2.2 Promotional campaigns for car sharing, walking, and cycling		68,600	17,150	51,450	PPP
4.2.3 Expand and improve cycling infrastructure		1,960,000	588,000	1,372,000	PPP, Donors (Grant)
4.2.4 Implementation of the pedestrian priority infrastructure		1,960,000	490,000	1,470,000	PPP, Donors (Grant)
Strategic objective 5. Improve the land use sector through appropriate strategic and legislative policies that will integrate all sectors considering the improvement of environmental assets and the reduction of urban development pressure	0.14%	3,606,400	2,092,300	1,514,100	
Priority 5.1 Enable sustainable strategic planning		666,400	622,300	44,100	
5.1.1 Completion of the Spatial Plan of the Brčko District		147,000	147,000		
5.1.2 Drafting and adoption of the new Urban Plan of the town of Brčko		392,000	392,000		
5.1.3 Strengthening the mechanism for adopting detailed spatial planning documents		29,400	14,700	14,700	Donors (Grant)
5.1.4 Preparation of the Study of Protected Nature Areas in Brčko District		98,000	68,600	29,400	Donors (Grant)
Priority 5.2 Strengthen green infrastructure		2,940,000	1,470,000	1,470,000	
5.2.1 Establishment of new public parks and green infrastructure in the narrower urban area of Brčko		2,940,000	1,470,000	1,470,000	Donors (Grant)
In total from Strategic document**	100%	2,586,566,920,00	1,114,167,880,00	1,472,399,040,00	
OVERVIEW PER RESOURCES					
(amounts in KM / EUR and percentages)					
Budget of Brčko district of BiH (KM / EUR)		Higher level of government (KM / EUR)		International donors, Loans (KM / EUR)	
1,114,167,880	569,339,786	0	0	1,472,399,040	752,395,909
43.08%		0.00%		56.92%	

Note: The total amount by Action includes consultant costs (Costs) and capital investments (CapEx). The amount did not include operating expenses (OpEx). OpEx was calculated on an annual basis.

Implementation and Monitoring

This section outlines the structure with key roles and responsibilities for implementing the GCAP Brcko District and how progress and impact will be monitored. This implementation and monitoring framework will facilitate information and evidence-based decision-making, ensuring effective and efficient use of resources, with public accountability through reporting requirements.

The Green Champion (Mayor), the Green City Officer, the GCAP Steering Committee, and the Government Departments will play key roles in this process. These roles will maintain accountability for the GCAP's progress during the timelines outlined in this document.

For monitoring, evaluation and reporting on the implementation of GCAP, two tools based on Excel tables have been developed that will enable:

- Monitoring the progress of the implementation of GCAP actions through the Progress Monitoring Plan (PMP);
- Monitoring the results and impact of implemented actions, linking it to the state and pressure indicators through the Impact Monitoring Plan (IMP);

6.1 Structure for GCAP Implementation

Key players	Roles and responsibilities
Mayer of the Brcko District – Green City Champion	<ul style="list-style-type: none"> • Appoint GCO and together will plan and coordinate the process of implementation; • Appoint and confirm Steering Committee members and chair their work under the implementation.
Green City Officer (GCO)	<ul style="list-style-type: none"> • Monitor implementation, liaising with relevant departments; • Coordinates cross-departmental GCAP monitoring and reporting, ensuring that the Progress Monitoring Plan (PMP) and Impact Monitoring Plan (IMP) are updated accordingly; • Monitor the progress of actions; • Cooperation with the Steering Committee of GCAP; • Prepare an annual report on the progress of activities.
GCAP Steering Committee	<ul style="list-style-type: none"> • Responsible for decision-making during the implementation process; • Meet at least twice a year to concretize measures, propose investments and make decisions regarding actions; • Provide technical support to the GCO and Governmental Departments.
Governmental Departments	<ul style="list-style-type: none"> • Appoint one person who will coordinate the implementation of the actions included in this document; • Coordinate the implementation of the specific action; • Monitor the progress of the relevant actions within the department; • Update indicator database (state-pressure-response); • Identify and liaise with respective stakeholders for data collection and action implementation; • Perform reporting using PMP and IMP tools; • Support GCO in monitoring the progress.

6.2 Monitoring and Reporting

Monitoring and reporting is the next stage of the GCAP process, which aims to identify what has been achieved and what opportunities exist for improvement in each period. The GCAP process is iterative, so challenges, objectives, and actions will need to be periodically revised to identify changes in State, Pressure, and Response indicators. The effectiveness of the implementation and monitoring will depend on continued political support and consistent ownership by a committed individual within the District administration.

Progress Monitoring Plan

The PMP lists all GCAP actions linked to the strategic objectives and priorities, including the body responsible for implementation and key milestones. The Green City Officer will monitor the PMP. Government departments will update the PMP for their respective actions, reporting back to the Green City Officer, who in turn will report to the Steering

Committee. Progress monitoring and reporting will be done on an annual basis as per the table provided in the Annex 6. The monitoring results will serve to plan the following stages of each action and make any necessary amendments to timelines, resources, and budgets.

Impact Monitoring Plan

The Impact Monitoring Plan (IMP) is used to assess whether the implemented GCAP actions produce the desired results and impacts. It is based on the Indicator Database (developed as part of the GCAP process), which established the quantitative basis for the BDBiH GCAP. The IMP lists the baseline for each indicator in relation to the annual monitoring that will be undertaken. The responsibility for monitoring the IMP rests with the Green City Officer, while the competent departments of the BDBiH Government will monitor indicators and report on changes annually. Proposal of Impact Monitoring Plan is in Annex 7.

Annex 1: Steering committee members and Technical Expert Group members

Steering Committee (SC) members

Steering Committee Members		
	Institution	Name
1	Department of Health and Other Services	Ilija Klariž
2	Department for Spatial Planning and Property Legal Relations	Siniša Jovanović
3	Institute for planning, programming and development of BDBiH	Mensura Kadrić
4	Department of Agriculture, Forestry and Economy	Zijad Bikić
5	Directorate for Finance	Marko Tomić
6	Department for economic development, sport and culture	Aleksandar Đurić
7	Public Enterprise Luka Brčko	Damir Đokić
8	Department of Education	Samir Čorbadžić
9	Mayor Cabinet	Lucija Ždravac
10	Department for European Integration and International Cooperation	David Ikić
11	Department for Professional and Administrative Affairs	Zoran Ješić
12	Department for Communal Affairs	Aleksandar Bojić
13	Coordinators Office of BDBiH in Council of Ministers	Miroslav Gavrić

