



NET ZERO CITIES

EU MISSION PLATFORM | CLIMATE NEUTRAL AND SMART CITIES

Climate City Contract

2030 Climate Neutrality Action Plan

2030 Climate Neutrality Action Plan of Functional Urban Area Sarajevo

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Disclaimer

During the extensive consultations with Government of Canton Sarajevo, the City of East Sarajevo, the City of Sarajevo, the Enterprise Alliance, the IFI/Embassy Net Zero Coalition and Civic Platforms, and following the recommendations of the Citizens Assembly, some points concerning the coordination/governance and land use remained to be clarified.

While these points are few, they are important and need to be dealt with through a transparent and consultative process to arrive at a shared and agreed set of solutions.

It is expected that the process would commence shortly and be completed to everyone's satisfaction when, if all things go according to plan, Sarajevo FUA could be awarded the Net Zero City Mission label.



Summary

Textual element

Bosnia and Herzegovina (BiH) has shown its commitment to international environmental cooperation by ratifying key agreements such as the Convention on Long-range Transboundary Air Pollution, the United Nations Framework Convention on Climate Change, the Kyoto Protocol, the Paris Agreement, and the Montreal Protocol. Despite this, progress has been limited, though recent alignment with EU air quality legislation indicates potential improvements.

In 2021, the Functional Urban Area (FUA) of Sarajevo aimed to become a climate-neutral and smart city by 2030 as part of the EU Net Zero Emission Cities Mission. The FUA Sarajevo includes the Sarajevo Canton, the City of East Sarajevo, and the City of Sarajevo, with a population of around 500,000. This area is characterised by high urban density, diverse demographic and economic profiles, and significant air pollution issues due to fossil fuel use and increased traffic. The FUA is one of the most polluted cities globally, facing challenges related to high levels of particulate matter and rising greenhouse gas (GHG) emissions.

FUA Sarajevo's commitment includes reducing GHG emissions by 80% by 2030 compared to 2018 levels.

Several national and regional policies and strategies support this transition, including the *2020-2030 Climate Change Adaptation and Low-Emission Development Strategy*, the *Framework Energy Strategy until 2035*, and the *Framework Traffic Strategy*. At the entity level, both the Federation of Bosnia and Herzegovina and Republika Srpska have adopted strategies targeting emission reductions and increased renewable energy use. Local documents like the *Green Cantonal Action Plan (GCAP)* and the *Sarajevo City Sustainable Urban Mobility Plan (SUMP)* also focus on reducing air pollution and enhancing energy efficiency.

Despite the comprehensive policy framework, challenges remain. The FUA Sarajevo needs to address several barriers:

- **Institutional and regulatory barriers:** Slow and fragmented authorisation processes, lack of centralised platforms, and insufficient legal frameworks to support the transition. Regulatory red tape and administrative capacity issues further hinder progress.
- **Organisational fragmentation:** The lack of coordination among institutions and fragmented responsibilities creates inefficiencies.
- **Financial constraints:** Limited funding available for climate projects, due to the limited capacities of FUA Sarajevo public institutions and communal public enterprises, presents a major challenge. Budget restructuring, co-financing, and guarantees from higher levels of government—as well as restructuring of the public utility sector—are required to increase financial capacity for the implementation of the NZC mission.
- **Technological and infrastructure deficiencies:** Inadequate energy infrastructure, outdated waste management facilities, and insufficient active travel infrastructure limit progress.
- **Behavioural and social barriers:** Insufficient awareness of sustainable practices represents significant challenge. Citizens are not aware of climate change causes and



consequences and how they can contribute to climate change mitigation and benefit from it.

Six priority areas/sectors have been identified as essential for guiding efforts in the FUA Sarajevo towards reaching Net Zero Cities objectives and attaining climate neutrality.

In the **energy sector**, priorities replacement of coal and wood stoves in individual houses by heat pumps and highly efficient biomass boilers, improving building energy efficiency, include modernizing district heating networks, and accelerating the shift to renewables such as solar, wind, and geothermal. Measures also tackle energy poverty and empower citizens and businesses through incentives, prosumer-friendly regulations, and awareness campaigns.

In the **transport sector**, the transition focuses on reducing number of vehicles, electrification of public and private fleets, expansion of tram and trolleybus systems, and promotion of shared and active mobility. Infrastructure upgrades, including charging stations and park-and-ride facilities and mobility hubs, are coupled with incentives and public outreach to support behavioural change.

The **industrial sector** will reduce reliance on fossil fuels through energy efficiency upgrades, and renewable energy integration. Important action in this sector also included phasing out F-gases.

Waste management is being transformed into a circular economy model, with a focus on separation at source, infrastructure expansion, and material recovery, particularly for bio-waste, textiles, and construction waste. Digital tools, financial incentives, and education campaigns will support this systemic shift.

Efforts in **agriculture, forestry and other land use** centre on urban greening, sustainable agriculture, and nature-based solutions such as afforestation and green infrastructure, underpinned by GIS-based monitoring and regulatory frameworks.

The pathways balance immediate impact with long-term transformation. In the **short term**, legal reforms, digital tools, and pilot projects lay the groundwork for systemic change. Over the **long term**, coordinated investment and policy support across all key sectors will ensure lasting emissions reductions and sustained climate neutrality beyond 2030.



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Abbreviations

Abbreviations and acronyms	Definition
AFOLU	Agriculture, Forestry and Other Land Use
BiH	Bosnia and Herzegovina
CA	Citizens Assemblies
CEAP	Cantonal Environmental Action Plan
CCC	Climate City Contract
CNAP	Climate Neutrality Action Plan
CNIP	Climate Investment Plan
EE	Energy Efficiency
EoI	Expression of Interest
ESAP	Environmental Strategy and Action Plan
EU	European Union
FBiH	Federation of Bosnia and Herzegovina
FUA	Functional Urban Area
GCAP	Green Cantonal Action Plan for Sarajevo
GHG	Greenhouse Gases
GIS	Geographic Information Systems
GIZ	German Development Agency
GB	Governing Board
IFIs	International Financial Institutions
IPPU	Industrial Processes and Product Use
IT	Information Technology
LCP	Large Combustion Plants
LEAP	Local Environmental Action Plan
LEZ	Low Emission Zone
MSW	Municipal Solid Waste
NECP	National Energy and Climate Plan
NERP	National Emission Reduction Plan
NMVO	Non-Methane Volatile Organic Compounds
NZEB	Nearly Zero-Energy Building
OT	Operational Team
RES	Renewable Energy Sources
RS	Republika Srpska
SEAP	Sarajevo Sustainable Energy Action Plan
SECAP	Sustainable Energy and Climate Action Plan
SUMP	Sarajevo City Sustainable Urban Mobility Plan
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
WWTP	Wastewater Treatment Plan



1 Introduction

Introduction

Bosnia and Herzegovina (BiH) has demonstrated its commitment to international environmental cooperation by becoming a party to several key agreements, including the **Convention on Long-range Transboundary Air Pollution** and the **United Nations Framework Convention on Climate Change**. While progress towards implementing these agreements has been limited, recent efforts to align with EU legislation on air quality indicate potential improvement. BiH has ratified the **Kyoto Protocol** and **Paris Agreement**, acknowledging its responsibilities in climate change mitigation. The country also became party to the Convention for the protection of the ozone layer (**Vienna Convention**) and to the Protocol on substances that deplete the ozone layer (**Montreal Protocol**).

In 2021, the Functional Urban Area (FUA) of Sarajevo applied to the **EU Net Zero Emission Cities Mission**, with the ambition of becoming climate-neutral and smart city by 2030. The FUA Sarajevo encompasses more than just a city. It is a complex entity that includes Sarajevo Canton¹ (Municipalities of Centar, Hadzici, Iidza, Ilijas, Novi Grad, Novo Sarajevo, Stari Grad, Trnovo, and Vogosca), City of East Sarajevo² (Municipalities of East Iidza, East Novo Sarajevo, East Stari Grad, Pale, Sokolac, East Trnovo) and City of Sarajevo³. The administrative and political organisation of this area is characterised by distinct governance structures, requiring coordination across multiple levels of government.

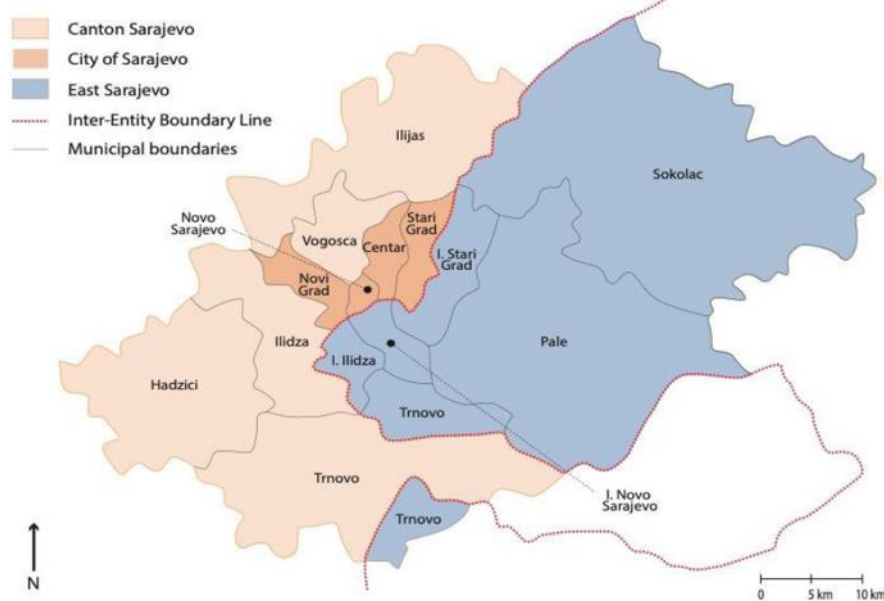


Figure 1: Map of the Administrative Division of the FUA Sarajevo
(Source: Urban Transformation Project Sarajevo, 2021)

The FUA Sarajevo, with an estimated population of approx. 500,000 people, is the most densely populated region in BiH. The FUA's population is relatively young, with a significant portion under 35 years of age, although there are trends of aging, particularly in rural areas. The area is highly urbanised, with City of Sarajevo serving as the central urban hub, while rural

¹ Canton Sarajevo, is one of the ten cantons of the Federation of Bosnia and Herzegovina in Bosnia and Herzegovina. Its cantonal seat is the city of Sarajevo, also the capital city of Bosnia and Herzegovina.

² City of East Sarajevo is the administrative, economic, cultural, university, tourist and sports centre of the eastern part of the Republic of Srpska, one of the two entities in Bosnia and Herzegovina. The administrative seat is in the Municipality of Pale.

³ City of Sarajevo is the unit of local self-governance that consists of four municipalities: Stari Grad, Centar, Novo Sarajevo and Novi Grad.



areas are more common in the outskirts of East Sarajevo. Economically, the City of Sarajevo is the region's core, with a diverse economy that includes services, trade, tourism, and a growing IT and creative industries sector. Sarajevo Canton supports this urban economy through broader activities like manufacturing and logistics, whereas the City of East Sarajevo is less economically developed, focusing on manufacturing, agriculture, and emerging services and tourism. Unemployment rates vary across the FUA area, generally lower in the City of Sarajevo, but remain a significant challenge, especially among the youth.

Regarding climate characteristics, the FUA area is influenced by the Central European continental climate from the north and the Mediterranean climate from the south. The interaction of these influences, along with the diverse relief, gives this area the characteristics of a moderately continental climate. The annual temperature pattern shows a fairly steady increase from January to July, followed by a pronounced decrease towards December. Air currents in Sarajevo are shaped by the complex terrain, which significantly modifies both their direction and speed. The dominant wind directions are from the southeast and west quadrants. The FUA Sarajevo, with its unique geographical location mostly in a valley surrounded by mountains, faces a fundamental problem of air pollution. During winter, the area experiences heavy fog that easily transforms into smog due to high pollution levels from the use of fossil fuels, increased traffic frequency and density, and the non-implementation of energy efficiency (EE) measures. Consequently, Sarajevo is one of the most polluted cities on the planet for over a dozen days during the winter period, with particulate matter levels above 400 $\mu\text{g}/\text{m}^3$. Despite various attempts to tackle this challenge, fossil fuel consumption and greenhouse gas (GHG) emissions have been rising steadily at 2.7% per year for at least a decade. Estimates show that each citizen of Sarajevo produces approx. 5.5 tons of CO_{2e} per annum, primarily from heating and transport. This situation poses a direct threat to inhabitants' health and general well-being and negatively impacts the tourism sector. To reduce GHG emissions, several planning and strategic sectoral documents have already been adopted at national, entity, cantonal, city, and municipality levels. These documents primarily aim to address air pollution, the use of fossil fuels, the non-implementation of EE measures, and increased traffic frequency and density. An overview of these developed and adopted documents, along with set targets, is presented in Module A-2 below. While challenging, the participation of the FUA Sarajevo in the **EU Net Zero Emission Cities Mission** represents a unique opportunity to address air quality issues, develop a sustainable, healthy, and attractive urban area, and build a prosperous green deal industry and circular economy.

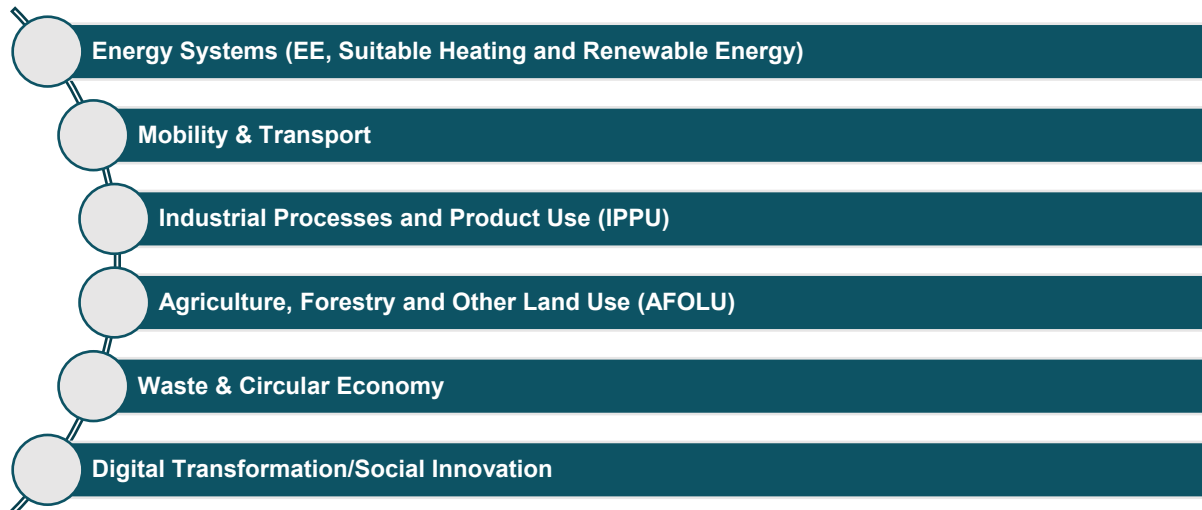
The vision for the FUA Sarajevo is to become a climate-neutral and smart city by 2030, in line with the EU Mission for 100 Cities. This transformation will prioritize the development of efficient, zero-carbon energy systems, sustainable and inclusive urban mobility, and a circular economy focused on eliminating waste and pollution. The city will enhance resilience and liveability through the restoration of biodiversity and the expansion of accessible, high-quality green spaces. These efforts will be underpinned by strong citizen engagement, multi-level governance, and innovative financing models, forming the foundation of Sarajevo's Climate City Contract and its commitment to a just, inclusive, and systemic transition.

As specified in the 2030 Climate Neutrality Commitments, FUA Sarajevo's commitment to reducing GHG emissions is clearly articulated in its 2022 Expression of Interest (EoI) for the Net Zero Emission Cities Mission, affirming the ambition to reach climate neutrality. The EoI specified that the GHG reduction targets would be refined in subsequent phases of the Mission. After extensive consultations with various stakeholders over the past two years, and recognising the need for meticulous planning, **FUA Sarajevo is committed to reducing GHG emissions by 80% by 2030 compared to 2018 levels.** These ambitious targets encompass the entire FUA Sarajevo, including all municipalities within Sarajevo Canton (and the City of Sarajevo), and the City of East Sarajevo. Emission sources within these administrative



boundaries that are included in the GHG emissions reduction targets are presented in Table I-1.1 below.

To achieve the project's climate goals, **six priority areas/sectors** have been identified as essential for guiding efforts in the FUA Sarajevo towards reaching Net Zero Cities objectives and attaining climate neutrality. These sectors are:



The development process was guided by principles of **transparency, inclusiveness, and collaborative governance**. Stakeholder and citizen engagement were central to shaping all three components of the **Climate City Contract (CCC)**. To ensure wide participation, a **Stakeholder Engagement Plan** was implemented. Consultations were held with a range of actors including municipal authorities, public institutions, civil society, the private sector, academia, and financial institutions. Engagement formats included multi-sectoral workshops, focus groups, coalition meetings (Business Alliance, Donor/Financial Institutions, Civic Platform), and bilateral consultations. Additionally, a **Citizens' Assembly** was convened to bring the voices of residents directly into the planning process. The assembly, along with a Citizens' Committee that met in May 2024, offered input on key priorities and concrete proposals, many of which were incorporated into the final plans. Through this inclusive and iterative approach, the CCC reflects not only institutional and expert priorities but also the concerns, aspirations, and ideas of the wider Sarajevo community.

The *Climate Neutrality Action Plan and Climate Neutrality Investment Plan* are integral components of the *Climate City Contract* package, which includes the following:

- A. The Commitment Document, signed by high-level officials from the Sarajevo FUA
- B. The Climate Neutrality Action Plan (CNAP)
- C. The Climate Neutrality Investment Plan (CNIP)

Together, the CNAP and CNIP complement the Commitment Document, and all three documents collectively form a unified package.

Table I-1.1 below presents the emission sources within the FUA Sarajevo administrative boundaries that are included in the GHG emissions reduction targets.