Technical Expert Group (TEG) members

Technical Expert Group		
	Institution	Name
1	Institute for planning, programming and development of BDBiH	Ramiz Muminović
2	Institute for planning, programming and development of BDBiH	Renea Kondić
3	Department of Health and Other Services	Adna Imširović
4	Department of Health and Other Services	Bojana Stević
5	Department of Health and Other Services	Slavica Bjelić
6	Department for Spatial Planning and Property Legal Relations	Nada Ljubojević
7	Department for Spatial Planning and Property Legal Relations	Ishak Abdurahmanović
8	Department for Spatial Planning and Property Legal Relations	Stanko Stančić
9	Department for Spatial Planning and Property Legal Relations	Matija Antić
10	Department of Agriculture, Forestry and Economy	Svjetlana Đukić
11	Directorate for Finance	Irena Tešić
12	Department for Public Register	Milijana Ivandić
13	Department for economic development, sport and culture	Marica Markovljević
14	Public Enterprise Luka Brčko	Damir Đokić
15	Department of Education	Dejan Nikolić
16	Mayor Cabinet	Lucija Ždravac
17	Department for European Integration and International Cooperation	David Ikić
18	Department of Public Affairs	Edisa Kasumović
19	Department for Communal Affairs	Aleksandar Bojić
20	Coordinators Office of BDBiH in Council of Ministers	Miroslav Gavrić

Annex 2: Wider group of stakeholders

District Governmental Departments

Department of Public Safety
 Department for Professional and Administrative Affairs
 Department for economic development, sport and culture
 Department of Agriculture, Forestry and Economy
 Department of Health and Other Services
 Department of Education
 Department for Spatial Planning and Property Legal Relations
 Department for displaced persons, refugees and housing issues
 Department for Communal Affairs
 Department of Public Affairs
 Public Registry Department
 Department for European Integration and International Cooperation
 Directorate for Finance
 Office for public property management
 Sector for general affairs and strategic planning
 Public health department

Public companies/entities

Public Enterprise Luka Brčko
 Public Enterprise Putevi Brčko
 Public Enterprise Komunalno Brčko
 Radio Brčko
 Development fund
 Institute for planning, design and development of BDBiH

Business Associations and Private providers Public companies/entities

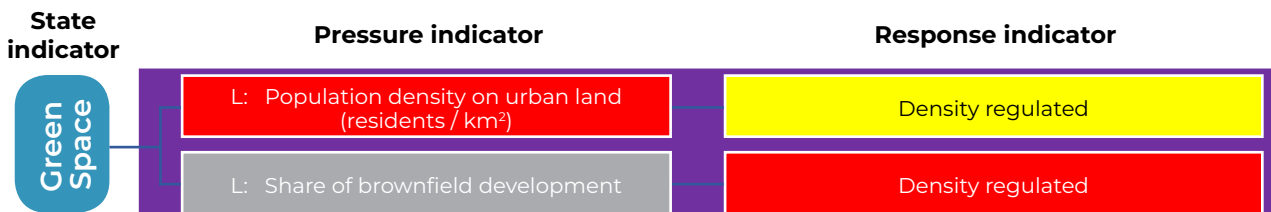
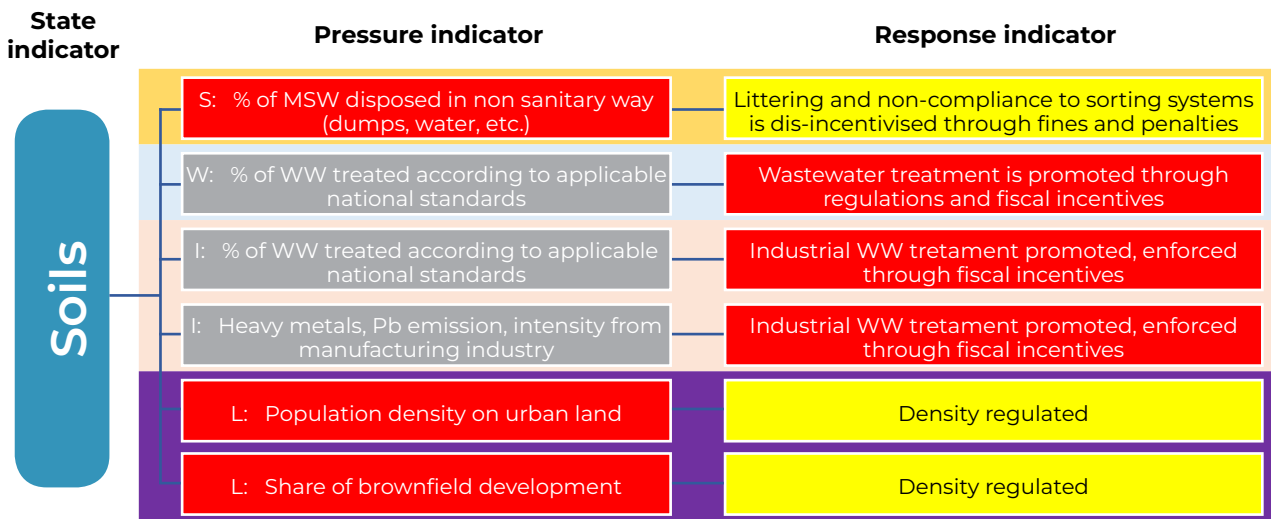
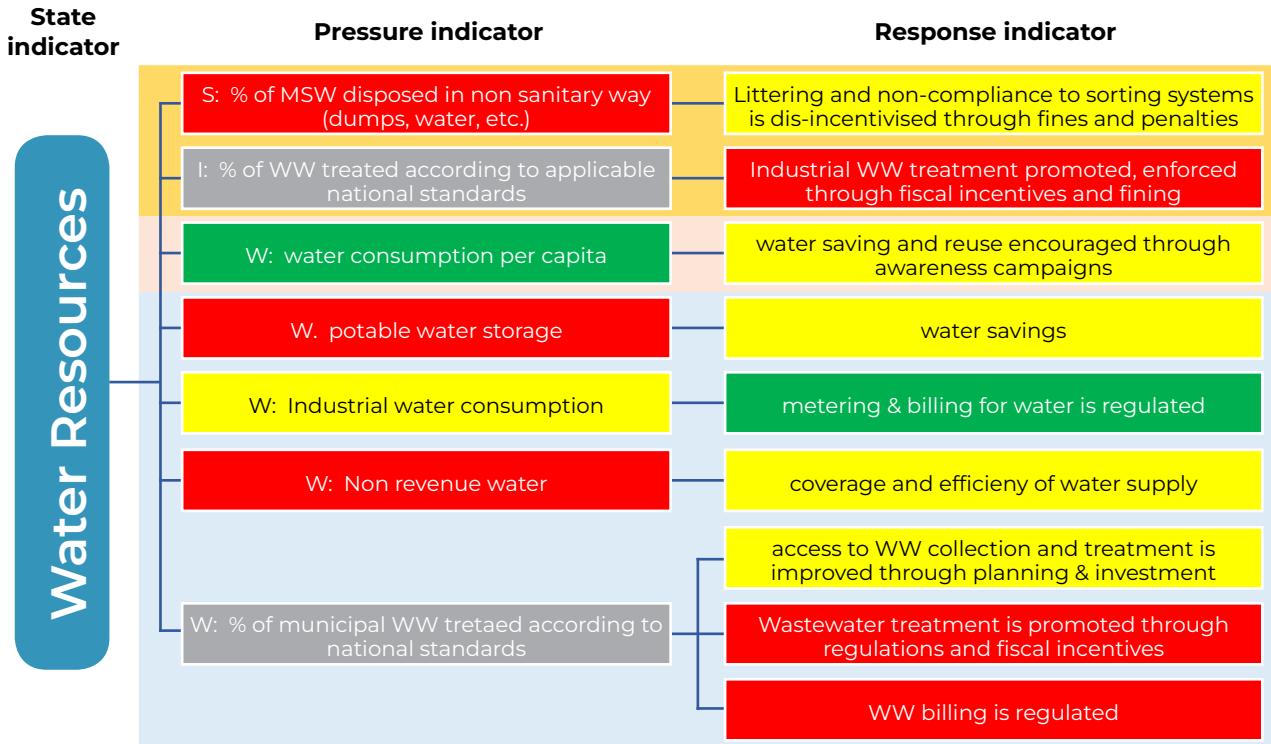
SMEs from the Construction industry sector - Bijelić - Gradnja d.o.o. Brčko; Liberty Group Brčko - proizvodnja modularnih kućica; Herceg Brčko - PVC i ALU proizvodnja; DH Inženjering
 SMEs from the Food industry sector - Studen Agrana - rafinerija šećera d.o.o.; Bimal d.d. Brčko