Table I-1.1: Climate Neutrality Target by 2030			
Sectors	Scope 1	Scope 2	Scope 3
Stationary energy	Included	Included ⁴	Optional information
Mobility & Transport	Included	Included	Optional information
Waste & Circular Economy	Included	Not applicable	Optional information
IPPU	Included	Included	Optional information
AFOLU	Included	Not applicable	Optional information

⁴ Refers to GHG emissions generated due to the electricity consumption.



2 Part A – Current State of Climate Action

2.1 Module A-1 Greenhouse Gas Emissions Baseline Inventory

GHG Emissions Baseline inventory

Geographic and sectoral coverage

The Baseline Inventory covers greenhouse gas (GHG) emissions for the **entire FUA Sarajevo**. It provides an overview of emissions by major fuel types and emitting sectors. The inventory includes emissions from **stationary energy, transport, waste, industrial processes and product use (IPPU), as well as agriculture, forestry and other land use (AFOLU)**. As mentioned earlier, the baseline year selected is **2018**.

Emission scopes

The inventory includes both **Scope 1 and Scope 2 emissions**. Scope 1 refers to direct emissions from activities occurring within the boundaries of FUA Sarajevo. This includes emissions from the combustion of fuels in buildings and vehicles, as well as industrial emissions such as fluorinated gases (F-gases). Since district heating is generated locally within the FUA, emissions from this sector are also considered Scope 1. Scope 2 emissions represent indirect emissions associated with the generation of electricity that is consumed within the FUA but produced outside its boundaries.

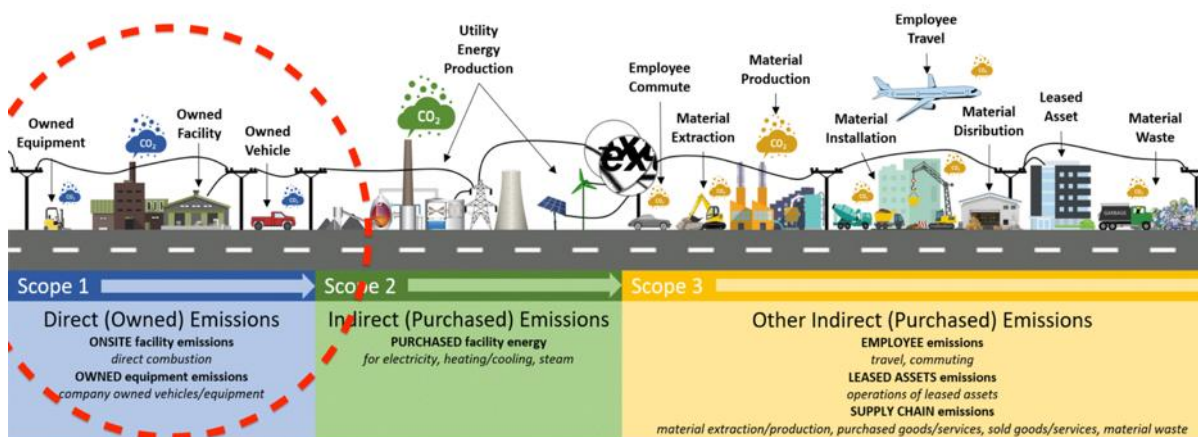


Figure 2: Understanding Scope 1, Scope 2 and Scope 3 emissions

Data sources

The FUA Sarajevo falls under the jurisdiction of three entities, two of which - Canton Sarajevo and East Sarajevo - are responsible for preparing the GHG inventory within their respective territories. Sarajevo Canton has undertaken significant steps to develop and



enhance its GHG inventory and environmental management systems. The first GHG inventory for Canton Sarajevo was produced for the year 2013.

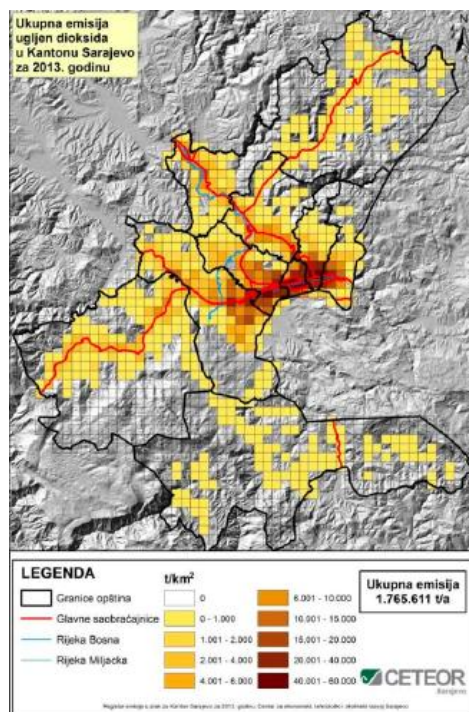


Figure 3: Total CO₂ emission, Canton Sarajevo (2013)

Since there was no integrated and up-to-date GHG inventory for the FUA Sarajevo, technical assistance was provided to support its development. The work of an expert team, supported by the FUA Sarajevo working group, culminated in the publication of *Greenhouse Gas Inventory for the Sarajevo Functional Urban Area (FUA): Methods and Results* (authors: Kelly G.P., Ranković A., Carvalho da Costa L.F.) in January 2025. The inventory was compiled from multiple data sources, with the primary data for Sarajevo Canton derived from its annually published Energy Balance Report. However, the report did not provide the contribution of East Sarajevo to the total greenhouse gas (GHG) emissions due to the lack of reliable energy consumption data for East Sarajevo in 2018. Only data for 2021 were available.

This Inventory has been further revised to incorporate missing data and reformatted to align with the CNAP methodology. This includes expanding emissions distribution and coverage to:

- Stationary energy
- Transport
- Waste
- Agriculture and land use
- Industrial processes

Additionally, the Inventory has been updated to comply with internationally recognized greenhouse gas accounting standards and protocols, such as the IPCC Guidelines for National GHG Inventories.



To ensure that East Sarajevo's contribution to total GHG emissions was represented the available energy consumption data from 2021, as presented in the Inventory were incorporated into the further analysis. This approach was considered reasonable because the calculated per capita emissions for East Sarajevo, based on the 2021 Inventory energy data, amounted to **4.96 tCO₂eq/capita**. This figure falls slightly below **5.29 tCO₂eq/capita** calculated for Sarajevo Canton in 2018, per the Inventory. This difference is consistent with expectations, reflecting the relatively lower level of development and energy consumption in East Sarajevo compared to Sarajevo Canton.

Industry within the Sarajevo Functional Urban Area (FUA) is concentrated in industrial zones across several municipalities. It primarily focuses on food, dairy, and beverage production, as well as wood processing and furniture manufacturing, construction, and metal processing. The industrial profile of the Sarajevo Functional Urban Area (FUA) is not heavily carbon-intensive compared to regions dominated by steel, cement, or chemical production. Instead, the industries present typically emit moderate levels of CO₂, mainly from energy consumption, cooling systems utilizing refrigerants with high global warming potential, and indirectly through transport and logistics activities. To calculate CO₂ emissions from energy use data on Energy Balance report were utilized. To capture emissions from F-gases within the IPPU sector, data from the **Cooling Equipment Registry of Bosnia and Herzegovina (UNDP)** were used. This registry provides municipal-level data, allowing for precise analysis across the municipalities comprising the FUA.

GHG emissions from the **waste sector** were calculated in line with IPCC methodology, which requires data on waste volume and its morphological composition. For the Sarajevo Canton, this data was obtained from the **Strategic Plan for Waste Management (2023–2030)** prepared by the cantonal utility KJKP "RAD." For the City of East Sarajevo, relevant information was taken from its **SECAP**. Wastewater-related emissions were calculated according to the *European Investment Bank (EIB) Project Carbon Footprint Methodologies*.

Emissions from the **AFOLU sector**, specifically methane and nitrous oxide emissions, were estimated based on IPCC Guidelines (Volume 4 – Agriculture, Forestry, and Other Land Use). Data on livestock and crop production came from the **Statistical Yearbook of the Sarajevo Canton and the Development Strategy of the City of East Sarajevo (2023–2029)**. In the absence of 2018 data, figures from 2019 were used, under the assumption that there were no significant year-on-year changes. For certain indicators, such as synthetic fertilizer use and protein consumption, national-level data were not available, so per capita estimates from **FAOSTAT** were used instead.

Regarding **carbon sinks** (negative emissions from the AFOLU sector), the *Fourth National Communication of Bosnia and Herzegovina to the UNFCCC* provided the necessary data on national level. A specific carbon sink factor, expressed in CO₂ equivalent per hectare of forest land, was calculated from this report and applied to the forest area within the FUA Sarajevo based on statistical land use data from 2018.

Energy use

The baseline energy profile for FUA Sarajevo in 2018 reveals a strong dependence on fossil fuels, with the **stationary energy** and **transport** sectors accounting for the majority of final energy consumption.

The **stationary energy sector**, which includes residential, commercial, and public buildings, recorded a total energy use of **10,898 TJ**, making up approximately **56% of total consumption**. This energy demand was met primarily through natural gas, solid fuels (such as coal and firewood), LUEL, and electricity. The use of fossil fuels (natural gas, solid fuels,



and LUEL) contributed to Scope 1 emissions, totalling 8,420 TJ (77%) in energy input. The consumption of electricity, generated outside FUA Sarajevo, resulted in Scope 2 emissions, corresponding to 2,477.91 TJ (22%). Public lighting, entirely powered by electricity, accounted for an additional 121.13 TJ (1%), also resulting in Scope 2 emissions.

The **transport sector** consumed a total of **6,587.76 TJ**, representing around **34% of final energy use**. The majority of this energy was provided by diesel fuel (4,180.14 TJ (63%)), followed by gasoline (1,830.75 TJ (28%)), kerosene (272 TJ (4%)), and LPG (257.87 TJ (4%)). A smaller share (47 TJ (1%)) was from electricity, used primarily in electric rail and public transport. Fuel use in transport is associated with Scope 1 emissions, while the electricity used contributes to Scope 2 emissions.

The **IPPU sector** accounted for **2,050.65 TJ** or about **10% of total energy use**. This includes **532.06 TJ** (26%) of energy from natural gas (Scope 1) and **1,518.59 TJ** (74%) from electricity (Scope 2). These energy sources support various industrial operations requiring both thermal and electrical energy.

Final energy consumption is not assigned to the **waste** and **AFOLU** sectors. Emissions from these sectors are calculated based on specific activities, such as methane from waste decomposition or greenhouse gases from livestock and fertilizer use, rather than energy consumption. These are presented separately below (please see Table A1-3).

A-1.1: Final energy use by source sectors (2018)			
Unit (TJ)			
Stationary Energy	Scope 1	Scope 2	Scope 3
Buildings	8,420	2,477.91	
Natural Gas	4,119		
Solid Fuels	4,046		
Electricity		2,477.91	
LUEL	255		
Public lighting		121.13	
Transport	6,540.76	47	
Diesel	4,180.14		
Gasoline	1,830.75		
Kerosene	272		
Electricity		47	
LPG	257.87		
Waste	N/A	N/A	
IPPU	532.06	1,518.59	
Natural Gas	532.06		
Electricity		1,518.59	
AFOLU	N/A	N/A	

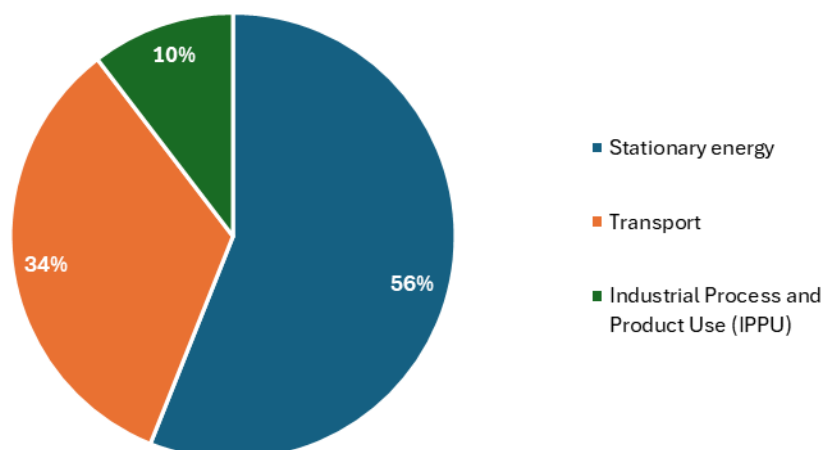


Figure 4: Share of total energy use by sectors (2018)

A-1.2: Emission factors applied (2018)

Source: IPCC 2006 Guidelines for National Greenhouse Gas Inventories⁵

Primary energy/ energy source	Carbon Dioxide (CO ₂)	Methane (CH ₄)	Nitrous Oxide (N ₂ O)	F-gases (hydrofluorocarbons and perfluorocarbons)	Sulphur hexafluoride (SF ₆)	Nitrogen trifluoride (NF ₃)
Electricity	0.76 tonCO ₂ /MWh	N/A	N/A	N/A	N/A	N/A
Natural gas	56.10 tonCO ₂ /TJ	0.005 tonCH ₄ /TJ	0.0001 tonN ₂ O/TJ	N/A	N/A	N/A
Fuel oil	77.40 tonCO ₂ /TJ	0.010 tonCH ₄ /TJ	0.0006 tonN ₂ O/TJ	N/A	N/A	N/A
LPG	63.10 tonCO ₂ /TJ	0.062 tonCH ₄ /TJ	0.0002 tonN ₂ O/TJ	N/A	N/A	N/A
Coal	101.00 tonCO ₂ /TJ	0.010 tonCH ₄ /TJ	0.002 tonN ₂ O/TJ	N/A	N/A	N/A
Gasoline	69.30 tonCO ₂ /TJ	0.033 tonCH ₄ /TJ	0.003 tonN ₂ O/TJ	N/A	N/A	N/A
Diesel	74.10 tonCO ₂ /TJ	0.004 tonCH ₄ /TJ	0.004 tonN ₂ O/TJ	N/A	N/A	N/A
Firewood	112 tonCO ₂ /TJ	0.300 tonCH ₄ /TJ	0.004 tonN ₂ O/TJ	N/A	N/A	N/A
Kerosene	71.9 tonCO ₂ /TJ	0.003 tonCH ₄ /TJ	0.001 tonN ₂ O/TJ	N/A	N/A	N/A



GHG emissions

The calculated emissions for 2018 reflect the distribution of GHG emissions across sectors and scopes. **Scope 1 emissions**, resulting from activities within the FUA Sarajevo boundaries, are particularly relevant due to their direct impact on local air quality and climate. **Scope 2 emissions**, although also significant, represent indirect emissions from electricity use, with impacts occurring primarily outside the FUA Sarajevo.

A-1.3: GHG emissions by source sectors (2018)				
Unit – tCo2eq				
		Scope 1	Scope 2	Total
Stationary Energy		716,451.54	548,685.80	1,265,137.34
Transport		481,073.53	9,921.80	490,995.33
Waste		305,828	-	305,828
IPPU		70,660.55	320,592.10	391.252,64
AFOLU	Sources (positive emissions)	105,856.21	-	105,856.21
	Sinks (negative emissions)	-383,950.00	-	-383,950.00
Total		1,627,069.88	879,199.70	2.175.119,57

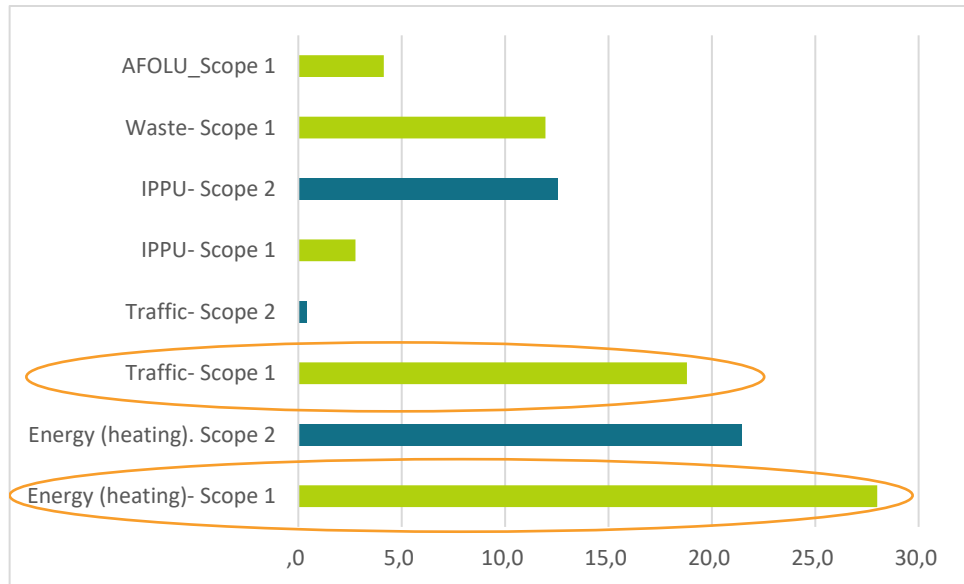


Figure 5: Share of GHG emissions by sector and scope in % (2018)

The majority of Scope 1 emissions originate from the **stationary energy** and **transport** sectors. Stationary energy alone accounts **43%**, primarily from the direct combustion of fuels in residential, commercial, and public buildings, both in individual and district heating boilers.

⁵ The exception is the emission factor for electricity, which was calculated for 2018 based on data available from the International Energy Agency. [Bosnia and Herzegovina - Countries & Regions - IEA](#)



The **transport sector** follows closely, contributing with 29%, largely from road transport fuels such as diesel and gasoline. Both sectors are key contributors to local air pollution and are central to mitigation planning.

The **waste sector** accounted for around **11%**, all under Scope 1, mainly from landfill gas and wastewater treatment and represent a considerable source of methane emissions. **IPPU** adds around **4%** under Scope 1, primarily from the fluorinated gases used in refrigeration and natural gas for heating and process needs. The remaining emissions in this sector, over **320,000 tCO₂eq**, were Scope 2, reflecting high electricity demand in industry.