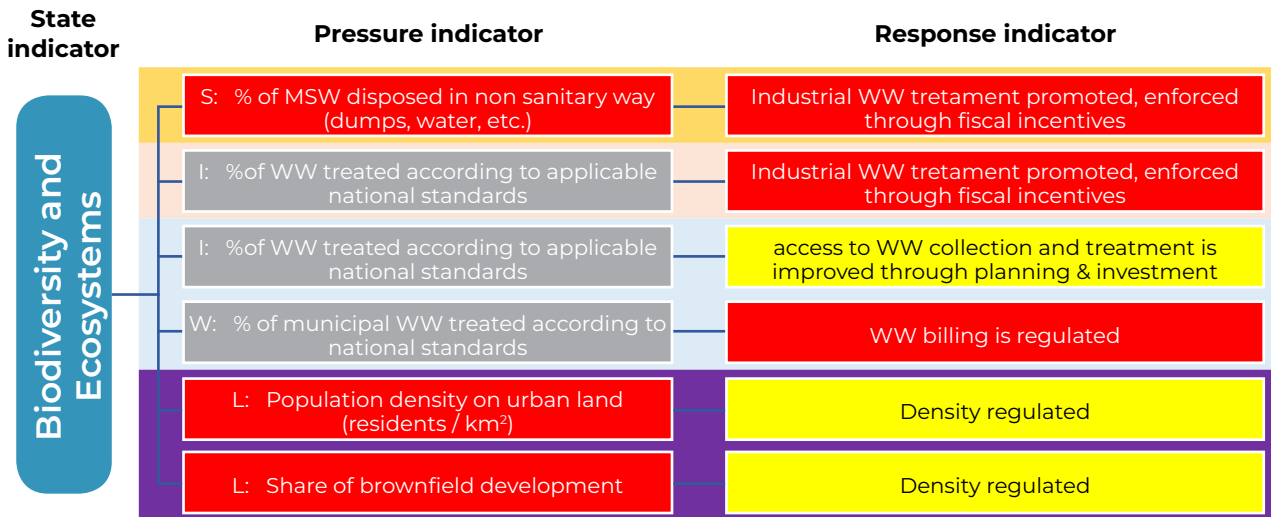
Civil Society and Other Organisations

NGOs (e.g. Women's Associations; Informal groups and networks; Activist groups):
 Association of active women (*Udruženje aktivnih žena*) Gender Brčko
 Association for consumer protection (*Udruženje za zaštitu potrošača*) Bona Fides Brčko
 Commercial chamber Brčko (*Privredna komora Brčko*)
 Employers Association (*Udruženja poslodavaca*)
 Civil Association for nature lovers (*Udruženje građana Klub Ljubitelja Prirode Brčko*)
 Association – Ecological movement (*Udruženje ekološki pokret*) „ECO TEAM FAZANERIJA“ Brčko
 Mountaineer society (*Planinarsko društvo*) “Njivce” Bijela, Brčko
 Mountaineer society (*Planinarsko društvo*) “Granaš” Brčko

Annex 3: Indicator database for GCAP BDBiH

State indicator	Pressure indicator	Response indicator
Air pollution	T: Averageage of car fleet	High polluting vehicles are regulated, energy efficient vehicles are incentivised through fiscal instruments
	T: Percentage of diesel cars in total vehicle fleet	High polluting vehicles are regulated, energy efficient vehicles are incentivised through fiscal instruments
	T: Share of total passenger cars run by alternative energy	High polluting vehicles are regulated, energy efficient vehicles are incentivised through fiscal instruments
	T: Transport modal share	Extension and improvement of public non motorised transport is promoted, investment
	T: Motorisation rate	Extension and improvement of public non motorised transport is promoted, investment
	T: Avarage number of vechicle cars / m.bikes per HH	Public and non-motorised transport is promoted through Information and awareness campaigns
	T: Kms of road dedicated exclusively to public transport / 10.000 pop	Public and non-motorised transport is promoted through Information and awareness campaigns
	T: Avarage travel speed during peak hrs	Traffic demand managed through smart technologies
	T: Avarage travel speed during peak hrs	Public and private investment in energy efficiency
	B: Electricity consumption in residential buildings	Green building promoted through standards and fiscal incentives
	B: Heat cooling consumption in buildings (fossil fuels)	Metering and billing for personal energy use regulated
	B: Heat cooling consumption in buildings	Support schemes for building renovation
	B: Heat cooling consumption in residential buildings (fossil fuels)	Support schemes for building renovation
	I: Electricity consumption per unit of industrial GDP	Energy efficient equipmentregulated and incentivised through fiscal instruments
	I: Fossil fuel consumption per unit of industrial GDP	Energy efficient technologies supported through private investment
	E: Share of households connected to district heating	Coverage and quality of electricity and heat supply is improved through investment
	E: Proportion of total energy derivated from RES / total energy production	RES in private buildingsto be incentivised through fiscal instruments
		RES developed and supported through public and private investment
		RES incentivicised through awareness campaigns
	S: % of MSW disposed in non sanitary way (dumps, water bodies)	Composting, recycling, and waste-to-energy facilities developed
S: % of MSW disposed in EU compliant sanitary landfills	Solid waste reuse, sorting, and recycling is promoted	