In the **AFOLU sector**, positive emissions (methane and nitrous oxide) amounted to **6%**. Carbon removals through forest land (sinks) were estimated at **-383,950 tCO₂eq**, significantly offsetting emissions from other sectors. As mentioned earlier, these figures are based on available national data, adjusted for the FUA area.

In 2018, Scope 1 emissions total was approximately 1.7 million tCO₂eq (excluding carbon sinks), highlighting the scale of emissions generated within the Functional Urban Area (FUA). These locally produced emissions are especially significant, as they directly contribute to the FUA's persistent air pollution—one of its most urgent environmental challenges. The majority of these emissions (89%) stem from fossil fuel combustion for heating and transportation, as well as from waste management activities.

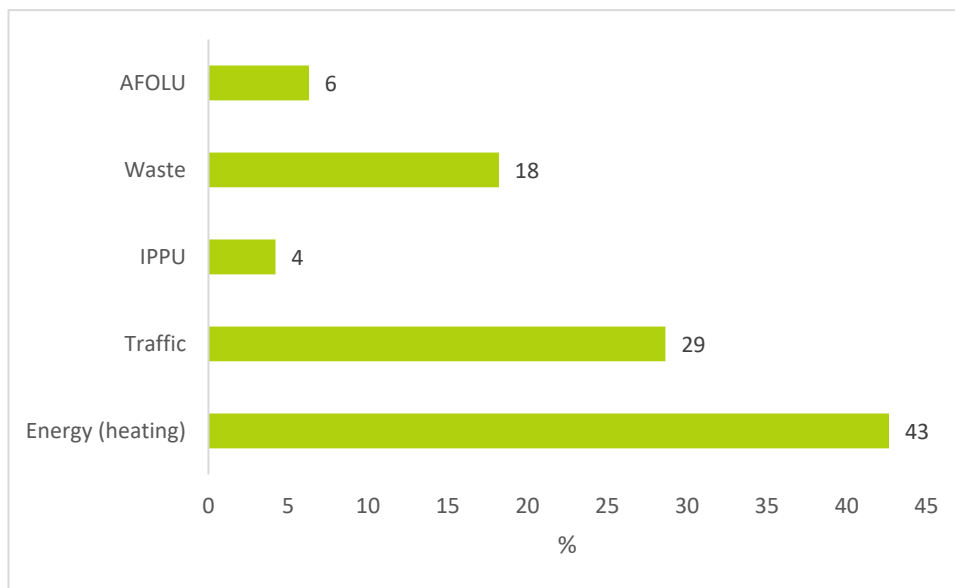


Figure 6: Sarajevo FUA scope 1 emissions in % (2018)

In the transport sector, a concerning trend is the heavy reliance on private vehicles, predominantly powered by diesel or petrol. Although the electrification of transport could significantly reduce local air pollution by shifting emissions outside the FUA, the current uptake of electric vehicles remains negligible. Presently, electricity-related emissions in transport come mainly from a portion of the public transport fleet and are minor compared to emissions from conventional fuels (98% of total sector's emissions).

In addition to the 2018 baseline, an analysis of 2022 data has been conducted, revealing an increase in the number of vehicles and fuel consumption. As a result, transport emissions



rose from 19% to 31% of total GHG emissions per Scope 1 and Scope 2, and from 29% to 37% of Scope 1 emissions. (Figure 7, Figure 8). This shift, along with the transport sector's significant contribution to GHG emissions, highlights the need to focus on this sector and implement measures aimed at reducing the number of vehicles on the road.

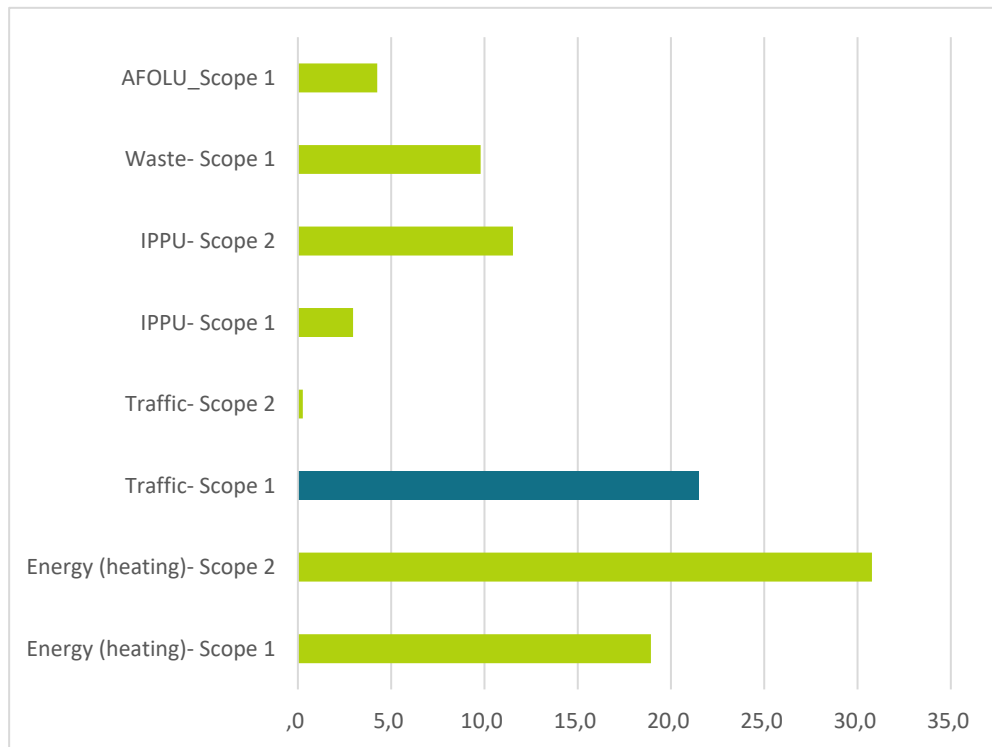


Figure 7: Share of GHG emissions by sector and scope in % (2022)

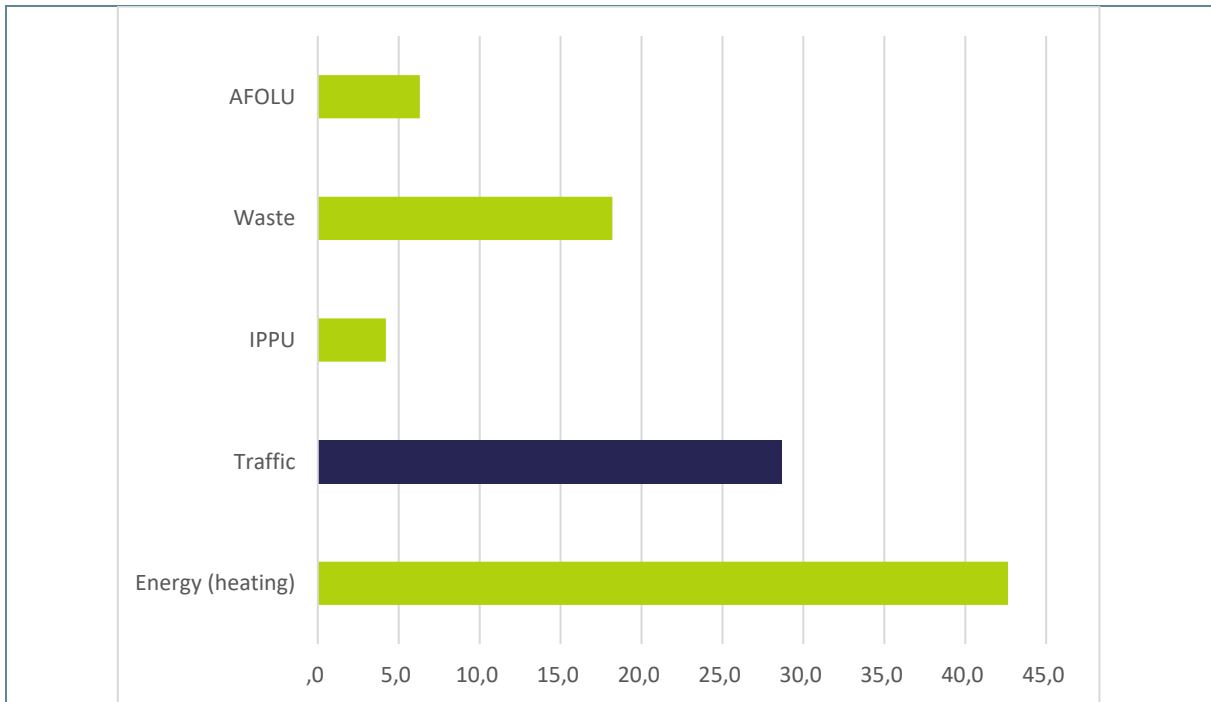


Figure 8: Sarajevo FUA scope 1 emissions in % (2022)

Within the stationary energy sector, natural gas is the primary heating fuel in the Sarajevo FUA, accounting for 49% of usage, largely due to its use in district heating systems. Yet, despite its high consumption, it contributes only 32% of the total sector's Scope 1 emissions under this category. In contrast, wood and coal – though used in smaller quantities, particularly in household boilers without proper emission controls – are the main contributors to GHG emissions in this sector (65%). This highlights how individual fuel choices have direct consequences for air quality, climate, and public health.

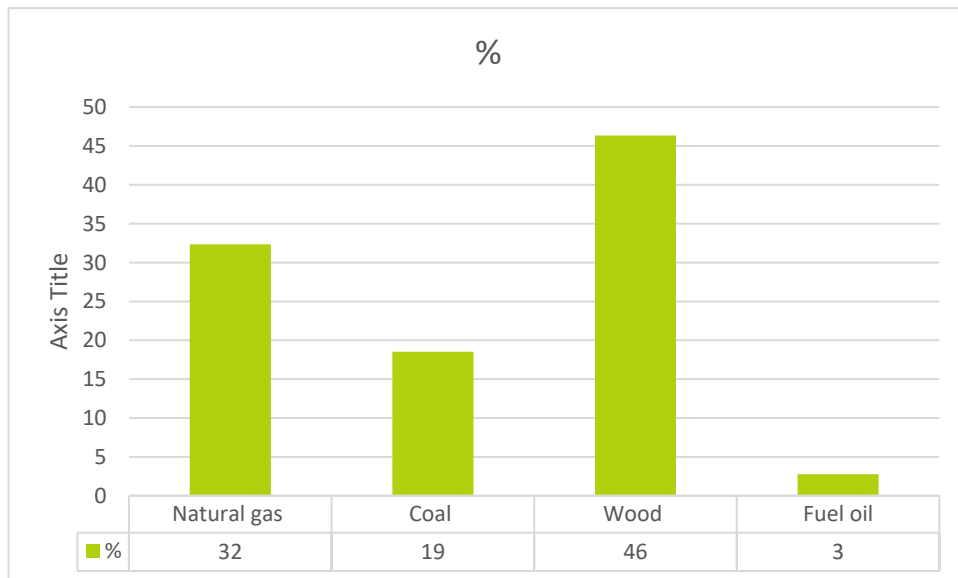


Figure 9: Sarajevo FUA scope 1 emissions for stationary energy sector (2018)



The waste sector poses another major concern. In the Sarajevo FUA, most waste is sent to landfills, resulting in the release of CH₄, which has 28 times the global warming potential of CO₂. More than 170,000 tonnes of waste are produced annually, yet less than 1% is recycled, with the rest being dumped. Additional emissions arise from wastewater treatment and sludge disposal, with the Butile plant, currently the only treatment facility, responsible for 19% of waste-sector emissions. However, municipal waste disposal is the primary emissions source in this sector.

In the IPPU sector, Scope 1 emissions include highly potent F-gases used in refrigeration. Despite their relatively small volumes, these gases have a significant global warming potential and must be addressed in industrial climate strategies. Natural gas use also contributes to emissions, accounting for 8% of Scope 1 emissions in this sector.

Although AFOLU sector represents a smaller share of total emissions (4%), they originate from CH₄ and N₂O, which are emitted in smaller quantities, but are far more potent than CO₂. Their intensity underscores the need for targeted action and monitoring.

Scope 2 emissions in 2018 totalled nearly 880,000 tCO₂eq and are associated with electricity consumption across all sectors. The majority of these emissions came from the stationary energy sector (62%) and the IPPU sector (36%). Given the fossil-fuel-based generation of electricity in BiH, high Scope 2 emissions are expected. Although these emissions occur outside FUA boundaries, they are driven by local consumption and must be factored into any comprehensive decarbonisation plan (Figure 5).

Translating the 2018 baseline into 2030 climate goals

Together, the Scope 1 and Scope 2 emission profiles provide a comprehensive understanding of the emission dynamics in FUA Sarajevo, identifying the key sectors where mitigation actions should be prioritised. Reducing Scope 1 emissions, particularly from stationary energy and transport, brings the most immediate co-benefits for local air quality. In parallel, interventions targeting Scope 2 emissions support a broader systemic transition toward climate neutrality.

Building on these insights, specific project portfolio was designed, energy savings were estimated and a projected emissions inventory for the year 2030 was developed. **This inventory is once again based on the energy balance, with emissions calculated using the same methodology and emission factors applied to the 2018 baseline.**

A key exception is the **emission factor for electricity**, which has been updated for 2030 to reflect the anticipated increase in renewable energy generation. This factor (**0.13 tCO₂/MWh**) was calculated based on expected electricity consumption and the forecasted share of renewables resulting from the implementation of CNAP projects. As a result, **the decarbonisation of electricity supply positively impacts emissions across all sectors**, given the widespread use of electricity.

Electricity consumption itself is projected to grow by approximately 30% by 2030 (in comparison to 2018), based on an assumed annual increase of 1%. This means that in order to reach net-zero emissions by 2030, the overall emission reductions must exceed the total emissions recorded in 2018.

It is important to note that the 2030 inventory, developed from the energy balance perspective, may not exactly match the sum of individual emission savings calculated for specific projects. This is due to the integrated nature of energy systems and overlapping impacts of various measures, especially those affecting electricity supply and demand.



Nonetheless, using the energy balance as the basis for the inventory provides a more accurate and holistic view of the transition pathway, and ensures that the cumulative effects of all actions are captured without losing the bigger picture.

Tracking emission reductions

In parallel with the development of the CNAP and the GHG inventory for the Sarajevo Functional Urban Area (FUA), Sarajevo Canton has taken significant steps to improve long-term air pollution monitoring and transparency. As part of its ongoing efforts to enhance air quality planning, a comprehensive **Air Emissions Register and Pollutant Information System** was completed in April 2025.

The system provides detailed data on 27 type of air pollutants based on nearly 100,000 identified emission sources. These include households, industrial facilities, transport, waste and agriculture. A major innovation is the integration of a high-resolution GIS platform (100x100m grid), allowing spatial mapping and direct public access to emission trends across the territory.

While the system is primarily designed for tracking **air pollutants**, it also includes a module for **CO₂ emissions**, supporting alignment with climate targets. Although its datasets cannot be retroactively applied to the 2018 baseline used in the CNAP, the system will significantly facilitate **monitoring the impact of implemented measures over time** and contribute to more transparent evaluation of progress. It can also serve as a tool for reporting specific indicators within the framework of Net Zero Cities. Hence, there is a growing institutional capacity to implement CNAP, strengthening the link between air quality planning and climate neutrality efforts.

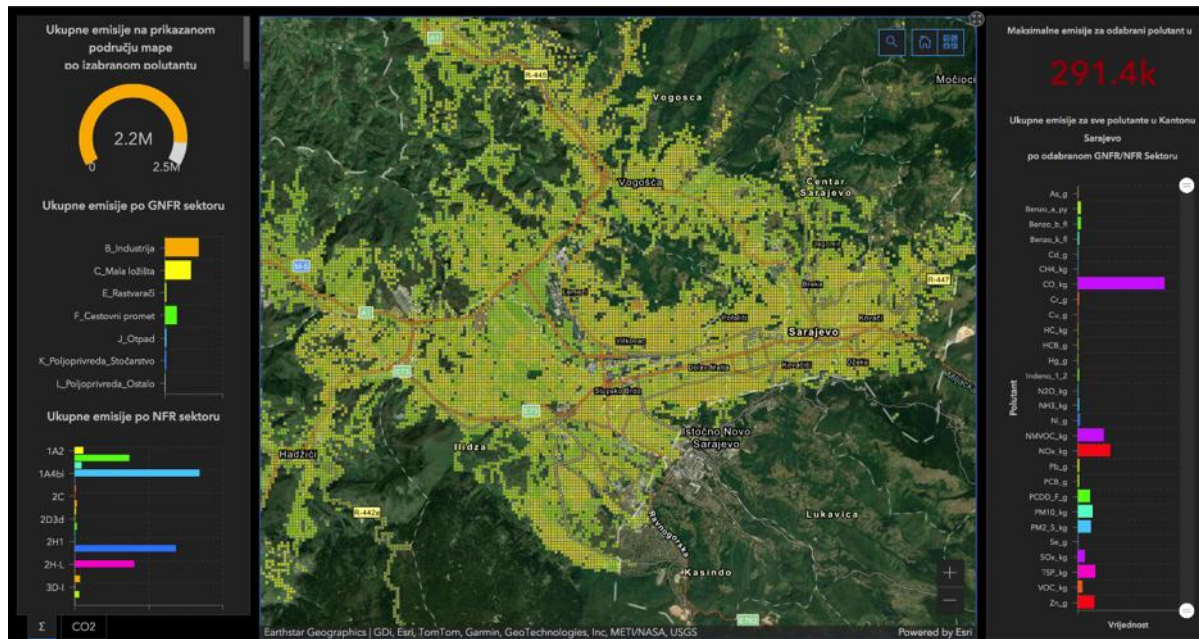


Figure 10: Air Emissions Register and Pollutant Information System of Sarajevo Canton⁶

⁶ Source: [IS Zaštite kvalitete zraka u KS](#)



It will be of equal importance for East Sarajevo to establish such Air Emissions Register and Pollutant Information System in order to support reporting specific indicators within the framework of Net Zero Cities and more transparent evaluation of CCC implementation progress.



2.2 Module A-2 Current Policies and Strategies Assessment

A-2.1: Description & assessment of policies

Several planning and strategic documents related to the transition to net-zero emissions have been adopted at national, entity, cantonal, city, and municipal levels. At the national level, BiH has established a robust framework for climate action with several key strategies. The *2020-2030 Climate Change Adaptation and Low-Emission Development Strategy* aims for a significant reduction in GHG emissions – 12.8% by 2030 and 50% by 2050 compared to 2014 levels, while promoting economic growth across sectors such as energy and waste management. Complementing this, the *Draft BiH Environmental Strategy and Action Plan 2030+* targets a 17.5% reduction in GHG emissions by 2030, with a focus on waste management and recycling. The *Framework Energy Strategy until 2035* emphasizes renewable energy and EE, while the *2015-2030 Framework Traffic Strategy* addresses emissions from transportation. The *National Energy and Climate Plan (NECP)*, outlines a long-term goal of net-zero emissions by 2050, targeting a 41.2% reduction in CO₂ emissions by 2030 and a 43.6% share of renewable energy in gross final energy consumption, in line with EU Energy Community requirements towards BiH as a member of Energy Community.

At the entity level, the *Federation of Bosnia and Herzegovina's (FBiH's) Environmental Protection Strategy (2022-2032)* aims for a 17.5% reduction in GHG emissions by 2030 and increased renewable energy use. The *FBiH Framework Energy Strategy until 2035* aligns with EU policies and emphasizes decarbonisation objectives. In the Republika Srpska (RS), the *Environmental Protection Strategy (2022-2032)* has the same targets with respect to reducing GHG emissions (17.5%) and increasing GHG sinks (10%) as in the FBiH. The *RS Energy Development Strategy until 2035* target significant reductions in GHG and PM emissions and increased use of renewable resources and improvements within district heating/cooling subsector, with additional emphasis on forestry for carbon sequestration.

Key initiatives and strategies addressing environmental and climate challenges within Sarajevo Canton include:

- *Green Cantonal Action Plan for Sarajevo (GCAP)*, *Cantonal Environmental Action Plan (CEAP)*, and *Sarajevo City Sustainable Urban Mobility Plan (SUMP)*: These documents identify residential heating/energy and transportation as major contributors to air pollution and have guided investments in building energy efficiency and sustainable transport during the 2018–2024 period.
- *Sarajevo Canton Development Strategy*: This Strategy highlights major environmental challenges related to air quality, including increased use of fossil fuels for heating, reliance on fossil-fuelled private road transport, and traffic congestion. It addresses issues such as ageing vehicle fleets, inadequate public transport services, and lack of dedicated lanes for public transit.
- *Development Strategies of Municipalities within FUA Sarajevo*: These strategies confirm worsening air quality and focus on improving EE in buildings, gasification, and replacing oil boilers with gas and biomass boilers. Planned measures include assessing renewable



energy potential, developing bicycle paths, and introducing waste separation through pilot projects.

As already emphasized, the FUA Sarajevo is a complex structure, and it consists of Sarajevo Canton, City of Sarajevo and City of East Sarajevo. Although it is one geographical unit, decision making procedure involves two entities (FBiH and RS) and three distinct level of governments – municipal, city, and cantonal. Furthermore, with respect to the Sarajevo Canton, further legislative division of powers between FBiH and canton exists in some areas like environment (as a shared competence), while some others are entrusted solely to the Canton (e.g. communal infrastructure). Furthermore, FBiH policy (e.g. FBiH ESAP) and cantonal policy (e.g. GCAP, CEAP) as well as regulations are applied to municipalities, but municipalities exercise certain jurisdiction in some specific fields like spatial planning for their own respective territory. With respect to East Sarajevo (and its five municipalities) the environmental policy (e.g. RS ESAP) and the RS legislation are applicable. Accordingly, different policy (as listed above) will be applicable with respect to the three parties creating FUA Sarajevo. Accordingly, these policies and strategies create a comprehensive framework for addressing climate and environmental challenges, enhancing sustainability, and working towards long-term climate goals in Sarajevo and its surrounding areas. Identified strengths of the current policies and strategies are:

- **Comprehensive scope and sectoral coverage:** The policies and strategies cover a broad range of sectors including energy, mobility, agriculture, forestry, land use, waste management, and digitalisation. This comprehensive approach ensures that various sources of GHG emissions are addressed, enhancing the overall effectiveness of climate action.
- **Alignment with EU and international standards:** Many of the policies, such as the *NECP* and the *BiH Framework Energy Strategy until 2035*, are aligned with EU directives and international agreements. This alignment demonstrates BiH's commitment to integrating with EU standards, which is crucial for future accession and international cooperation.
- **Quantifiable targets and clear objectives:** The strategies and action plans mainly set clear, quantifiable targets for GHG emission reductions, EE improvements, and renewable energy adoption. These specific targets provide a clear roadmap for achieving climate goals.
- **Focus on renewable energy and EE:** Several policies, including the *NECP* and various energy strategies, prioritise the adoption of renewable energy sources (e.g., wind, solar, hydro) and the enhancement of EE. This focus supports the transition to a low-carbon economy and reduces reliance on fossil fuels, which is essential for long-term sustainability.
- **Inclusion of action plans for implementation:** The existence of detailed action plans, such as the *Draft BiH National Emission Reduction Plan (NERP)* and the *Sarajevo Sustainable Energy Action Plan (SEAP)*, is a strength as they provide a clear path for implementation, monitoring, and adjustment of strategies. This ensures that the policies are actionable, and progress can be tracked over time.
- **Integration of environmental and economic goals:** Several strategies, such as the *2020-2030 BiH Climate Change Adaptation and Low-Emission Development Strategy*, emphasize the dual goals of environmental protection and economic growth. This



integration ensures that climate actions contribute to sustainable development, balancing ecological preservation with economic needs.

- **Focus on public and stakeholder engagement:** Strategies like the *Draft BiH Environmental Strategy and Action Plan 2030* and the *GCAP* highlight the importance of engaging the public and stakeholders in the implementation process. This inclusion fosters broader support and participation, which is critical for the success of climate initiatives.

To assess the gap between emissions reductions from existing initiatives and the FUA Sarajevo 2030 climate neutrality target, the implementation of projects and actions under current policies and strategies was analysed. Due to the lack of publicly available data, various stakeholders were contacted to gather the necessary information and indicators.



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
Strategy	National	2020-2030 BiH Climate Change Adaptation and Low-Emission Development Strategy	The Strategy aims to create a resilient and sustainable future by addressing the urgent need to adapt to climate change impacts while reducing GHG emissions and fostering economic growth. For low-emission development, the Strategy identifies the priority sectors: (i) electricity generation, (ii) building and housing, (iii) transport, (iv) agriculture, (v) forestry, and (vi) waste. The Strategy requires financial resources totalling approx. EUR 8.539 billion over a period of 10 years for its successful implementation.	In the sectors of <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling), <u>Circular Economy (Waste)</u> , <u>Agriculture, Forestry and Other Land Use</u> , and <u>Mobility</u> , the Strategy has established the following GHG emission reduction targets: <ul style="list-style-type: none"> • 12.8% reduction of GHG emissions by 2030 compared to 2014 levels • 50% reduction of GHG emissions by 2050 compared to 2014 levels. 	There is a need to establish clear funding mechanisms, including international climate funds, public-private partnerships, and national budget allocations. In the energy sector, efforts must focus on improving energy efficiency, increasing the share of clean energy sources, and modernizing heating and cooling systems to reduce dependence on fossil fuels. For the circular economy, a robust waste management system must be developed, emphasizing waste reduction, recycling, and energy recovery from waste. The agriculture, forestry, and land-use sectors must implement sustainable land management practices, promote reforestation, and enhance carbon sequestration efforts. Additionally, the mobility sector requires investments in low-emission transportation, public transport electrification, and improved infrastructure for active mobility.
Action Plan	National	2022-2030 National Energy and Climate Plan (NECP)	NECP is a strategic framework designed to transform the country's energy sector and drive progress toward a low-carbon economy. It focuses on investing in renewable energy technologies – such as wind, solar, and hydro power, and enhancing EE across residential and industrial sectors. The NECP also emphasizes the need for legislative reforms and policy implementation to align with EU	In the sectors of <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling), <u>Circular Economy (Waste)</u> , <u>Agriculture, Forestry and Other Land Use</u> , and <u>Mobility</u> , the NECP has established the following targets: <ul style="list-style-type: none"> • 41.2% reduction of CO₂ emissions by 2030 • 43.6% share of renewable energy in gross final energy consumption 	Achieving a 41.2% reduction in CO ₂ emissions by 2030 requires an accelerated shift to clean energy sources, particularly through increasing the share of renewable energy to 43.6% in final energy consumption. For FUA Sarajevo, this means substantial investments in solar, wind energy projects, along with the modernization of district heating systems to integrate



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
			directives and international agreements. Securing adequate funding through both domestic and international sources is crucial for supporting climate and energy projects. The Plan includes provisions for regular monitoring and reporting to track progress and adjust strategies as needed. Despite BiH's non-EU status, the NECP aligns with EU climate and energy policies, reflecting the country's commitment to integrating with EU standards.	by 2030 achieving final energy consumption of 4.34 Mtoe by 2030.	more renewable sources. Additionally, strict energy efficiency measures in residential and industrial sectors are necessary to reduce overall consumption and meet the final energy consumption target of 4.34 Mtoe by 2030.
Action Plan	National	2018-2027 Draft BiH National Emission Reduction Plan (NERP)	The NERP has been prepared according to the Policy Guidelines on the preparation of National Emission Reduction Plans, issued by Energy Community Secretariat in 2014 and is related to the emission reductions of sulphur dioxide (SO ₂), nitrogen oxides (NO _x) and dust from large combustion plants (LCP) in BiH, for both constituent entities – FBiH) and RS.	The NERP sets the following targets in the <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling) sector: <ul style="list-style-type: none"> reduction of SO₂ emissions by 95% until 2028 compared to 2014, in LCPs reduction of NO_x emissions by 64% until 2028 compared to 2014, in LCPs reduction of PMs emissions by 77% until 2028 compared to 2014, in LCPs. 	FUA Sarajevo should focus on complementary measures such as upgrading infrastructure, adopting clean technologies, improving energy efficiency, and increasing the use of renewable energy. In parallel, it is crucial to enhance regulatory alignment, engage relevant stakeholders, and mobilize financial resources and regional cooperation to contribute effectively to the overall success of the NERP objectives by 2028.
Strategy and Action Plan	National	Draft BiH Environmental Strategy and Action Plan (ESAP) 2030+	The Draft BiH ESAP 2030+ is developed for 10-year period (2022-2032) and covers topics of water management, waste management, biodiversity and nature protection, air quality, climate change and energy, chemical safety and noise, sustainable resource management, and environmental management. The Strategy focuses on developing public policies to mitigate negative impacts, enhance climate resilience, facilitate EU	The Strategy sets an overall objective of reducing GHG emissions by 17.5% by 2030 compared to 2014 levels. Additionally, specific objectives in the <u>Circular Economy (Waste)</u> sector are outlined as follows: <ul style="list-style-type: none"> 34% increase of recycling rate by 2030 compared to 2018 20% increase of recycled communal waste by 2030 compared to 2015 	To achieve the BiH ESAP 2030+ objectives and FUA Sarajevo's climate neutrality goals, key actions include enhancing circular economy practices, improving waste management with a focus on increasing recycling and reducing untreated waste, and advancing sustainable resource management. The transition to renewable energy, boosting energy efficiency, and adopting climate change mitigation strategies are essential to



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
			legislation transposition, ensure sustainable public services, and strengthen environmental protection frameworks.	<ul style="list-style-type: none"> 9% reduction of untreated communal waste by 2030, compared to 2017. 	meet the 17.5% GHG reduction target by 2030. Additionally, aligning public policies with EU legislation, strengthening environmental protection frameworks, and increasing public awareness are critical.
Strategy	National	BiH Framework Energy Strategy until 2035	The Strategy aims to establish a sustainable, secure, and competitive energy system by promoting renewable energy, rationalising resource management (including the use of waste in energy production), enhancing EE, and modernising the coal sector. Its mission is to align with EU energy policies and global climate goals while ensuring a reliable energy supply. The Strategy envisions a competitive and long-term sustainable energy system, realised through available capacities, resources, and appropriate dynamics. The Strategy sets out a course for other institutional documents and framework in the energy sector.	<p>The Strategy has established the following GHG emission reduction targets for the sectors of <u>Energy</u> (including EE, Clean Energy, and Heating and Cooling) and <u>Circular Economy (Waste)</u>:</p> <ul style="list-style-type: none"> 22% reduction of non-methane volatile organic compounds (NMVOC) emissions by 2025 compared to 2010 95% reduction of SO₂ emissions by 2028 compared to 2014 62% reduction of NO_x emissions by 2028 compared to 2014 88% reduction of PM emissions compared to 2014 emissions. 	Key actions in FUA Sarajevo include promoting renewable energy development, improving energy efficiency to align with EU energy policies and global climate goals. The efforts should focus on reducing non-methane volatile organic compounds by 22% by 2025, and significantly cutting SO ₂ , NO _x , and particulate matter (PM) emissions by 2028. Rationalizing resource management, including using waste for energy production, will play a crucial role in reducing emissions. Additionally, strengthening institutional frameworks, enhancing regulatory measures, and securing financing for clean energy projects are necessary for a sustainable, competitive, and secure energy system.
Strategy	National	2015-2030 BiH Framework Traffic Strategy	The Strategy provides an overview of the regulatory and institutional objectives and strategic activities that need to be achieved by 2030. It defines an action plan for roads, railways, inland waterways, and air traffic. Additionally, the Strategy outlines the distribution of responsibilities, time frames, and key performance indicators.	Although no specific goal has been set for the reduction of GHG emissions in the <u>Mobility sector</u> , the Strategy emphasizes the need to reduce GHG emissions from this sector by lowering the average age of cars.	The actions should include modernizing the public transport fleet by incentivizing the replacement of older, high-emission vehicles with newer, cleaner models, particularly through electric vehicles. Additionally, expanding and enhancing public transportation networks, including integrating low-emission buses and promoting cycling and walking infrastructure, will help reduce overall emissions. Strengthening institutional coordination for transport planning,



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
					improving traffic management, and developing sustainable mobility policies will also be crucial in achieving GHG emission reductions. In addition, investment in green infrastructure, such as electric vehicle charging stations will support the transition to a cleaner and more efficient mobility system.
Roadmap	National	UNDP ROADMAP – Towards a nearly zero-energy pathway for the public buildings sector in the Balkans+ region – 2023+	This Roadmap offers insights into the current status of implementing the nearly zero-energy building (NZEB) concept in the public buildings sector within the Balkans region, including BiH. It examines current and upcoming developments in the field of NZEBs and their implications for building services. Specifically, it explores the potential for NZEBs in newly constructed buildings as well as in the existing stock of public buildings. It also provides recommendations on how to achieve closer alignment with EU policies for EE in the public buildings sector.	The Roadmap sets the following targets in the <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling) sector: <ul style="list-style-type: none"> • 12,59 kt reduction of CO₂ in new public buildings by 2030 compared to 2022 • 55,22 kt reduction of CO₂ in existing public buildings by 2030 compared to 2022. 	The actions include implementing energy-efficient building technologies and upgrading existing public buildings to meet NZEB standards. This includes retrofitting heating, cooling, and insulation systems to reduce CO ₂ emissions. Additionally, promoting the use of renewable energy sources in new and existing public buildings will be important for achieving the 12.59 kt CO ₂ reduction in new buildings and 55.22 kt CO ₂ reduction in existing buildings by 2030. Strengthening local building classes to align with EU energy efficiency regulations, facilitating training and capacity building for building professionals, and ensuring financial support for retrofitting projects will help achieve these targets.
Strategy and Action Plan	Entity	2022-2032 FBiH Environmental Protection Strategy (ESAP)	The FBiH ESAP is a crucial component of the Draft BiH ESAP, outlining strategic environmental protection goals and specific action plans to achieve these objectives within the FBiH. The Strategy addresses environmental protection across seven thematic areas of EU strategic activities: water management, waste management, biodiversity and nature protection, air	In the sectors of <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling), <u>Circular Economy (Waste)</u> , <u>Agriculture, Forestry and Other Land Use</u> , and <u>Mobility</u> , the Strategy has established the following targets, among others: <ul style="list-style-type: none"> • 17.5% reduction of total GHG emission by 2030 compared to 2014 	As stated above.



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
			quality, climate change and energy, chemical safety and noise, and sustainable resource management. It focuses on actions to: mitigate and reduce negative impacts and enhance resilience to climate change; increase compliance with EU regulations and relevant international agreements; ensure more sustainable public services; strengthen the framework for environmental protection; and facilitate the transposition of the EU acquis.	<ul style="list-style-type: none"> • 10% increase of GHG sink by 2030 compared to 2014 • 30% reduction of the emission of pollutants from transport by 2030 (including dust) compared to 2016 • 15% increase of the share of district heating in the total heated area in buildings by 2030 • 50% reduction of emissions from private housing by 2032 compared to the 2022 • 22% reduction of energy consumption in residential buildings by 2030 compared to 2018 • 11% reduction of primary energy consumption by 2030 compared to 2020 • share of renewable energy sources in gross final energy consumption is 60% by 2030 compared to 49,3% in 2019 • share of renewable energy sources in electricity production is 50% by 2030 compared to 49% in 2019 • share of renewable energy sources in transport is 9% by 2030 compared to less than 1% in 2018. 	
Strategy and Action Plan	Entity	RS Environmental Protection Strategy (ESAP) 2022-2032	The RS ESAP is an essential component of the Draft BiH ESAP and outlines strategic environmental protection goals and specific action plans to achieve these objectives within the RS. Aligned with seven thematic areas of EU legislation, the Strategy addresses: water management, waste management, biodiversity and nature	<p>In the sectors of <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling), <u>Circular Economy (Waste)</u>, <u>Agriculture, Forestry and Other Land Use</u>, the Strategy has established the following targets:</p> <ul style="list-style-type: none"> • 17.5% reduction of GHG emissions by 2030 compared to 2014 	As stated above.