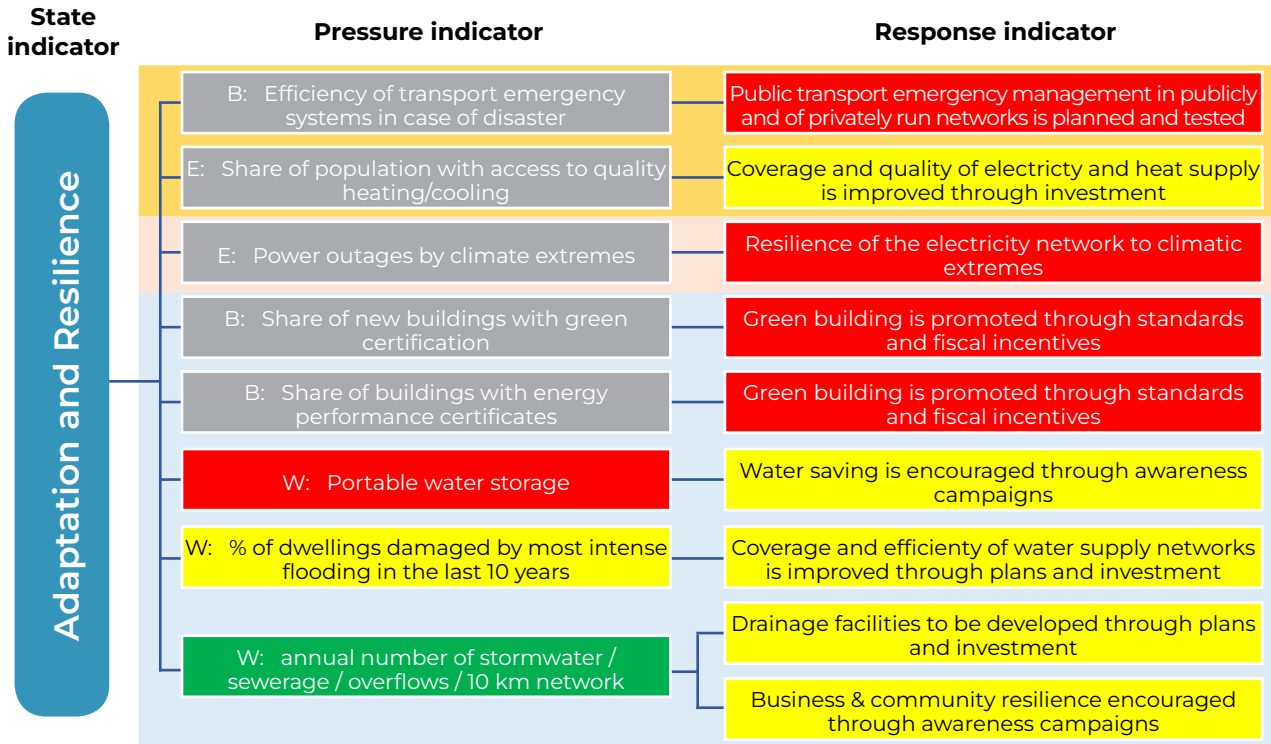
State indicator

Pressure indicator

Response indicator

Mitigation GHG Emissions

State indicator	Pressure indicator	Response indicator
	T: Averageage of car fleet	High polluting vehicles are regulated, energy efficient vehicles are incentivised through fiscal instruments
	T: Percentage of diesel cars in total vehicle fleet	High polluting vehicles are regulated, energy efficient vehicles are incentivised through fiscal instruments
	T: Share of total passenger cars run by alternative energy	High polluting vehicles are regulated, energy efficient vehicles are incentivised through fiscal instruments
	T: Transport modal share	Extension and improvement of public non motorised transport is promoted, investment
	T: Motorisation rate	Extension and improvement of public non motorised transport is promoted, investment
	T: Avarage number of vechicle cars / m.bikes per HH	Public and non-motorised transport is promoted through Information and awareness campaigns
	T: Kms of road dedicated exclusively to public transport / 10.000 pop	Public and non-motorised transport is promoted through Information and awareness campaigns
	T: Avarage travel speed during peak hrs	Traffic demand managed through smart technologies
	B: Electricity consumption in buildings	Public and private investment in energy efficiency
	B: Electricity consumption in residential buildings	Green building promoted through standards and fiscal incentives
	B: Heat cooling consumption in buildings (fossil fuels)	Metering and billing for personal energy use regulated
	B: Heat cooling consumption in buildings	Support schemes for building renovation
	B: Heat cooling consumption in residential buildings (fossil fuels)	Support schemes for building renovation
	I: Electricity consumption per unit of industrial GDP	Energy efficient equipment regulated and incentivised through fiscal instruments
	I: Fossil fuel consumption per unit of industrial GDP	Energy efficient technologies supported through private investment
	E: Share of households connected to district heating	Coverage and quality of electricity and heat supply is improved through investment
	E: Share of renewables in total energy production	RES in private buildingsto be incentivised through fiscal instruments
		RES developed and supported through public and private investment
		RES incentivivised through awareness campaigns
	S: % of MSW disposed in non sanitary way (dumps, water bodies)	Composting, recycling, and waste-to-energy facilities developed
	S: % of MSW disposed in EU compliant sanitary landfills	Solid waste reuse, sorting, and recycling is promoted



Legend:

- Transport
- Buildings
- Industry
- Energy
- Solid Waste
- Water
- Land Use

Annex 4: Pressure indicators - overview of available data and their benchmarking threshold

Water supply and wastewater - overview of available data and their reference value threshold

Populated			
core	2	Domestic water consumption per capita	GREEN
		Non-revenue water	RED
optional	4	Annual average of the daily number of hours of continuous water supply per household	YELLOW
		Energy used for urban water production and supply	RED
		Potable water storage	RED
		Share of industrial water consumption	YELLOW
Unpopulated (no data)			
core	2	Percentage of residential and commercial wastewater that is treated according to applicable national standards	No data
		Sewer Network Integrity (Pipe break)	No data
optional	5	Water consumption per unit of city GDP	No data
		Percentage of non-industrial buildings equipped to reuse grey water	No data
		Percentage of wastewater from energy generation activities that is treated according to applicable national standards	No data
		Energy used for wastewater collection and treatment	No data
		Sludge safely treated disposed of or safely used	No data