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
			protection, air quality, climate change and energy, chemical safety and noise, as well as sustainable resource management encompassing agriculture, forestry, fisheries, and mining activities, and environmental management	<ul style="list-style-type: none"> 10% carbon sink increase by 2030 compared to 2014 13% reduction of total energy consumption by 2030 compared to 2018 5% reduction of total communal waste disposal by 2032 compared to 2018 50% increase of waste recycling rate by 2032 compared to 2019. 	
Strategy	Entity	FBiH Framework Energy Strategy until 2035	The Strategy provides the context and direction of energy development in the FBiH, focusing on sustainable development policies that balance three aspects: security of supply, price competitiveness and decarbonisation policy, i.e. cleaner energy. Overall, the Strategy provides a comprehensive approach to transforming the energy sector, focusing on sustainability, emissions reduction, and alignment with EU policies.	<p>The Strategy sets the following targets in the <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling) sector:</p> <ul style="list-style-type: none"> 95% reduction of SO₂ emissions in LCPs by 2028 compared to 2014 64% reduction of NO_x emissions in LCPs by 2028 compared to 2014 77% reduction of PMs emissions in LCPs by 2028 compared to 2014 the share of renewable energy sources in gross final energy consumption is 41% by 2020. 	As stated above.
Strategy	Entity	RS Energy Development Strategy until 2035	The Strategy represents a set of goals and measures for implementing the Government of the RS's energy policy. It focuses on developing the RS's energy sector through the use of domestic resources, the inclusion of renewable sources to meet energy needs, the introduction and promotion of EE measures, and the application of modern energy technologies.	<p>The Strategy sets the following targets in the <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling) sector:</p> <ul style="list-style-type: none"> 94% reduction of SO₂ emissions in LCPs by 2028 compared to 2014 57% reduction of NO_x emissions in LCPs by 2028 compared to 2014 94% reduction of PM emissions in LCPs by 2028 compared to 2014. 	As stated above.
Strategy	Entity	FBiH Building Renovation	The Strategy provides an overview of the national, international, and EU regulatory frameworks related to	The Strategy aims to reduce GHG emissions in the <u>Energy</u> (encompassing EE, Clean Energy, and	As stated above.



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
		Strategy until 2050	building sector renovation. It includes a description of the current state of the construction sector in FBiH, renovation scenarios for residential and non-residential buildings, and identifies measures along with priorities and an indicative financial framework.	Heating and Cooling) sector, specifically from the building stock, by 73.86% by 2050.	
Strategy	Entity	RS 2011-2021 Forestry Development Strategy	The Strategy recognises the importance of forests and forest land as one of the most important natural resources of the RS. The Strategy focuses on sustainable management and utilisation of forest resources to ensure a balance between various societal demands and the conservation of forest ecosystems. Measures contributing to the reduction of GHG emissions include: increasing forested areas, integrating biodiversity protection into forestry practices, planning forest management with a focus on environmental protection, and analysing the state and updating the balance of CO ₂ accumulation and emissions with increased forest cover and CO ₂ storage. Additionally, the Strategy envisages expanding existing and creating new carbon dioxide absorbers and replacing fossil fuels with renewable wood-based fuels (biomass).	Although quantitative indicators are not specified, the Strategy sets the following targets in the <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling) and <u>Agriculture, Forestry and Other Land Use</u> sectors: <ul style="list-style-type: none"> • increasing forest areas • sustainable forest management: planning forest management, including the application of practices that reduce CO₂ and other GHG emissions during forest operations • analysis of the state and updating the balance of CO₂ accumulation and emissions • replacement of fossil fuels with renewable wood-based fuels (biomass) • expanding existing and creating new CO₂ sinks. 	As stated above.
Strategy	Entity	2021-2027 FBiH Agriculture and Rural Development Strategy	The Strategy outlines the key policies, objectives, and actions for advancing agriculture and rural development in the FBiH. It aims to enhance food security, promote ecological practices, strengthen eco-friendly farming methods to address and mitigate the effects of climate change, and support	The Strategy sets the following targets in the <u>Agriculture, Forestry and Other Land Use</u> sector: <ul style="list-style-type: none"> • 3,000 ha land dedicated to organic agriculture by 2027 compared to 1,230 ha in 2021 	This requires strengthening financial support for farmers adopting organic practices, enhancing certification processes, and improving advisory services for sustainable farming methods. Land consolidation efforts should prioritize regulatory improvements, infrastructure



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
			rural development. The strategy includes nine priorities and 22 specific measures, aligning with the EU's Common Agricultural Policy.	<ul style="list-style-type: none"> 30,000 ha of consolidated agriculture land by 2027 compared to 0 ha in 2021. 	investments, and incentives for landowners to participate in consolidation programs. Additionally, promoting climate-resilient agriculture, integrating agroecological practices, and fostering cooperation between stakeholders will be crucial for achieving long-term sustainability and alignment with EU agricultural policies.
Strategy	Entity	2021-2027 RS Strategy for the Development of Agriculture and Rural Areas	The Strategy outlines a plan to enhance agricultural production, improve its structure, and promote sustainable rural development. This Strategy is crucial for guiding policy decisions, synchronising efforts across different levels, and achieving long-term growth and stability in agriculture and rural areas.	In the sector of <u>Agriculture, Forestry, and Other Land Use</u> , the Strategy establishes a target of achieving 1,000 hectares dedicated to organic agricultural production by 2027, compared to 554 hectares in 2021.	The actions must focus on expanding organic agricultural production to 1,000 hectares by 2027. This requires strengthening support mechanisms for farmers through financial incentives, technical assistance, and capacity-building programs to transition to organic farming. Enhancing certification processes, improving market access for organic products, and promoting sustainable land management practices are essential for long-term growth.
Action Plan	Cantonal	Green Cantonal Action Plan (GCAP) for Sarajevo	The GCAP outlines the Canton's 'green city' vision and strategic objectives. It builds on existing plans and initiatives, such as the Cantonal Environmental Action Plan (CEAP), by employing a systematic approach to future development that addresses a wide range of environmental issues and links them to economic and social goals. Additionally, it provides a comprehensive set of 'green city' actions for the Sarajevo Canton, targeting the identified challenges and translating them into actionable investment opportunities. The priority	In the sectors of <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling), <u>Circular Economy (Waste)</u> , <u>Agriculture, Forestry and Other Land Use</u> , and <u>Mobility</u> , the Strategy has established the following targets, among others: <ul style="list-style-type: none"> <4 t/yr/capita annual CO₂ equivalent emissions by 2030 compared to 4.27 t/yr/capita in 2013 5% share of passenger vehicles run by electricity or gas by 2030 compared to 2% in 2017 <96 KWh/m² consumption of energy from fossil fuels for heating 	To achieve the GCAP targets key actions must focus on decarbonizing the energy and mobility sectors, enhancing resource efficiency, and strengthening climate resilience. Reducing CO ₂ emissions requires expanding district heating, improving building energy performance, and increasing the share of renewable energy in the energy mix. Sustainable urban mobility should be prioritized through the adoption of low-emission vehicles and the development of efficient public transport networks. Waste management improvements, including higher recycling rates, minimized landfill disposal, and circular



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
			<p>objectives for Sarajevo Canton identified in the GCAP include:</p> <ul style="list-style-type: none"> Improving air quality (reducing emissions from transport and residential heating, promoting cleaner technologies, increasing renewable energy use, and improving building energy efficiency), Promoting sustainable urban mobility (expanding public transport, promoting cycling and walking, supporting low-emission vehicles), Enhancing green infrastructure (creating more accessible green spaces through better spatial planning), Encouraging low-carbon development (promoting energy-efficient buildings - both new constructions and retrofits, developing low-carbon industries, and increasing low-carbon energy generation). 	<p>in residential buildings by 2030 compared to 101 KWh/m² in 2018</p> <ul style="list-style-type: none"> 127 KWh/m² consumption of energy from fossil fuels for heating in non-residential buildings by 2030 compared to 147 KWh/m² in 2017 10% share of industrial energy consumption from renewable energy by 2030 >20% of total city energy is derived from RES by 2030 compared to 15% in 2017 50% share of population with access to district heating by 2030 compared to 23% in 2015 300 kg/year of total solid waste generation per capita by 2030 compared to 450 kg/year in 2016 21% of municipal solid waste sorted and recycled by 2030 compared to <1% in 2017 1% of municipal solid waste disposed in open dumps/water bodies by 2030 compared to 5% in 2017 80% of industrial waste recycled by 2030 compared to total industrial waste produced >10 m²/capita of open green space by 2030 compared to 9 m²/capita in 2016 38% of green space areas within urban limits by 2030 compared to 2% in 2016. 	<p>economy practices, are important for reducing environmental impact. Additionally, expanding urban green spaces, restoring biodiversity, and implementing nature-based solutions will enhance climate resilience and air quality.</p>
Action Plan	Cantonal	Cantonal Environmental	The CEAP forms the foundation for planning and implementing	In the sectors of <u>Energy</u> (encompassing EE, Clean Energy), and <u>Circular</u>	Scaling up building retrofits, integrating renewable energy in residential and



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
		Action Plan (CEAP) for the period 2016-2021	environmental protection measures in the Sarajevo Canton. It proposes operational goals with concrete measures to achieve the strategic objectives outlined in relevant Cantonal strategies, covering areas such as nature, water resources, air quality management, land, forests, waste management, noise, lighting, human health, and environmental risks, including accidents and chemicals. The Plan includes a detailed action plan for the period 2017-2021.	<p><u>Economy (Waste)</u>, the Plan has established the following targets:</p> <ul style="list-style-type: none"> • 14,000 MWh of energy saved in residential buildings by 2020 compared to 2017 • reduction of 3,300 tonnes of CO₂ in residential buildings by 2020 compared to 2017 • 12,720 MWh of energy saved in public buildings by 2020 compared to 2017 • reduction of 3,000 tonnes of CO₂ in public buildings by 2020 compared to 2017 • 30% less biodegradable waste from the gardens of the total quantity that is disposed at "Smiljevic" landfill by 2020 • 15% less biodegradable municipal waste by 2020 • 30% less waste deposited at landfills by 2020. 	public buildings, and improving district heating efficiency will be essential to achieving energy savings and emission reductions. In waste management, efforts should prioritize reducing landfill disposal through expanded composting, biodegradable waste diversion, and increased recycling rates. Strengthening regulatory enforcement, securing financial support for green investments, and promoting citizen engagement in energy conservation and sustainable waste practices will be crucial for long-term environmental sustainability and achieving CEAP targets.
Action Plan	Cantonal	Sarajevo City Sustainable Urban Mobility Plan (SUMP) 2019-2025	<p>The SUMP for the Sarajevo Canton and the City of Sarajevo is a strategic plan designed to address the mobility needs of residents and businesses, with the aim of enhancing the quality of life in Sarajevo and its surrounding areas. It encompasses all nine municipalities within the Sarajevo Canton. The main objectives of the SUMP include:</p> <ul style="list-style-type: none"> • Improving public transportation services, • Enhancing conditions for non-motorized transport modes, such as walking and cycling, 	<p>The Plan sets the following targets in the <u>Mobility</u> and <u>Digital Transformation</u> sectors:</p> <ul style="list-style-type: none"> • 12% reduction in GHG emissions from transport by 2025 compared to 2019 • 50% of public owned vehicles are zero-emission by 2030. 	To align FUA Sarajevo with the SUMP, key actions should focus on reducing transport-related GHG emissions and accelerating the transition to clean mobility. Expanding and modernizing public transportation with zero-emission buses and trams, improving cycling and pedestrian infrastructure, and promoting shared mobility solutions. Policies and incentives should encourage the adoption of electric and low-emission vehicles, particularly in the public sector, to meet the target of 50% zero-emission public-owned vehicles by 2030. Additionally, integrating digital mobility



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
			<ul style="list-style-type: none"> Promoting the adoption of electromobility and low-emission transport systems, Encouraging innovation in sustainable urban mobility solutions, Optimizing urban logistics to support efficient goods movement and Increasing overall traffic safety. 		solutions, optimizing traffic management, and implementing low-emission zones will further support sustainable urban mobility. Strengthening institutional coordination, securing green financing, and engaging citizens in behavioural change initiatives will be essential for achieving long-term emissions reductions and enhancing urban mobility.
Strategy	Cantonal	Development of Electric-Powered Transport in Sarajevo Canton	The Strategy outlines a comprehensive plan for introducing electric mobility across Sarajevo Canton through four key models: electric bus transport, electric/hybrid taxi systems, electric bicycle infrastructure, and a network of charging stations powered by renewable energy. It includes simulation models, financial frameworks, an action plan, stakeholder roles, and success indicators.	<p>The Strategy sets several key targets aligned with environmental and mobility goals for Sarajevo Canton:</p> <ul style="list-style-type: none"> Reduce emissions from transport, especially from outdated diesel vehicles, and achieve “zero-emission” mobility in the public transport sector by 2030. Replacement of the current bus fleet with electric buses, as well as the gradual transition of taxi services and the introduction of electric bicycles and supporting infrastructure. Establishment of a charging network. Build a public culture around clean transport through 	Sarajevo suffers from critical air quality issues, largely due to traffic and heating. With most vehicles averaging 19 years of age and heavy reliance on diesel, there is a pressing need to modernize the transport system. Electrification of transport offers a scalable and sustainable solution to improve public health, reduce noise, lower emissions, and support the city’s Net Zero goals.



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
				<p>education, communication campaigns, and pilot projects.</p> <ul style="list-style-type: none"> The Strategy commits to climate action consistent with the Paris Agreement and EU directives, aiming to reduce emissions by at least 40% by 2030 compared to earlier baselines. 	
Strategy	Cantonal	Strategy for Bus Fleet Renewal in Sarajevo Canton	<p>The Strategy outlines a roadmap to modernize the ageing diesel bus fleet, reduce GHG and air pollutant emissions, and expand access to sustainable public transport services. Its objectives include:</p> <ul style="list-style-type: none"> Replacing ageing diesel buses (most over 15 years old) with low- and zero-emission alternatives, prioritizing e-buses, Expanding the e-bus fleet through a demonstration project and ultimately scaling up electrification across GRAS and Centrotans (companies providing public transport services), Improving air quality and reducing CO₂ and NO_x emissions significantly by transitioning away from diesel. 	<p>Although the Strategy does not set specific quantitative targets, it contributes to reducing GHG emissions and improving air quality by promoting the transition from diesel to e-buses. It also emphasizes that the environmental benefits of introducing e-buses will be significantly enhanced if accompanied by the decarbonization of the electricity mix - an objective that is also planned under this CNAP.</p>	<p>To align transport sector with the goals of sustainable and climate-resilient urban development, key actions should prioritize the renewal and decarbonization of the public bus fleet. This includes scaling up the deployment of e-buses, supported by investment in charging infrastructure and depot modernization. Improving operational efficiency, expanding service coverage to underserved areas, and phasing out older diesel buses will be critical to cutting emissions and improving air quality.</p>
Operational Plan/Project ⁷	Cantonal	Preliminary Engineering Design for the	The document aims to enhance urban mobility and air quality by expanding and connecting the fragmented cycling	While no direct emission reduction targets are quantified in this Plan, it contributes to climate goals by enabling	To support Sarajevo's transition toward sustainable and low-emission urban mobility, action is needed to close the

⁷ While this is not a strategic document, it is included here due to its relevance and significance to the overall objectives.



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
		Cycling Infrastructure Improvements	<p>network. The project covers new or improved cycling lanes across four municipalities (Novo Sarajevo, Centar Sarajevo, Stari Grad, and Ilidža), accompanied by supporting infrastructure. Objectives include:</p> <ul style="list-style-type: none"> Improving air quality and reducing GHG emissions by promoting cycling as a sustainable mode of transport, Expanding and modernizing Sarajevo's cycling infrastructure to enable safer, continuous, and accessible east-west urban mobility, Increasing modal share of cycling by providing infrastructure that supports both daily commuting and recreational use, Strengthening public awareness and infrastructure support through the installation of repair stations, and parking facilities. 	a shift from fossil-fuel-based transport to low-carbon mobility. Cycling generates zero emissions and, when supported with adequate infrastructure, has the potential to displace a significant portion of short urban trips currently made by car.	gaps in the cycling network and create a safe, continuous, and accessible infrastructure for cyclists. The successful implementation of new and improved cycling paths requires stronger institutional coordination and timely municipal approvals. Additionally, investing in supporting infrastructure such as bicycle parking and repair stations is needed to enhance user experience.
Action Plan	Cantonal	Sarajevo Sustainable Energy Action Plan (SEAP)	<p>The SEAP is a key document that, based on collected data about the current situation, outlines precise and clear guidelines for implementing EE projects and measures, as well as utilising renewable energy sources at the city level. The main goals of the Action Plan are to: reduce CO₂ emissions from the construction, traffic, and public lighting sectors; enhance the security and diversification of the city's energy supply; lower energy consumption in the building, traffic, and public lighting sectors; increase the</p>	<p>The Plan sets the following targets in the <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling) and <u>Mobility</u> sector:</p> <ul style="list-style-type: none"> 21% reduction of total CO₂ emissions by 2020 compared to 2008 (building sector – 62,47%, traffic – 36,1% and public lighting sector – 1,43%) 	Scaling up building retrofits, integrating renewable energy in residential and public buildings, and improving district heating efficiency will be essential to achieving energy savings and emission reductions.



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
			share of energy produced from renewable sources; and facilitate the transformation of urban areas into ecologically sustainable zones.		
Strategy	Cantonal	Strategy for limiting the use of coal and other solid fuels in Sarajevo Canton for the period 2023-2033	The Strategy is aimed at helping Sarajevo Canton authorities plan future activities and steps to improve air quality. It includes: an assessment of total emissions and the air quality impact of all individual solid fuel combustion plants; analysis and proposals for enhancing emission control; improvements in the chimney-sweeping sector; control and certification of furnaces and fuels used in the Sarajevo Canton; analysis of exposure to excessively polluted air; proposed measures for reducing air emissions; and recommendations for legislative improvements to enhance air quality in the Sarajevo Canton, along with addressing various challenges.	For the analysed zones ⁸ , the Strategy sets the following targets in the <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling) sector: <ul style="list-style-type: none"> • 98% reduction of SO₂ emissions by 2033 compared to 2023 • 97% reduction of PM emissions by 2033 compared to 2023 • 90% reduction of coal and firewood by 2033 compared to 2023. 	To achieve the ambitious air quality improvement targets set in the Strategy for Limiting the Use of Coal and Other Solid Fuels in Sarajevo Canton (2023-2033), urgent actions are needed to phase out coal and firewood use, improve heating system efficiency, and promote clean energy alternatives. Key measures include accelerating the transition to district heating and renewable energy sources, providing financial incentives and subsidies for households to replace solid fuel-based heating systems, and enforcing stricter emission control regulations. Strengthening monitoring and certification of fuels and heating appliances, improving chimney-sweeping services, and implementing awareness campaigns on the health impacts of air pollution will further support the transition.
Strategy	Cantonal	2021-2027 Sarajevo Canton Development Strategy	The Strategy outlines the directions for change and measurable development that can be achieved through well-coordinated preparation and implementation of annual budgets, public investment programs, and strategic megaprojects across all	In the sectors of <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling), <u>Circular Economy (Waste)</u> , <u>Agriculture, Forestry and Other Land Use</u> , and <u>Digital Transformation</u> , the Strategy has established the following targets, among others:	As stated above.

⁸ Zones defined by Plan are: Municipalities Novi Grad (Aneks, Svrakino Selo I, II and III, Staro Hrasno, Buca Potok, Brijesce, Alipasin Most I and II), Novo Sarajevo (Pofalici I and II, Velesici, Gornji Velesici, Hrasno Brdo, Vraca, Dolac), Centar (Betanije-Sip, Bardakcije, Hrastovi, Mrkovici, Mejtas-Bjelave, Soukbnar), Stari Grad (Medrese, Moscanica, Sedrenik, Vratnik, Babica Nasca, Bistrik, Mahmutovac, Sirokaca, Toka-Dzeka), Ilijas (Ilijas I, Mrakovo, Podlugovi) and Vogosca (Blagovac, Semizovac).



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
			institutions. The four strategic goals ensure synergy among the economy, environment, and society while respecting the interests of local self-government units in the Sarajevo Canton. Additionally, the Strategy identifies primary environmental challenges, including: poor air quality due to increased use of fossil fuels, wood, and other non-renewable energy sources for heating; heavy reliance on fossil-fuelled private road transport with an ageing car fleet and low engine standards; and traffic congestion, insufficient dedicated lanes for public transit, and poor-quality or inefficient public transport services. The Strategy serves as the foundational document for drafting sectoral strategies, the Framework Budget Document, the Sarajevo Canton Budget and Public Investment Program, the Three-Year Work Plan of the Cantonal Ministries, and the annual work program of the Sarajevo Canton Government.	<ul style="list-style-type: none"> • 4 CO₂ emissions per capita by 2030 compared to 4.27 in 2021 • 20% of total energy consumption derived from renewable energy sources by 2030 compared to 15% in 2021 • reduction of required thermal energy to 70 kWh/m² per year by 2030 compared to 130 kWh/m² in 2021 • 220,000 t/year of total disposed waste by 2030 compared to 161,086 t/year in 2021 • 2,000 t/year of separately collected waste by 2030 compared to 1,816 t/year in 2021 • 11% of municipal waste sorted and recycled by 2030 compared to <1% in 2017 • 10 ha of artificial afforestation compared to 7 ha in 2021. 	
Action Plan	Cantonal	Draft Sarajevo Canton Urban Plan 2016-2036	The Plan, as one of the most important development documents, aims to resolve spatial conflicts, offer optimal solutions, consider the interests of residents, and guide planning and strategic decisions of public interest. The Plan defines a concept for future development based on the principles of rational land use and the planning of new content and accompanying infrastructure to promote sustainable urban development. It sets strategic	<p>Encompassing the sectors of <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling), <u>Circular Economy (Waste)</u>, <u>Agriculture</u>, <u>Forestry and Other Land Use</u>, <u>Digital Transformation</u>, and <u>Mobility</u>, the following targets are established in the Plan:</p> <ul style="list-style-type: none"> • reduction of at least 55% GHG emissions by 2030 • 50 ha of new green urban spaces by 2036 compared to 2016. 	The actions must focus on reducing GHG emissions by at least 55% by 2030 through energy efficiency measures, increased renewable energy adoption, and low-carbon mobility solutions. The expansion of at least 50 hectares of new green urban spaces by 2036 requires integrating green infrastructure, urban forestry, and biodiversity-enhancing initiatives. Sustainable mobility improvements should prioritize zero-emission public transport, active mobility



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
			focus on the following areas: land use, industry, tourism, green urban spaces, forests, traffic and energy infrastructure, water bodies, and the circular economy/waste management.		infrastructure, and optimized land use planning to reduce car dependency. Advancing circular economy principles involves enhancing recycling systems, promoting material reuse in construction and industry, and utilizing digital tools for waste management optimization.
Strategy and Action Plan	Cantonal	Sarajevo Canton Digital Administration 2.0	The primary purpose of this Strategy, along with the Action Plan, is to propose a concept for a digital information system for Sarajevo Canton, serving as the backbone of a scalable, consolidated, and interconnected digital governance system. This system enables real-time access to various data sets, their integration, analysis, and visualisation (including geospatial data), thereby laying the foundation for a modern, successful, and efficient administration, as well as the provision of user-oriented e-services. The Vision for Digital Administration of Sarajevo Canton 2.0 is based on an assessment of the current state of digital resources in the Sarajevo Canton, which was conducted across all institutions and organisations of the Canton in 2020. Its aim is to propose improvements to the existing situation.	Since this is only a Vision that provides a concept for digital administration and a central IT system, it identifies only general targets in <u>Digital transformation</u> sector, such as: <ul style="list-style-type: none"> optimisation of internal processes and cooperation between administrative bodies, public institutions, and enterprises through systematically managed data management and exchange, while reducing the ecological footprint. 	Sarajevo Canton Digital Administration 2.0 Strategy requires actions that integrate digital transformation with sustainability goals. Key steps include enhancing real-time data management to improve energy efficiency in public services, reducing paper usage, and streamlining administrative processes to lower resource consumption. Expanding the interoperability of digital systems across sectors can support smart mobility, energy monitoring, and environmental data tracking.
Programme/ Tool	Cantonal	UP Digital Tool Sarajevo: EnerPol	EnerPol is a sophisticated urban energy planning tool that integrates various data, including geographic information systems (GIS), to simulate and analyse energy demand and supply within urban areas. It creates high-resolution digital twins of cities, enabling urban planners to model different scenarios for energy	Although no quantitative targets are defined, EnerPol aids in reducing GHG emissions by simulating energy flows and identifying inefficiencies. It promotes the adoption of renewable energy sources (RES), improves building energy performance, and optimises urban infrastructure. These	Key steps include integrating real-time data for better scenario modelling, using simulations to identify inefficiencies in buildings and infrastructure, and promoting targeted interventions for GHG emission reduction. Expanding the tool's application to prioritize renewable energy integration, district heating



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
			usage, identify areas for improvement, and implement strategies to optimise EE.	simulations enable evidence-based decision-making, which is crucial for sustainable urban development and achieving climate goals.	optimization, and energy-efficient urban planning will accelerate decarbonization efforts.
Strategy	Municipal	Development strategies of the municipalities within FUA Sarajevo	Development strategies of the municipalities within the FUA Sarajevo confirm the deteriorating state of air quality and focus planned activities on improving infrastructure and EE measures in buildings, gasification, and replacing existing heating oil boilers with gas and biomass boilers.	<p>Although the strategic objectives of each municipality are different, they can be grouped as follows:</p> <ul style="list-style-type: none"> • improve the competitiveness and self-sustainability of the local economy • enhance the quality of social life by improving educational, health, and sports-recreational infrastructure • sustainably manage the environment and develop infrastructure in accordance with the principles of the green transition • increase number of households using gas as primary heating source • increase of the recycled and sorted municipal waste amount. 	As stated above.
Action Plan	City	2020-2030 Sustainable Energy and Climate Action Plan (SECAP) of the City of East Sara	<p>The SECAP of the City of East Sarajevo is the city's strategic framework for reducing CO₂ emissions, adapting to climate change, and improving the quality of life. Key objectives include:</p> <ul style="list-style-type: none"> • Reducing CO₂ emissions to contribute to climate change mitigation, • Adapting local infrastructure and communities to the impacts of climate change, 	The key target in the SECAP of the City of East Sarajevo is to reduce CO ₂ emissions by at least 40% by 2030, compared to the baseline year 2010.	Key should focus on significantly improving energy efficiency across sectors, particularly through replacing public lighting with LED systems, enhancing the energy performance of residential and public buildings (such as installing insulation, replacing windows, and promoting renewable energy sources), and expanding and modernizing district heating systems. Additionally, actions should address sustainable urban mobility by promoting cycling, expanding pedestrian zones, and introducing electric vehicles into



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
			<ul style="list-style-type: none"> Combating energy poverty and ensuring access to sustainable energy for all citizens. 		public transport. Important priorities also include modernizing water and wastewater infrastructure, promoting the use of renewable energy through energy communities, and supporting citizens and businesses in implementing renewable energy/energy efficiency projects,
Action Plan	Municipal	2020-2030 Sustainable Energy and Climate Action Plan (SECAP) of Municipality of East Ilidza	The SECAP of the Municipality of East Ilidza is an action plan outlining initiatives to achieve sustainability goals and increase the municipality's resilience to climate change impacts. Municipality of East Ilidza has shown its commitment to the Global Covenant of Mayors and has pledged to reduce GHG emissions and track its progress. Inspired by this largest global initiative focused on local energy and climate activities, the SECAP addresses various topics related to GHG emission reduction.	<p>In the sectors of <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling), <u>Circular Economy (Waste)</u>, and <u>Mobility</u>, the Plan has established the following targets:</p> <ul style="list-style-type: none"> 54.28% reduction in CO₂ emissions by 2030 compared to 2010 – in all buildings 18% reduction in CO₂ emissions by 2030 compared to 2010 – in traffic sector 46% reduction in CO₂ emissions by 2030 compared to 2010 – in public lighting 54% reduction in CO₂ emissions by 2030 compared to 2010 – in waste management sector. 	Key actions should focus on emissions reductions across buildings, mobility, public lighting, and waste management. Energy efficiency upgrades and increased integration of renewable energy in buildings are important to achieving the ambitious CO ₂ reduction targets. In mobility, promoting low-carbon transport options such as public transit, cycling infrastructure, and electric vehicles will help decarbonize the sector. Public lighting modernization through energy-efficient technologies will contribute to lower emissions. Enhancing waste management with improved recycling, composting will further drive sustainability. Institutional collaboration, financial incentives, and public engagement will be key enablers for achieving these goals.
Action Plan	Municipal	2020-2030 Local Environmental Action Plan (LEAP) of the Municipality of Hadzici	The LEAP is a strategic document that outlines long-term goals and actions for environmental protection within a municipality of Hadzici. The LEAP is crucial for guiding local decision-making and aligning with current cantonal regulations in the field of environmental protection. The Plan also facilitates public participation, regional	<p>In the sectors of <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling), <u>Circular Economy (Waste)</u>, and <u>Agriculture, Forestry & Other Land Use</u>, the Plan has established the following targets:</p> <ul style="list-style-type: none"> 50% decrease of days with PM₁₀ concentration above limit values by 2022 	As stated above.



A-2.2: List of relevant policies, strategies & regulations						
Type	Level	Name & Title	Description	Relevance	Need for action	
			cooperation, and resource optimisation, enhancing the Municipality's capacity to address environmental challenges effectively.	<ul style="list-style-type: none"> 50% decrease of days with SO₂ concentration above limit values by 2022 30% reduction of waste disposed at landfills by 2025. 		
Action Plan	Municipal	2023-2027 Local Environmental Action Plan (LEAP) of the Municipality of Novo Sarajevo	The Municipality of Novo Sarajevo, due to its location, faces high air pollution during the winter months. The Municipality intensifies efforts to protect the living environment and recognises that investing in its improvement is essential for further sustainable development and for protecting the health and well-being of all residents. The LEAP outlines long-term goals and actions to address these issues.	<p>In the sectors of <u>Energy</u> (encompassing EE, Clean Energy, and Heating and Cooling), <u>Circular Economy (Waste)</u>, and <u>Agriculture, Forestry & Other Land Use</u>, the Plan has established the following targets:</p> <ul style="list-style-type: none"> 20% reduction in total energy consumption by 2027 compared to 2023 – in municipality owned buildings 10% increase in renewable energy sources in total energy consumption by 2027 compared to 2023 20% increase in green urban spaces conditions by 2027 compared to 2023 20% reduction of municipal waste by 2024 compared to 2023. 	As stated above.	
Actional Plan	Municipal	Climate Strategic Plan of the Municipality of Novo Sarajevo	The Plan provides a framework and direction for guiding the Municipality's efforts in better preparing for climate change. Specifically, the Plan includes proposed measures for: integrating climate issues into all aspects of local planning and sustainable development, efficiently implementing climate-related measures in Novo Sarajevo, and securing adequate financial resources from international initiatives, funds, and other sources.	<p>Although no quantitative targets have been set, the Plan identifies the following main goals and priorities:</p> <ul style="list-style-type: none"> reduction of GHG emissions, increasing EE, promotion of renewable energy sources, strengthening resilience to climate change, preservation and improvement of natural resources and ecosystems, raising citizens' awareness, 	As stated above.	



A-2.2: List of relevant policies, strategies & regulations					
Type	Level	Name & Title	Description	Relevance	Need for action
				<ul style="list-style-type: none"> • involvement of the local community, • cooperation with relevant institutions, • capacity building. 	



The current strategic documents rarely specify the total expected reduction in GHG emissions. Additionally, several planned actions overlap across multiple strategies, which, if summed up, could lead to double-counting of their projected benefits. Furthermore, even when actions were planned, progress in implementing these strategies has been limited.

To accurately determine the emissions gap that must be addressed through the CNAP, only **actions that were actually implemented**, not just planned, during the 2018-2024 period were quantified and excluded from the baseline. The remaining emissions will need to be mitigated through CNAP actions, as outlined in the table below. The implemented projects primarily focused on improving energy efficiency in buildings through retrofiting⁹. In addition, substantial progress was made in the transport sector¹⁰. Emission reductions were also noted from investments in energy efficiency within industrial companies, as detailed below.

	(1) Baseline emissions		(2) Emissions Reduction Target 2030 ¹¹		(3) Emission reduction through other Action Plans		(4) Emissions Gap		(5) Emissions reduction through the CCC Action Plan to address the Gap		(6) Residual emissions	
	(absolute) (tCO _{2eq} /year)	(absolute) (tCO _{2eq} /year)	(%)	(absolute) (tCO _{2eq} /year)	(%)	(absolute) (tCO _{2eq} /year)	(%)	(absolute) (tCO _{2eq} /year)	(%)	(absolute) (tCO _{2eq} /year)	(%)	
Stationary Energy	1,265,137	1,145,535	91%	38,081	3%	1,107,070	88%	1,107,070	88%	119,987	9%	
Transport	490,995	397,752	81%	74,975	15%	322,777	66%	322,777	66%	93,243	19%	
Waste	305,828	203,770	67%	-	0%	203,770	67%	203,770	67%	102,058	33%	
IPPU	391,253	307,582	79%	1,500	0,4%	317,221	81%	317,221	81%	72,532	19%	
AFOLU	105,856	44,786	42%	-	0%	44,786	42%	44,786	42%	61,070	58%	
Total	2,559,070	2,110,180	82%	114,556	4%	1,995,624	78%	1,995,624	78%	448,889	18%	

⁹ In December 2017, the Government of Sarajevo Canton adopted the Energy Efficiency Model to establish a sustainable investment system for improving building energy efficiency over a 10-year period. Using a sample of 100 multi-unit residential buildings and 1,000 individual homes, it was estimated that investments of one million BAM yield an average CO_{2eq} reduction of 640 tCO_{2eq}. This metric was applied to estimate emissions reductions for projects implemented between 2018 and 2024 based on investment values.

¹⁰ Data on estimated CO_{2eq} reductions were sourced from the IFIs involved in projects' financing.

¹¹ Without carbon sinks.



It is important to note that the table above does not account for carbon sinks. The **residual emissions presented will be offset by carbon sinks through residual emission strategy** , which are projected to increase from 383,950 tCO₂eq/year (in the baseline scenario) to 449,246 tCO₂eq/year (in 2030) through improved forest management, additional afforestation, and investments in green urban solutions, as outlined below - in Section 3.2.7 Strategy for Residual Emissions. **This will ultimately enable FUA Sarajevo to achieve net-zero emissions.**



2.3 Module A-3 Systemic Barriers and Opportunities to 2030 Climate Neutrality

A-3.1: Description of urban systems, systemic barriers, and opportunities

Achieving climate neutrality in FUA Sarajevo involves integrating and optimizing various urban systems. Each system, whether transportation, energy, waste management, agriculture, forestry and other land use, mobility and digital transformation, plays an important role. Several systemic barriers hinder the progress toward climate neutrality:

- **Institutional and regulatory barriers:** Slow and fragmented authorisation processes, complex administrative rules, lack of coordination in spatial and energy planning, insufficient legal frameworks to support the transition and inadequate monitoring and management of forest land, all of which hinder the implementation of climate neutrality actions and sustainable development. Additionally, outdated and unharmonized legislation, challenges in multi-apartment building renovations, and fragmented governance structures further complicate progress.
- **Organisational fragmentation:** Challenges in reaching tenant agreements for multi-apartment building renovations, and a lack of comprehensive, up-to-date data on urban green spaces, with fragmented management across various public institutions.
- **Financial constraints:** Limited funding sources, insufficient subsidies for households transitioning to renewable fuels, high upfront costs for energy efficiency and renewable energy projects, pricing and revenue risks for utility-scale renewable energy producers, and misaligned financing for waste management and silvicultural measures.
- **Technological and infrastructure deficiencies:** Inadequate energy infrastructure, outdated waste management facilities, lack of integration in transportation and mobility infrastructure, and fragmented data systems.
- **Behavioural and social barriers:** Insufficient awareness resistance to new technologies and practices, illegal waste management practices that hinder recycling and climate neutrality efforts, a shortage of skilled labour in agriculture, and the use of heat-storing materials in pavements that exacerbate urban heat. Additionally, relatively high gas prices discourage new users (households) from adopting this heating option and have prompted existing consumers to disconnect from the gas network. At the same time, rather low electricity prices for households reduce the economic attractiveness of energy efficiency measures, hindering their implementation and limiting incentives for behavioural change.