Transport - overview of available data and their reference value threshold

Populated			
core	2	Average age of car fleet total and by type	RED
		Transport modal share in commuting cars motorcycles taxi bus metro tram bicycle pedestrian	RED
optional	6	Percentage of diesel cars in total vehicle fleet	RED
		Fuel standards for light passenger and commercial vehicles	RED
		Share of total passenger car fleet run by alternative energy (total and by type)	GREEN
		Transport modal share in total trips	YELLOW
		Motorisation rate	RED
		Average number of vehicles cars and motorbikes per household	RED
Unpopulated (no data – no flag)			
core	2	Average travel speed on primary thoroughfares during peak hour	No data
		Interruption of public transport systems in case of disaster	No data
optional	5	Share of population having access to public transport within 15min by foot	No data
		Kilometres of road dedicated exclusively to public transit per 100000 population	No data
		Kilometres of dedicated bicycle path per 100000 population	No data
		Travel speed of bus service on major thoroughfares daily average	No data
		Efficiency of transport emergency systems in case of disaster	No data

Buildings - overview of available data and their reference value threshold

Populated			
core	2	Electricity consumption in buildings	YELLOW
		Fossil fuels consumption for heating and cooling	GREEN
optional	6	Electricity consumption in residential buildings	RED
		Electricity consumption in commercial buildings	YELLOW
		Electricity consumption in public buildings	YELLOW
		Fossil fuels consumption for heating and cooling in residential buildings	GREEN
		Annual fossil fuels consumption for heating and cooling in commercial buildings	GREEN
		Fossil fuels consumption for heating and cooling in public buildings	RED
Unpopulated (no data – no flag)			
optional	2	Share of new buildings with green certification	No data
		Share of buildings with energy performance certificates (EPC)	No data

Energy - overview of available data and their reference value threshold

Populated			
core	2	Share of population with an authorized connection to electricity	GREEN
		Share of renewable in total energy consumption	GREEN
optional	3	Electrical interruptions	RED
		Percentage of network line losses	YELLOW
		Share of households connected to district heating	RED
Unpopulated (no data – no flag)			
core	2	Share of population with access to quality heating / cooling	No data
		Power outages by climate extremes	No data
optional	3	Share of district heating from carbon intensive sources	No data
		Share of city enterprises with ISO50001/EMAS certification or similar	No data
		Share of district heating from renewable sources	No data







Solid waste - overview of available data and their reference value threshold













Populated			
core	4	Total municipal solid waste generation per capita	YELLOW
		Share of the population with weekly municipal solid waste MSW collection	RED
		Municipal solid waste treated in sorting, processing and treatment plants	RED
		Remaining life of current landfills	RED
optional	4	Proportion of dry recyclables	RED
		Proportion of organic waste	RED
		Percentage of MSW which is disposed of in open dumps controlled dumps or bodies of water or is burnt	RED
		Municipal solid waste disposed in EU-compliant/equivalent sanitary landfills	RED

Land-use - overview of available data and their reference value threshold

Populated			
core	2	Population density on urban land	RED
		Average annual growth rate of built-up areas	GREEN
optional	3	Proportion of the population living within 20 minutes to everyday services (grocery stores, clinics)	GREEN
		Share of brownfield development	RED
		Vacancy rates of residential buildings	RED
Unpopulated (no data – no flag)			
core	1	Vacancy rates of commercial buildings	No data
optional	2	Average commuting distance	No data
		Average commuting time	No data

Annex 5: Priority challenges per environmental topics

Priority – environmental state	Pressure sectors	Priority challenges
 <p>Water resources</p>	 <p>Water supply and wastewater</p>	There is no strategic approach to communal water infrastructure planning and adequate planning and technical documentation
		The imperfection of the water supply system under the jurisdiction of JP Komunalno, manifests itself in large losses, insufficient pressures on the network, the age of the network and the underdevelopment of the system for users
		There is no reliable and complete cadastre of underground installations in GIS format
		Variable water quality in water resources of surface waters that belong to the direct basin of the Sava River in the area of BDBiH
		Protection of the quantity and quality of drinking water sources by establishing sanitary zones
		Inadequate collection (coverage) and purification of wastewater
 <p>Air quality</p>	 <p>Transport</p>	Use of older car, more polluting car fleet significantly effect on air quality in District
		increasing rate of motorisation and vehicle ownership
		Energy efficient vehicles are not stimulated through fiscal instruments
		Insufficient planning the expansion and improvement of public and non-motorized transport
	 <p>Energy</p>	High use of fossil fuels in residential buildings
		lack of district heating system
		Lack of any kind of fiscal incentives related to RES facilities investment in private buildings
	 <p>Buildings</p>	Undeveloped use of renewable energy technologies supported through public and private investment
		Household stoves- significant impact of fossil fuel combustion, especially in the winter months

Priority – environmental state	Pressure sectors	Priority challenges
 Soil	 Municipal Waste	Lack of information system for waste management
		Limited capacity for development of Waste management centre
		Lack of waste separation system
		District landfill is not sanitary
	 Land use	Insufficient utilization of brownfield sites
 Climate mitigation and GHG emissions	 Transport	Limited options for non-motorised users
	 Buildings	Lack of long-term planning for building renovation
		Lack of Green building measures and promotion
		Insufficient investments in energy efficiency in buildings
		lack of skilled professional and technical expertise in BDBiH to support the implementation of energy-efficient technologies and practices related to energy management of the buildings
Insufficient awareness of the benefits of energy efficiency and the energy prices in BDBiH		
 Biodiversity, ecosystems and climate adaptation	 Land use	Illegal construction on quality agricultural land
	 Municipal waste	Lack of practice of disposal of different hazardous waste such as medical waste, waste batteries, carcasses - lack of recycling yard
	 Land use	Urban density
 Green spaces	 Land use	The high share of vacant residential buildings indicates unproductive use of the housing stock in the territory of BDBiH, as the largest part of the existing built-up areas
		Lack of integrated land use, transit-oriented development, mixed-use development