Despite the barriers, there are significant opportunities to advance climate neutrality:

- **Technological advances:** Expanding district heating systems with renewable energy integration, advancing waste management technologies such as waste-to-energy, biogas facilities, and recycling initiatives, and fostering urban agriculture through modern farming techniques. Additionally, investments in smart digital infrastructure, public transport improvements, and energy-efficient technologies such as solar panels and electric vehicles will drive sustainability and enhance urban mobility.
- **Financial innovations:** Leveraging international climate funds and grants, restructuring local budgets and public utilities, and fostering public-private partnerships for climate initiatives. Additionally, reallocating funds from energy price subsidies to renewable energy projects, implementing a GHG emissions tax, and supporting innovative financing models such as public ESCOs and renewable energy



auctions can drive investments in sustainable energy solutions and energy efficiency improvements.

- **Policy reforms:** Enhancing digital governance to streamline regulatory processes, promote transparency, and improve coordination across authorities. This includes accelerating the adoption of laws for energy efficiency and forest management, fostering public-private partnerships for energy renovations, and developing unified spatial and urban planning frameworks to ensure sustainable development. Additionally, improving digital monitoring systems and integrating green infrastructure initiatives will enhance environmental protection and urban planning.
- **Public engagement:** Educating residents about sustainable practices through awareness campaigns, clear communication, and community involvement, while showcasing successful projects to demonstrate practical solutions. Additionally, promoting the agricultural sector and implementing technologies to improve operational efficiency will foster a skilled workforce, while sustainable urban design can mitigate the urban heat island effect.

By addressing these barriers and leveraging available opportunities, FUA Sarajevo can advance towards its climate neutrality targets and build a more sustainable urban environment.

Table A-3.2 below provides a more detailed analysis of systemic barriers and opportunities by sector.

Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
Cross-sector		
Institutional/ regulatory Political	Slow/disaggregated authorisation process: The authorisation process in BiH, including FUA Sarajevo, is often slow and fragmented, frequently influenced by strong political pressures. It involves multiple layers of bureaucracy across various governmental levels. This disaggregated approach results in delays and inefficiencies, hindering the timely implementation of initiatives.	Continue to enhance the ongoing improvements in digital technologies and e-governance to accelerate processes, minimise delays, and boost transparency, in alignment with strategic policy goals and identified priorities. Accelerating the development of clear and accessible guidance and support for navigating regulatory requirements can help stakeholders better understand and comply with the rules.
Institutional/ regulatory	Regulatory red tape: The regulatory environment in BiH, including FUA Sarajevo, is characterised by complex and burdensome administrative rules and procedures. This red tape creates significant obstacles for stakeholders attempting to navigate the system, leading to increased costs, prolonged	Leveraging digital technologies to create online platforms for regulatory processes can enhance efficiency and transparency. Establishment of e-governance solutions, such as digital application systems and automated approval workflows, will reduce paperwork, accelerate processing times, and simplify access to and compliance with regulations for stakeholders. In



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
	timelines, and potential discouragement from investing in or initiating climate neutrality actions.	2021 Sarajevo Canton has adopted strategic document “A vision of a digital governance 2.0” , which is currently under implementation by Cantonal Agency for statistics. Inclusion of a cantonal representative from the IT and Statical Department within cantonal working group is beneficial and could facilitate this process.
Institutional/ regulatory	<p>Internal institutional structure for developing, implementing, and monitoring CCC: A Governing Board and Operational Team within FUA Sarajevo have been established. However, there are limited human resources, and the current structure is insufficient to manage the entire process and address the interests and priorities of various levels of governance. Despite these constraints, several important platforms and alliances have already been created to support the implementation process. These include collaboration frameworks with international financial institutions (IFIs), civil society networks, and private sector coalitions. These platforms aim to facilitate knowledge exchange, mobilize investment, and foster inclusive participation. The involvement of civic and private actors through thematic working groups, climate alliances, and cross-sectoral partnerships has laid the groundwork for a broader governance ecosystem. Nevertheless, these mechanisms must be</p>	<p>This matter has already been addressed and recognised by the Sarajevo Canton. Consequently, it has established a working body composed of relevant ministries and institutions pertinent to CNAP development which is commendable. To support the existing internal institutional structure for the implementation of the CCC a Transition Hub will be created.</p> <p>The Sarajevo Functional Urban Area (FUA) has already established strong cooperation with other European cities through Horizon and Interreg projects, aiming to address shared challenges such as climate change, energy transition, sustainable mobility, digitalization, and social inclusion.</p> <p>These partnerships enable cities to exchange knowledge and experiences, co-develop and test innovative solutions, and adapt best practices to their local contexts—fostering more resilient, inclusive, and future-ready urban development. Sarajevo is one of eight cities that are taking part in Commit2Green project to co-design and implement cross-scalar, participatory greening and renaturing strategies at the community level.</p>



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
	further strengthened and institutionalized to ensure effective coordination, long-term ownership, and integrated decision-making across the full spectrum of stakeholders.	
Organisational	<p>Complex organisational structure within FUA Sarajevo to achieve climate neutrality target: Although the organisational structure within FUA Sarajevo has already been defined and established, there is a risk that activities among the authorities of FUA Sarajevo may not continue after the completion of technical assistance within this project. This risk is compounded by the FUA's geographical scope and the involvement of various public institutions at different levels.</p>	<p>Support the creation of memorandum of understanding which will ensure clearly defined responsibilities for each authority and established methods for exchanging information and coordinating efforts.</p>
Financial	<p>Limited funding sources: Although investment in climate neutrality projects has been increasing in recent years, insufficient financial resources and restricted access to funding still pose significant obstacles. City and municipal budgets are constrained resulting in limited available financing including an inadequate capacity for new loans and lack of available grants for implementation of climate actions.</p>	<p>Further investigate international financial mechanisms and grants, such as those available through global climate funds and development banks. Consider budget restructuring options for Sarajevo Canton and City of East Sarajevo as well as restructuring of the public utility companies to increase their funding capacities. Moreover, in cooperation with relevant ministries and municipal sectors, authorities should consider allocating a portion of funds to further support vulnerable groups and mitigate (energy) poverty. Additionally, support the establishment and management of public-private partnerships for climate</p>



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
		initiatives as an alternative funding mechanism.
Social and behavioural	<p>Insufficient awareness and resistance to new technologies and practices: Despite increasing awareness of sustainable practices, such as EE measures, eco-friendly vehicles, and sustainable agriculture, many residents and businesses still lack a thorough understanding of the benefits and available co-financing options for these initiatives. This knowledge gap, coupled with high upfront costs, relatively low energy prices, inefficient use of available funds, and limited management skills, hinders the adoption of sustainable practices. Furthermore, resistance to new digital tools persists, driven by unclear benefits, perceived inconveniences, and disparities in access to information.</p>	<p>Continue supporting comprehensive public awareness campaigns to educate residents on the benefits of sustainable practices, including EE and energy management, waste management, mobility, as well as sustainable agriculture, forestry and land use. Implement clear guidelines and advisory services for efficient fund allocation to impactful sustainable projects and use pilot projects and success stories to demonstrate new methods.</p> <p>Emphasising education, clear communication, and community engagement will build trust, address concerns, and increase comfort with new technologies, leading to greater acceptance and smoother implementation of future advancements.</p>
Energy Systems		
Institutional/ regulatory	<p>Lack of legal framework for independent power producers: Despite there is legislation related to energy within the FUA Sarajevo, the absence of a comprehensive legal framework for independent power producers (IPPs) significantly affects the implementation of actions in the energy sector. This regulatory gap leads to various challenges: increased financial and operational risks due to uncertainty and lack of clear rules, restricted market access for IPPs to sell their</p>	<p>Accelerate the enhancement of existing regulations and the establishment of new ones for IPPs by exploring potential financial and technical support from international institutions (such as USAID, GIZ, EU, UNDP, etc.).</p> <p>Support more efficient coordination among authorities to remove existing obstacles promptly and adopt the necessary laws and accompanying regulations. This will address any uncertainties that IPPs currently face.</p>



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
	generated power and compete, complex and costly administrative hurdles, and inadequate support mechanisms such as subsidies and tax incentives.	
Institutional/ regulatory	Not harmonised legislation in the field of energy: There are differing primary and secondary legislations regarding EE, energy performance requirements for buildings, and technical standards across FBiH and RS. The complexity of authority jurisdictions, spanning entities, cantons, and municipalities, along with differing legislative requirements and restrictions, creates a fragmented regulatory environment. This lack of harmonisation presents a significant barrier to the effective implementation of energy policies and initiatives, leading to inefficiencies and challenges in achieving cohesive energy goals.	Closely monitor the establishment of a common entity regulatory framework for energy in FBiH and RS by harmonising EE standards and performance requirements for buildings across both entities to ensure consistency and promote effective energy use. Additionally, develop and implement standardised technical requirements for energy systems and technologies to facilitate interoperability and reduce regulatory complexity.
Institutional Organisational	Obstacles in the implementation of renovation measures for multi-apartment buildings: There is legislation within the FUA Sarajevo for implementing renovation measures for multi-apartment buildings. Investing in the renovation of a multi-apartment building requires reaching an agreement among individual tenants. This often presents a challenge due to differing opinions and attitudes among the tenants.	Promote the adoption of legislation that allows for building renovation investments in multi-apartment buildings without requiring unanimous tenant participation. Additionally, encourage authorities in FBiH, RS, and the Sarajevo Canton to set and achieve ambitious annual renovation targets for multi-apartment buildings within the FUA Sarajevo through the implementation of EE measures.



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
Technological/ infrastructural	<p>Current district heating system network coverage: The district heating system within FUA Sarajevo primarily serves the urban area but does not cover the entire region. As a result, various energy sources, such as natural gas, coal, wood, briquettes, pellets, and light fuel oil, are used for individual heating systems in the areas not covered by the district heating.</p>	<p>Advance the expansion of the district heating system by implementing the action priorities identified in policy and strategic documents for the City of East Sarajevo and Sarajevo Canton, while successfully continuing gasification activities in the eastern part of RS.</p>
Technological/ infrastructural	<p>Current use of resources/energy sources: Although the use of RES has been increasing each year, only a limited number of heating and cooling systems currently utilise these sources.</p>	<p>Increase the share of RES by enhancing initiatives to integrate RES into heating systems, such as through the use of heat pumps, solar systems, and biomass systems, while considering regulatory limitations in the urban areas of the City of Sarajevo.</p>
Technological/ infrastructural	<p>Potential for using energy from renewable sources: Already conducted research and analyses have shown that the FUA Sarajevo region is relatively rich in RES, primarily solar, wind, and geothermal. However, the potential for using renewable energy in relation to specific locations within FUA Sarajevo has not been assessed in detail. There is no map identifying suitable locations within FUA Sarajevo for utilisation of renewable energy (such as solar, wind, or geothermal). Moreover, the reliance on electricity primarily generated from fossil fuels poses a significant challenge to achieving climate neutrality.</p>	<p>Utilize the available potential through specific projects for renewable energy within FUA Sarajevo.</p>
Technological/ infrastructural	<p>Rational energy consumption: Consumption-based billing</p>	<p>Accelerate the introduction of consumption-based billing in multi-apartment buildings by</p>



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
	at the apartment level is used for district heating systems in multi-apartment buildings, but not in all buildings.	installing calorimeters, implementing digital reading systems, and other related technical measures.
Financial	<p>Lack of Available Subsidies to Households for Switching to Renewable Fuels. Energy-poor households face significant financial challenges when transitioning to renewable fuels due to the current lack of targeted subsidies. Subsidies should be exclusively directed toward renewable fuels and green energy efficiency measures, as allocating support for fossil fuel connections undermines the net zero mission by perpetuating dependency on carbon-intensive energy sources.</p>	<p>Continue reallocating financial resources from cross-subsidising energy prices to co-financing mechanisms for sustainable renewable energy projects and EE improvements. Introduce a mandatory tax on GHG emissions through the Emission Trading System (ETS), ensuring that the revenues are directed to projects that promote climate neutrality. This approach is particularly urgent in light of the Carbon Border Adjustment Mechanism (CBAM), especially in the electricity sector, as failure to implement a domestic ETS would result in financial outflows to the EU rather than retaining and reinvesting these resources locally. Redirecting financial incentives to promote renewable fuels can help alleviate energy poverty and accelerate the shift toward a greener, more resilient energy system.</p>
Financial	<p>High upfront funding requirement for the energy efficiency and renewable energy projects is the largest obstacle for large scale energy efficient renovations, switching to renewable energy heating and cooling as well as renewable energy production for households and businesses.</p>	<p>Leverage existing and continue developing innovative financing models and incentives to support high initial capital investments in climate-friendly solutions including privately operated Energy as a Service PV and heating/cooling solutions providers, private ESCO and operative leasing. Public ESCO model has also emerged as an effective model for rolling out large scale multi-apartment building renovations scaling to entire neighbourhoods. This model includes District Heating Companies as Public ESCOs which capture the energy efficiency savings effects through lower costs of heating fuel.</p>



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
Financial	Pricing and revenues risk for utility scale renewable energy producers: Utility-scale renewable energy producers face significant pricing and revenue risks due to market volatility, and the intermittent nature of renewable resources. Investors and financiers require long-term power purchase agreements to secure predictable revenue streams. These uncertainties increase the financial risk for investors, resulting in higher capital costs and posing challenges for securing project financing.	Encourage the implementation of renewable energy auctions of FAU Sarajevo or higher government levels. Through renewable energy auctions, producers secure long-term Power Purchase Agreements at fixed prices. This approach ultimately reduces market uncertainties and helps attract long-term investment in large-scale renewable energy projects like Wind Power Plants and utility scale ground mounted PV Power Plants.
Circular Economy (Waste)		
Social and behavioural Institutional	Waste prevention and reuse are marginal activities: Waste prevention and reuse activities are rarely prioritized at the policy or infrastructure level. Existing activities, such as the food prevention program or WEEE repair centres, are isolated and small-scale.	Scale up reuse centres (furniture, WEEE, textiles), implement the Zero-Waste Business Certification, promote public procurement for reusable goods, and introduce mandatory waste prevention plans for publicly funded events. Develop a dedicated Prevention and Reuse Action Plan.
Institutional/ regulatory	Weak enforcement and limited localisation of extended producer responsibility (EPR) schemes: Although entity-level EPR frameworks exist for packaging, WEEE and tyres, local implementation is inconsistent and underperforming. Textile waste is yet to be covered by the EPR.	Localise EPR through specific schemes for tyres, textiles, packaging, and WEEE. Use digital tools (e.g., batch tracking, reverse vending machines), reward-based systems (vouchers), and direct service agreements with producer responsibility organisations and treatment providers. Introduce local EPR action plan.
Technological/ infrastructural Social and behavioural	Single-stream waste collection and landfill dependence: Sarajevo Canton primarily uses a single-stream collection system for municipal solid waste (MSW), with over	Support implementation of a separate collection system for recyclable waste. This will necessitate modifications to the existing charging system for waste management services to enhance source segregation of



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
	<p>98% of collected MSW being disposed of at Smiljevici regional landfill. Similarly, East Sarajevo municipalities dispose all waste at municipal landfills.</p>	<p>recyclables, supported by a continuous and targeted educational and awareness campaign to engage citizens in effective waste separation. This implementation will require acquiring waste disposal equipment, including additional recyclable waste collection bins and vehicles for transporting the recyclables to appropriate treatment facilities.</p> <p>It is an advantage that Sarajevo Canton already possesses a sorting plant that segregates recyclable waste for further selling. Although this infrastructure for processing exists, it currently operates below its capacity due to the limited volume of waste being separately collected.</p> <p>Expand targeted awareness campaigns (e.g., schools, neighbourhoods, media), digital platforms and community-based reward systems. Engage retailers and NGOs as trusted intermediaries.</p>
<p>Technological/ infrastructural</p>	<p>Insufficient waste treatment and separation for circularity: There is a lack of waste treatment for different categories, such as biodegradable, recyclable, and combustible fractions of municipal solid waste, in accordance with circularity principles within the FUA area.</p>	<p>A 2019 comprehensive feasibility study for Sarajevo Canton proposed several scenarios for waste-to-energy technologies for solid wastes (such as biogas production from organic waste with combined heat and power, high efficiency for dry recyclable waste fractions). Accelerate the decision-making and development process for the Waste Treatment Plant, including finalising and adopting the preferred solution by the Canton Administration and selecting a location.</p> <p>Additionally, considering that 30% of MSW is biodegradable, accelerate the existing plans to set up a biogas facility for</p>



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
		biodegradable waste at the regional landfill site.
Technological/ infrastructural	Lack of treatment for dewatered sludge from WWTP: Although there are plans in place, dewatered sludge from the WWTP in Sarajevo Canton is not yet treated (East Sarajevo lacks an operational WWTP). Currently, the sludge is being stored or landfilled on-site.	Accelerate the implementation of the project proposal for the thermal treatment of sludge in Sarajevo Canton (2018). This project, based on the feasibility study for the treatment and disposal of sludge from WWTW Butile, recommends adding sludge drying at Butile to increase dry solids before transportation to a cement plant for co-incineration.
Technological/ infrastructural	Management of animal waste from food industry and slaughterhouses: Although animal waste production is analysed within FUA Sarajevo, there are issues with animal waste from slaughterhouses, butchers, and the food industry.	A register of animal waste production is developed for Sarajevo Canton. Encourage the further development of a feasibility study and detailed assessment in accordance with the waste hierarchy, the EU Animal By-products Regulation, and the EU Industrial Emissions Directive. This study should aim to develop, evaluate, and compare different animal waste management scenarios, including the potential procurement of an animal waste incineration facility.
Technological/ infrastructural	Increasing construction and demolition waste generation and landfilling due to industry growth: The construction industry is experiencing growth in the FUA area, leading to increased generation and landfilling of construction and demolition waste.	Promote the adoption of advanced waste management practices and recycling initiatives for construction and demolition waste to reduce landfill impact and support circular economy principles.
Financial	Incentive deficiencies in waste management pricing structure: The waste management system is not economically viable and does not incentivise the population to reduce waste generation or to segregate at the source. The main reason for this condition is the inappropriate pricing for collection, transportation, treatment, and disposal	Support development of a new tariff model for waste management services that reflects actual waste production, encouraging reduction and segregation at the source.