Annex 6: Progress Monitoring Plan

City	Country	Sector	GCAP Action Smart potential	Action Code	SO / Targets 5 year mid-term Targets	GCAP Actions	Investment / Policy	Implementing Body	Source of Funding	Potential Support	Status Implementation	Status against planned	Description Note	Date	Entered by	CAPEX (€) estimate	OPEX (over 5 years) (€) estimate	Dev't & Advisor costs	Funding source	PPP potential (y/n)
Brčko	BiH	Water	No Smart	1.1.1	SO1	Preparation of a master plan for the area of water supply and wastewater drainage	Policy	Department for Spatial Planning, Property and Legal Affairs	District budget, Grant							n/a	n/a	EUR 600,000		n
Brčko	BiH	Water	No Smart	1.1.2	SO1	Establishment of sanitary protection zones	Investment	Department for Spatial Planning, Property and Legal Affairs	District Budget, Grant							100,000	9,000	n/a		n
Brčko	BiH	Water	No Smart	1.1.3	SO1	Water management legal framework development	Policy	Department for Spatial Planning, Property and Legal Affairs	District Budget, Grant							n/a	n/a	EUR 150,000		n
Brčko	BiH	Water	Smart Component	1.2.1	SO1	Improvement of drinking water treatment process	Investment	Department for Spatial Planning, Property and Legal Affairs	District Budget, Loan	EBRD						500,000	15,000	n/a		n
Brčko	BiH	Water	Smart Component	1.2.2	SO1	Reconstruction and extension of the water supply network and the reduction of non-revenue water	Investment	Department for Spatial Planning, Property and Legal Affairs	District Budget, Grant, Loan	EBRD						10,000,000	200,000	n/a		n
Brčko	BiH	Water	Smart Component	1.3.1	SO1	Technical and investment documentation for the collection and disposal of wastewater and used water	Policy	Department for Spatial Planning, Property and Legal Affairs	District Budget, Grant							n/a	n/a	EUR 750,000		n
Brčko	BiH	Water	Smart Component	1.3.2	SO1	Construction of the sewage network: expansion, rehabilitation and construction of new sections	Investment	Department for Spatial Planning, Property and Legal Affairs	District Budget, Grant, Loan	EBRD						10,000,000	200,000	n/a		n
Brčko	BiH	Water	Smart Component	1.3.3	SO1	Construction of a wastewater treatment plant – WWTP	Investment	Department for Spatial Planning, Property and Legal Affairs	District Budget, Grant, Loan	EBRD						24,000,000	225,000	n/a		n
Brčko	BiH	Water	Smart Component	1.4.1	SO1	Modernization and digitalization in water management	Investment	Department for Spatial Planning, Property and Legal Affairs	District Budget, Grant							150,000	20,000	n/a		n

City	Country	Sector	GCAP Action Smart potential	Action Code	SO / Targets 5 year mid-term Targets	GCAP Actions	Investment / Policy	Implementing Body	Source of Funding	Potential Support	Status Implementation	Status against planned	Description Note	Date	Entered by	CAPEX (€) estimate	OPEX (over 5 years) (€) estimate	Dev't & Advisor costs	Funding source	PPP potential (y/n)
Brčko	BiH	Urban Transport	Entirely Smart	2.2.1	SO2	Development of a data collection program for the entire city and a multimodal transport model	Policy	Department for Public Affairs	District Budget, Grant							n/a	n/a	EUR 800,000		n
Brčko	BiH	Urban Transport	No Smart	2.2.2	SO2	Develop low-emission transport policies	Policy	Department for Public Affairs	District Budget, Grant							n/a	n/a	EUR 100,000		n
Brčko	BiH	Urban Transport	Smart Component	2.2.3	SO2	Prepare a feasibility study of the rapid (fast) public transport system corridor	Policy	Department for Public Affairs	District Budget, Grant							n/a	n/a	EUR 150,000		n
Brčko	BiH	Urban Transport	Entirely Smart	2.2.4	SO2	Implementation of bus operation reform	Investment	Department for Public Affairs	District Budget, Grant, Loan	EBRD						15,000,000	300,000	n/a		n
Brčko	BiH	Urban Transport	Smart Component	4.2.1	SO4	Sustainable Urban Mobility Plan (SUMP) for BDBiH	Investment	Department for Public Affairs	District Budget, Grant							100,000	17,000	n/a		n
Brčko	BiH	Urban Transport	Smart Component	4.2.2	SO4	Promotional campaigns for car sharing, walking and cycling	Policy	Department for Public Affairs	District Budget							n/a	n/a	EUR 35,000		y
Brčko	BiH	Urban Transport	No Smart	4.2.3	SO4	Expand and improve cycling infrastructure	Investment	Department for Public Affairs	District Budget, Grant							1,000,000	110,000	n/a		y
Brčko	BiH	Urban Transport	No Smart	4.2.4	SO4	Implementation of the pedestrian priority infrastructure	Investment	Department for Public Affairs	District Budget, Grant							1,000,000	50,000	n/a		y
Brčko	BiH	Energy	Smart Component	2.1.1	SO2	Establishment of energy data collection	Policy	Department for Communal Affairs	District Budget, Grant							n/a	n/a	EUR 70,000		n
Brčko	BiH	Energy	No Smart	2.1.2	SO2	Development of by-laws related to the energy sector	Policy	Department for Communal Affairs	District Budget, Grant							n/a	n/a	EUR 100,000		n
Brčko	BiH	Energy	No Smart	2.1.3	SO2	Development of a feasibility study for the construction of a cogeneration plant in BDBiH	Policy	Department for Communal Affairs	District Budget, Grant							n/a	n/a	EUR 250,000		n
Brčko	BiH	Energy	Entirely Smart	2.1.4	SO2	Development of a feasibility study for the construction of a district heating system for the District of Brčko	Policy	Department for Communal Affairs	District Budget, Grant							n/a	n/a	EUR 200,000		n

City	Country	Sector	GCAP Action Smart potential	Action Code	SO / Targets 5 year mid-term Targets	GCAP Actions	Investment / Policy	Implementing Body	Source of Funding	Potential Support	Status Implementation	Status against planned	Description Note	Date	Entered by	CAPEX (€) estimate	OPEX (over 5 years) (€) estimate	Dev't & Advisor costs	Funding source	PPP potential (y/n)
Brčko	BiH	Energy	Smart Component	2.1.5	SO2	Construction of a cogeneration plant	Investment	Department for Communal Affairs	District Budget, Grant, Loan	EBRD						95,000,000	19,250,000	n/a		n
Brčko	BiH	Buildings	Smart Component	4.1.1	SO4	Definition of nearly zero energy buildings (nZEB) through primary energy indicators (kWh/m ²) and the minimum share of RES use (%)	Policy	Office for Management of Public Assets	District Budget							n/a	n/a	EUR 17,500		n
Brčko	BiH	Buildings	Smart Component	4.1.2	SO4	Introduction of energy management in public buildings	Policy	Office for Management of Public Assets	District Budget, Grant							n/a	n/a	EUR 150,000		n
Brčko	BiH	Buildings	Smart Component	4.1.3	SO4	Rulebook on Energy Audits	Policy	Office for Management of Public Assets	District Budget, Grant							n/a	n/a	EUR 10,000		n
Brčko	BiH	Buildings	Smart Component	4.1.4	SO4	Drafting of other secondary legislation in the field of building construction	Policy	Office for Management of Public Assets	District Budget, Grant							n/a	n/a	EUR 50,000		n
Brčko	BiH	Buildings	No Smart	4.1.5	SO4	Study on Renewable Energy Potential in BDBiH Buildings	Policy	Office for Management of Public Assets	District Budget, Grant							n/a	n/a	EUR 70,000		n
Brčko	BiH	Buildings	Smart Component	4.1.6	SO4	Installation of solar systems (PV and for the preparation of domestic hot water) in public institutions	Investment	Office for Management of Public Assets	District Budget, Grant, Loan							2,000,000	100,000	n/a		n
Brčko	BiH	Buildings	Smart Component	4.1.7	SO4	Installation of thermostatic sets and their smart metering in all buildings owned by BDBiH	Investment	Office for Public Property Management of BDBiH	District Budget, Grant							60,000	3,000	n/a		n
Brčko	BiH	Buildings	No Smart	4.1.8	SO4	Establishment of a legal framework for efficient energy management and the introduction of green public procurement criteria for the purchase of electrical appliances for buildings owned by BDBiH	Policy	Office for Public Property Management of BDBiH	District Budget, Grant							n/a	n/a	EUR 25,000		n


City	Country	Sector	GCAP Action Smart potential	Action Code	SO / Targets 5 year mid-term Targets	GCAP Actions	Investment / Policy	Implementing Body	Source of Funding	Potential Support	Status Implementation	Status against planned	Description Note	Date	Entered by	CAPEX (€) estimate	OPEX (over 5 years) (€) estimate	Dev't & Advisor costs	Funding source	PPP potential (y/n)
Brčko	BiH	Buildings	Smart Component	4.1.9	SO4	Improvement of energy efficiency in buildings owned by BDBiH	Investment	Office for Public Property Management of BDBiH	District Budget, Grant, PPP							13,000,000	50,000	n/a		y
Brčko	BiH	Buildings	Smart Component	4.1.10	SO4	Improvement of energy efficiency in residential buildings and residential family houses	Investment	Office for Public Property Management of BDBiH	District Budget, Grant							182,000,000	50,000	n/a		n
Brčko	BiH	Buildings	Smart Component	4.1.11	SO4	Improving energy efficiency in commercial and service buildings	Investment	Office for Public Property Management of BDBiH	District Budget, Grant							71,000,000	50,000	n/a		n
Brčko	BiH	Solid Waste	Smart Component	3.2.1	SO3	Improvement of the system of records and reporting on waste	Policy	Department for Communal Affairs	District Budget, Grant							n/a	n/a	EUR 50,000		n
Brčko	BiH	Solid Waste	Smart Component	3.2.2	SO3	Study on possibilities of waste prevention, treatment, and recycling	Investment	Department for Communal Affairs	District Budget, Grant							EUR 80,000	n/a	EUR 200,000		n
Brčko	BiH	Solid Waste	No Smart	3.2.3	SO3	Collection infrastructure for mixed (residual) and recyclable waste	Investment	JP Komunalno Brcko	District Budget, Loan							2,000,000	80,000	n/a		n
Brčko	BiH	Land use and Biodiversity	Smart Component	5.1.1	SO5	Completion of the Spatial Plan of the BDBiH	Policy	Department for Spatial Planning, Propert and Legal Affairs	District Budget							n/a	n/a	EUR 75,000		n
Brčko	BiH	Land use and Biodiversity	Entirely Smart	5.1.2	SO5	Drafting and adoption of the new Urban Plan of the town of Brčko	Policy	Department for Spatial Planning, Propert and Legal Affairs	District Budget							n/a	n/a	EUR 200,000		n
Brčko	BiH	Land use and Biodiversity	Smart Component	5.1.3	SO5	Strengthening the mechanism for adopting detailed spatial planning documents	Policy	Department for Spatial Planning, Propert and Legal Affairs	District Budget, Grant							n/a	n/a	EUR 15,000		n
Brčko	BiH	Land use and Biodiversity	Smart Component	5.1.4	SO5	Preparation of the Study of Protected Nature Areas in BDBiH	Policy	Department for Spatial Planning, Propert and Legal Affairs	District Budget, Grant							n/a		EUR 50,000		n


City	Country	Sector	GCAP Action Smart potential	Action Code	SO / Targets 5 year mid-term Targets	GCAP Actions	Investment / Policy	Implementing Body	Source of Funding	Potential Support	Status Implementation	Status against planned	Description Note	Date	Entered by	CAPEX (€) estimate	OPEX (over 5 years) (€) estimate	Dev't & Advisor costs	Funding source	PPP potential (y/n)
Brčko	BiH	Land use and Biodiversity	No Smart	5.2.1	SO6	Establishment of new public parks and green infrastructure in the narrower urban area of Brčko	Investment	Department for Public Affairs	District Budget, Grant							1,500,000	37,500	n/a		n
Brčko	BiH	Land use and Biodiversity	Smart Component	3.1.1	SO3	Establishment of soil quality monitoring in the BDBiH	Policy	Department for Agriculture, Forestry and Water Management	District Budget							n/a	n/a	EUR 22,000		n
Brčko	BiH	Land use and Biodiversity	Entirely Smart	3.1.2	SO3	Development of a unique GIS of the BDBiH	Policy	Public Register Department	District Budget, Grant							n/a	n/a	EUR 170,000		n

Annex 7: Impact Monitoring Plan

City	Country	Indicators	Indicator Code	Sector	PSR	Trend	Colour code	Unit	Figure (In Indicator Database of GCAP)	Data Source / Contact Detail	Related Actions (Major Impact)	Related Actions (Medium Impact)	Related Actions (Minor Impact)	Figure (3 years after GCAP finalisation)	Colour code	Figure (5 years after GCAP finalisation)	Colour code
Brčko	BiH	Average annual concentration of PM2.5	1	Air	State	N/A	N/A	µg/m ³	No data		Energy	Transport	Buildings				
Brčko	BiH	Average annual concentration of PM10	1.1	Air	State	Negative	Yellow	µg/m ³	28.12	Monthly reports on air quality for the territory of the BDBiH in 2014	Energy	Buildings	Transport				
Brčko	BiH	Average daily concentration of SO ₂	1.2	Air	State	Negative	Red	µg/m ³	65.03	Monthly reports on air quality for the territory of the BDBiH in 2014	Energy	Transport	Buildings				
Brčko	BiH	Average daily concentration of NOx	1.3	Air	State	Positive	Green	µg/m ³	11.51	Monthly reports on air quality for the territory of the BDBiH in 2014	Energy	Transport	Buildings				
Brčko	BiH	Biochemical Oxygen Demand BOD in rivers and lakes	2	Water	State	Negative	Yellow	mg/L	2.93	Annual reports on surface water quality for the territory of the BDBiH 2012 - 2020, Water Institute Ltd. Bijeljina	Water	Solid Waste	Land-use				
Brčko	BiH	Ammonium NH ₄ concentration in rivers and lakes	2.1	Water	State	Negative	Red	mg/L	520	Annual reports on surface water quality for the territory of the BDBiH 2012 - 2020, Water Institute Ltd. Bijeljina	Water	Solid Waste	Land-use				
Brčko	BiH	Water samples complying with national potable water quality standards	3	Water	State	Positive	Green	%	99	Annual financial and activity reports of Public Company "Komunalno Brčko" 2018-2020	Water	Solid Waste	Land-use				
Brčko	BiH	Number of contaminated sites	4	Soil	State	Positive	Green	CSs / 1000 inh (or km ²)	0.19	Expert estimation (based on Spatial Development Strategy of the BDBiH and Yearbook on Water Consumption and Degree of Pollution of Wastewater in SR Bosnia and Herzegovina in 1990)	Land use	Solid Waste	Industries				
Brčko	BiH	Open green space area per capita	6	Green spaces	State	Positive	Green	m ² /capita	18.52	Expert estimation (based on CORINE Land Cover 2018 and Spatial Plan of the BDBiH 2007 - 2017)	Land use	Transport	Industries				
Brčko	BiH	Abundance of bird species (all cpecies)	7	Biodiversity	State	N/A	N/A	%			Land use	Industries	Transport				
Brčko	BiH	Annual CO ₂ emissions per unit of GDP	8.1	Climate Change	State	Negative	Red	Tonne / USD of GDP	1.76	Fourth National Communication and third biennial update report for BiH under the UNFCCC	Buildings	Transport	Energy				
Brčko	BiH	Economic damage from natural disasters	9	Climate adaptation	State	Negative	Red	%	7	Bosnia and Herzegovina Floods, 2014 – Recovery Needs Assessment	Land use	Solid waste	Waste water				
Brčko	BiH	Avarage age of car fleet	10	Transport	Pressure	Negative	Red	Years	18	Registration of motor vehicles (iddeea.gov.ba))	Transport	Energy	Buildings				
Brčko	BiH	Percentage of diesel cars in total vehicle fleet	10.1	Transport	Pressure	Negative	Red	%	73	Registration of motor vehicles (iddeea.gov.ba))	Transport	Industries	Energy				
Brčko	BiH	Fule standars for light passengers	10.2	Transport	Pressure	Negative	Red	EURO	3	Registration of motor vehicles (iddeea.gov.ba))	Transport	Industries	Energy				
Brčko	BiH	Transport modal share	11	Transport	Pressure	Negative	Red	%	0.68	Agency for Statistics of BiH	Transport	Land use	Industries				
Brčko	BiH	Motorisation rate	11.2	Transport	Pressure	Negative	Red	No of vehicles	0.76	Agency for Statistics of BiH	Transport	Land use	Energy				
Brčko	BiH	Avarage number of vehicles	11.3	Transport	Pressure	Negative	Red	No of vehicles	1.17	Agency for Statistics of BiH	Transport	Land use	Energy				

City	Country	Indicators	Indicator Code	Sector	PSR	Trend	Colour code	Unit	Figure (In Indicator Database of GCAP)	Data Source / Contact Detail	Related Actions (Major Impact)	Related Actions (Medium Impact)	Related Actions (Minor Impact)	Figure (3 years after GCAP finalisation)	Colour code	Figure (5 years after GCAP finalisation)	Colour code
Brčko	BiH	Share of population with access to quality heating / cooling	15	Energy	Pressure	N/A	N/A	%	No data		Energy	Buildings	Industries				
Brčko	BiH	Share of households connected to district heating	15.1	Energy	Pressure	Negative	Red	%	2	Census of Population, Households and Dwellings in Bosnia and Herzegovina, Statistics Agency BiH, 2013	Energy	Buildings	Industries				
Brčko	BiH	Share of renewable in total energy consumption	16	Energy	Pressure	Positive	Green	%	39	The data for whole country (Bosnia and Herzegovina)	Energy	Buildings	Industries				
Brčko	BiH	Electricity consumption in buildings	18	Buildings	Pressure	Negative	Yellow	kWh / m ²	61.94	JP Komunalno Brcko	Buildings	Energy	Industries				
Brčko	BiH	Fossil fuels consumption for heating and cooling	19	Buildings	Pressure	Negative (downward)	Green	kWh / m ²	92.11	https://bhas.gov.ba/Calendar/Category/35 ; https://docplayer.net/52097261-Brcko-distrikt-bosne-i-hercegovine-akcijski-plan-energetski-odrzivog-razvitka-seap.html	Buildings	Energy	Industries				
Brčko	BiH	Share of new buildings with green certification	19.4	Buildings	Pressure	N/A	N/A	%	No data		Buildings	Energy	Industries				
Brčko	BiH	Share of buildings with energy performance certificate	19.5	Buildings	Pressure	N/A	N/A	%	No data		Buildings	Energy	Industries				
Brčko	BiH	Water consumption per capita	25	Water	Pressure	Positive	Green	L / day / capita	163	JP Komunalno Brcko	Water	Buildings	Energy				
Brčko	BiH	Non revenue water	25.1	Water	Pressure	Negative	Red	%	53	JP Komunalno Brcko	Water	Buildings	Energy				
Brčko	BiH	Industrial water consumption	25.6	Water	Pressure	Negative	Yellow	%	35	JP Komunalno Brcko	Water	Industries	Energy				
Brčko	BiH	Percentage of residential and commercial wastewater treated	26	Wastewater	Pressure	N/A	N/A	%	No data		Water	Buildings	Energy				
Brčko	BiH	Share of population with municipal solid waste collection	30	Solid waste	Pressure	Negative	Red	%	10	Waste management strategy of BDBiH as part of the Environmental Strategy of the BDBiH for the period 2022–2032	Solid waste	Buildings	Land use				
Brčko	BiH	Proportion of dry recycling	30.1	Solid waste	Pressure	Negative	Red	%	0	Waste management strategy of BDBiH as part of the Environmental Strategy of the BDBiH for the period 2022–2032	Solid waste	Buildings	Land use				
Brčko	BiH	Population density on urban land	33	Land use	Pressure	Negative	Red	Residents/ km ²	793.5	Spatial Plan of BDBiH 2007 - 2017 and Census of Population, Households and Dwellings in BiH 2013	Land use	Buildings	Energy				
Brčko	BiH	Share of brownfield development	34.1	Land use	Pressure	Negative	Red	%	15	Expert estimation (based on data on building permits 2018 - 2021 from Department for Public Safety)	Land use	Buildings	Energy				

 fill in as part of the monitoring plan by GCAP Consultant

 fill in 5 years after GCAP finalisation