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
	services, which are charged as a flat rate (based on housing square footage) regardless of actual waste produced.	
Social and behavioural Institutional	<p>Illegal waste management practices and environmental compliance challenges: Although awareness of recycling and proper primary waste disposal is slowly increasing within FUA Sarajevo, illegal waste management practices, such as unauthorised shipping, dumping, and burning of waste, pose significant barriers to implementing climate neutrality actions within the circular economy (waste) sector. Unauthorised shipping of waste evades regulatory controls and leads to hazardous handling, while illegal dumping in remote areas results in environmental pollution and disrupts recycling efforts. Uncontrolled burning of waste contributes to air quality degradation and increased GHG emissions. These illegal practices undermine formal waste management systems, impede recycling and waste-to-energy initiatives, and hinder progress towards climate neutrality goals.</p>	<p>Initiate a further review of legal regulations and explore opportunities to improve penalties for illegal waste disposal, following effective examples from European cities. Consider identification of unauthorised dumpsites and develop strategic plans for their remediation. Continue to enhance inspection and monitoring capabilities. Work towards increasing the availability of waste containers in rural FUA areas to encourage proper waste disposal and deter illegal activities.</p>
Social and behavioural Financial	<p>Low market acceptance and visibility of circular products: Products made from recycled or reused materials lack recognition and demand among consumers and businesses. In many cases, these</p>	<p>Promote circular products through GPP rules, quality certification, and fiscal incentives (e.g., VAT exemption for recycled aggregates). Demonstrate performance via public pilot projects (roads, public buildings) using recycled content. Stimulate</p>



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
	materials are also more expensive than virgin alternatives due to limited economies of scale, higher processing costs, or lack of supporting incentives.	demand by including circular products in public procurement criteria and facilitating their entry into mainstream distribution channels.
Agriculture, Forestry and Other Land Use		
Institutional/ regulatory	The absence of a Law on Forest at the FBiH level: This barrier significantly undermines the ability to ensure sustainable forest management and effective administration across all cantons, including Sarajevo Canton. The conversion of forests and other high-value soils into construction land is a frequent issue, particularly in areas lacking current regulatory plans. This practice often leads to the loss of valuable natural resources and environmental degradation.	Accelerate the adoption of the (new) Law on Forests at the FBiH level. The adoption of this Law offers a critical opportunity to address these issues by providing a stronger and more unified legal framework than the existing cantonal law. This would enable more effective regulation and control over forest land use, curbing illegal conversions and better protecting forest ecosystems.
Institutional/ regulatory	Lack of coordinated spatial planning across entities: Spatial planning is currently fragmented, with the highest-level documents limited to the entity level (FBiH and RS), leading to misalignment in regional development efforts.	Further strengthen mechanisms for coordination and alignment between entity-level spatial plans to promote territorial cohesion. Develop inter-entity frameworks and guidelines to foster better coordination and alignment between entity-level spatial plans. Encourage integration across key sectors such as housing, transport, energy, and industry, with a focus on enhancing regional and local urban and rural development. Emphasize the preservation of forests and uncultivated land as critical resources within these coordinated efforts.
Institutional/ regulatory	Non-adoption of the new Spatial plan of FBiH: The current Spatial plan in the FBiH dates to the 1981-2000 period, making it	Accelerating the adoption of the new Spatial Plan is crucial as it serves as the highest-level planning document, providing a comprehensive framework for



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
	<p>outdated and inadequate for current needs. Although a new Spatial Plan was created and adopted by the House of Representatives of the FBiH Parliament in 2014, it has yet to be approved by the House of Peoples to come into force.</p>	<p>land use, urban planning, and the development of regional and local plans. This Plan would offer essential guidance for urban plans and other city-level documents, ensuring that development across the FBiH aligns with modern needs and sustainable practices.</p>
Institutional/ regulatory	<p>Non-adoption of the new Urban Plan of Sarajevo Canton for 2016-2036: The absence of an updated Urban Plan provides flexibility at the local/municipal levels, particularly regarding changes in urban density and other critical planning parameters.</p>	<p>Accelerate the adoption of the new Urban Plan for Sarajevo Canton, which is essential to prevent flexibility of existing regulatory plans and ensure consistent urban development. The Plan to establish clear urban parameters for each plot, including Floor Area Ratio (FAR), Building Site Coverage (BSC), and non-built site areas, providing a robust framework for sustainable and transparent urban planning. Accelerating the adoption process will safeguard against unregulated changes and promote orderly development across the canton.</p>
Institutional/ regulatory	<p>Inadequate monitoring and management of forest land: The fragmented institutional responsibilities outdated technological tools, and uncoordinated regulations across government levels have led to insufficient monitoring and management of forest land in the FUA area. This has resulted in illegal construction, logging, land loss, and increased risks of forest fires, landslides, and soil erosion.</p>	<p>Support development and implementation of enhanced digital monitoring systems, leveraging GIS and digital platforms that would significantly improve detection and prevention of illegal activities, streamline land use monitoring, and strengthen regulatory enforcement, ultimately safeguarding forest resources and reducing environmental risks.</p>
Institutional/ regulatory	<p>Lack of standards for tree planting in urban plots: The absence of clear standards and regulations</p>	<p>Support establishment of tree planting standards in urban plots. Introduce mandatory standards requiring the planting</p>



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
	for planting trees in the unbuilt open areas within construction plots/parcels often leads to the use of grass or horticultural plants, which do not provide the same ecological benefits as trees.	of at least one large tree (capable of reaching 20 meters at maturity) per plot. Additionally, require the planting of one more large tree for every 200 m ² of open space. In cases where planting is unfeasible, apply qualitative compensatory measures, such as planting multiple medium-sized trees, with their number and types subject to municipal approval.
Institutional/ regulatory	<p>Fragmentation between higher level plans and various lower-level plans: The disconnect between higher-level plans and various lower-level plans, such as regulatory plans and urban projects, leads to fragmented planning of connected spaces, particularly open green areas.</p> <p>Lack of strategic management of green urban spaces: There is a lack of a systematic approach to urban green spaces, with no cohesive national, regional, or local strategy for their densification and management. This results in inconsistent treatment of green spaces across various documents and authority levels.</p>	<p>Support implementation of the systematic green infrastructure development measures in FUA Sarajevo area. Urban green spaces in FUA Sarajevo are currently addressed through various documents across different levels of authority, but without a unified or coherent strategy. Although there are national initiatives—such as those led by the Federal Ministry of Physical Planning, which include programs for green infrastructure—their implementation remains limited and fragmented.</p> <p>The development of an Urban Nature Plan presents an opportunity to consolidate these efforts. It could be integrated either within the ongoing process of drafting the Urban Plan for Canton Sarajevo or incorporated into the upcoming Spatial Plan for the Canton.</p> <p>This approach aligns with the EU Biodiversity Strategy for 2030, which calls on all cities with more than 20,000 inhabitants to develop ambitious Urban Nature Plans. These plans are intended to serve as overarching frameworks to articulate, formalize, and showcase a city's commitment to enhancing</p>



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
		biodiversity and protecting urban nature.
Organisational	<p>Lack of comprehensive and precise data ('cadastre of green spaces') on urban green areas (public and private) in FUA Sarajevo. Some incoherent and outdated data is managed in parallel by different public institutions and entities (cantonal institutes, cantonal public utility company Park d.o.o. and municipalities). However, there is no one comprehensive data source.</p>	<p>Consider establishment of digital green space cadastre (in GIS format) that will enable the efficient management and maintenance of urban green spaces with in the FUA, moreover it should provide exact information about percentage of urban green spaces. Development of such registry would enhance efficiency, minimise risks and reduce costs.</p>
Technological/ infrastructural	<p>Inadequate nursery infrastructure and lack of coordinated production of climate-resilient planting material: Existing nursery capacities within the FUA Sarajevo are insufficient to meet the increasing demand for high-quality, climate-adapted planting material required for afforestation, reforestation, and urban greening efforts. The production is fragmented, often lacking modern infrastructure, irrigation systems, and quality control mechanisms. Moreover, there is no unified production plan or monitoring framework to ensure species suitability, survival rates, or long-term ecosystem impact.</p>	<p>Support the implementation of a strategic planting material production program based on the Nursery Production Study and Plan. This includes: (1) modernizing existing nurseries, (2) developing new production units in underserved areas (e.g., Pale), (3) training nursery operators, and (4) establishing quality control systems. These efforts will ensure sustainable, cost-effective, and locally adapted supply of planting material for AFOLU projects, while also contributing to local employment, improved biodiversity, and long-term ecosystem resilience.</p>
Technological/ infrastructural	<p>Challenges in agricultural production:</p> <ul style="list-style-type: none"> • Lack of and underutilization of 	<p>Development of urban agriculture. This concept holds significant potential for improving sustainable agricultural practices.</p>



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
	<p>land for agricultural production. This has become an increasingly pressing issue due to accelerated urbanization and infrastructural development, which reduce the availability of arable land, especially in the City of Sarajevo and the municipalities of Vogošća, Ilidža, Eastern Ilidža, and Eastern New Sarajevo. In addition to agricultural land being converted into construction zones, another challenge is the inadequate utilization of existing agricultural land. Although the concept of urban agriculture is increasingly mentioned in development documents, its practical application is still in the early stages, limiting the potential for food production in urban areas.</p> <ul style="list-style-type: none"> • Climate change and land degradation. Climate change causes more frequent and intense droughts, floods, and other extreme weather events. These factors directly affect crop yields and, due to industry uncertainty, often lead to abandonment of agricultural production. At the same time, erosion and loss of soil fertility further 	<p>The growing demand for locally produced products creates opportunities for innovative approaches, such as vertical farms, urban gardens, and hydroponic production, which allow for more efficient use of space in cities. The development of short supply chains and local markets reduces dependence on intermediaries and enables faster and more efficient product distribution. Additionally, the use of natural resources, such as rainwater and solar energy, can further contribute to the sustainability of these systems, reducing ecological impacts and increasing the self-sufficiency of urban communities. Certain segments of urban agriculture, such as planting fruit trees in individual yards, are considered measures that represent adaptation to climate change and land protection. Innovations in cultivation and adaptation to climate change offer solutions to mitigate these negative effects. The use of varieties that are adapted to local ecological conditions, such as drought-resistant, disease-resistant, and pest-resistant varieties, can improve production stability. Regenerative agriculture, such as agroforestry and forest farms, involves soil restoration through minimal tillage practices and cover crops, enabling long-term soil fertility preservation and reducing the negative impact of climate change. Digitalization and the development of smart agriculture represent a key opportunity for sector improvement. The introduction of GIS technologies enables more</p>



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
	<p>complicate the long-term sustainability of production. Without adequate adaptation measures, these changes can lead to significant economic and ecological consequences.</p> <ul style="list-style-type: none"> • Low level of technological modernization in the agricultural sector. Digital tools and innovations are still insufficiently applied in production, so farmers often do not have access to modern technologies or are not adequately educated about their benefits, resulting in higher production costs and less efficient resource use. The lack of education on modern agricultural practices further slows the process of adapting to contemporary trends in agriculture. • Insufficiently developed capacities for renewable energy: The current infrastructure for utilising RES in agriculture is underdeveloped, limiting opportunities to reduce energy costs and GHG emissions. 	<p>precise land management, optimization of resource use, and better production planning. At the same time, the development of educational programs and training can provide farmers with the knowledge and skills needed to apply new production techniques, as well as implement digital solutions, thus increasing efficiency and sustainability in production.</p> <p>Investment in energy infrastructure: Implementing technologies such as solar panels and biogas systems, would significantly reduce dependence on fossil fuels and lower energy costs on farms.</p>
Financial	<p>Misaligned financing for silvicultural measures: The current financial support for silvicultural measures, including nursery production, is not fully</p>	<p>Further support implementation of the Forestry Program, conducting a thorough forest inventory, and establishing an Information System. These initiatives would provide a solid</p>



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
	based on development programs and a comprehensive analysis of the conditions and needs of forests, which limits the capacity for adequate production of planting material and effective forest regeneration.	foundation for defining an adequate financing model for silvicultural measures, ensuring timely and effective forest management. The Federal Government adopted a Decision in 2018 on the establishment, management, maintenance, and use of the Forestry Information System (FIS) of the Federation of BiH, which is managed by the Federal Ministry of Agriculture, Water Management and Forestry. Additionally, in 2023, Šume Srpske (Forests of Republika Srpska) introduced an information system aimed at making field operations faster and more efficient, and to enable real-time and spatial data processing.
Social and behavioural	Human resource issues: The shortage of skilled labour complicates the growth and development of agricultural enterprises and the sector. High workforce turnover leads to a loss of valuable knowledge and experience, negatively impacting production efficiency and quality.	Continue with the implementation of automation technologies to reduce dependence on skilled labour and boost operational efficiency. Additionally, promote the agricultural sector as an attractive career path through targeted outreach, education, and incentives to retain and develop a skilled workforce.
Social and behavioural	Predominant use of heat-storing materials in pavement: The widespread use of bituminous and cement-bound materials as pavement surface materials, contributes to local temperature increases by storing heat, exacerbating the urban heat island effect.	Mitigate urban heat islands through material selection. Select materials, texture and colours for pavement surfaces that reduce heat absorption and storage. Prioritise the use of reflective, permeable, and cooler materials in the design to mitigate the urban heat island effect, contributing to a more comfortable and sustainable urban environment.
Mobility & Transport		
Technological/ infrastructural	Infrastructural and planning barriers to active travel: Despite increased investment in mobility	The ongoing preparation of the Urban Plan presents a critical opportunity to advance the development of infrastructure



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
	<p>infrastructure, the lack of essential infrastructure, such as sidewalks, dedicated cycling lanes, and safe pedestrian crossings, limits the viability and attractiveness of these low-emission modes of transport. Without proper planning and investment in active travel infrastructure, it is difficult to foster a culture of sustainable mobility and achieve the goals of climate neutrality in the sector.</p>	<p>that supports climate-neutral transportation modes. This includes the integration of key elements such as Park & Ride facilities, mobility hubs, and an expanded network of bicycle lanes, all designed to reduce dependency on private car use and lower transport-related emissions.</p> <p>In parallel, the introduction of Low Emission Zones (LEZs) or Restricted Mobility Zones should be considered. These zones can significantly improve air quality and urban liveability by limiting access for high-emission vehicles, while prioritizing clean transport modes, shared mobility, and active travel options.</p> <p>Connecting mobility hubs and active travel routes to nature and biodiversity goals represents a strategic opportunity to align transport planning with broader objectives for sustainability, climate action, and urban resilience. This integrated approach should be a key component of the Urban Nature Plan, ensuring that mobility infrastructure not only supports low-emission transport but also enhances access to green spaces, strengthens ecological networks, and contributes to a healthier urban environment.</p>
Technological/ infrastructural	<p>Lack of cross-modal ticketing and payment systems (to encourage modal shift): Without workable solutions that allow users to switch between different modes of transport – such as buses, trains, and bicycles, there is</p>	<p>Encourage the establishment of a unified system for issuing, purchasing, and using tickets across all public transportation modes, including half-day, daily, weekly, and monthly passes, in similarity to systems used in many European cities.</p>



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
	limited incentive for people to adopt more sustainable transportation options. This lack of integration hinders the development of a cohesive and user-friendly transportation network that encourages modal shifts towards more environmentally friendly choices.	
Technological/ infrastructural	Spatial dispersion or uneven accessibility: Despite increased investment in public transport infrastructure, many areas, particularly those outside urban centres, still have limited access to public transport services and cycling infrastructure. This uneven distribution of transportation resources makes it challenging for residents to utilise sustainable modes of travel, thereby reducing the overall effectiveness of public transport.	Enhance accessibility and connectivity by developing comprehensive public transport networks and cycling infrastructure that reach underserved areas, particularly outside urban centres. Support investment in extending public transport routes and increasing service frequency to connect remote and suburban areas with urban centers. Continue with the implementation of strategies such as demand-responsive transport services to address specific mobility needs in less accessible areas.
Technological/ infrastructural	Public transport schedules between different public transport modalities are not integrated and optimised.	Supporting the integration of public transport schedules, including the introduction of planning based on 'takt' schedules ¹² (locally known as 'taktički vozni red'), will contribute to greater predictability and resource savings in city public transport. Develop an online application for availability and tracking a public and shared transport .
Technological/ infrastructural	Insignificant share of eco-friendly vehicles in FUA Sarajevo's mobility sector: Although there is a trend toward increasing the number of eco-friendly vehicles in public transport,	Continue implementing measures from existing planning and strategic documents aimed at procuring electric public vehicles , as well as supporting the purchase of electric cars, e-bikes, and scooters .

¹² This planning system is based on harmonising the timetables of all types of public transport (e.g., buses, trains, trams) operating within a specific area.



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
	their share in the total mobility sector within FUA Sarajevo remains almost insignificant.	
Digital Transformation		
Technological/ infrastructural	Infrastructure limitations, such as outdated or insufficient digital infrastructure: The current digital infrastructure presents opportunities for improvement, as it may be outdated or insufficient to fully support the advanced technologies required for smart city initiatives. By upgrading and modernising the infrastructure, robust central IT systems can be established that consolidate all information and data onto a single, modular, and API-friendly platform.	Increase investments in modern digital infrastructure and smart technologies. Prioritise upgrades in areas like smart meters for efficient district heating modernization and smart street lightning for energy efficiency to lay the foundation for a smart city. Moreover, support development of central Geoportal with all institutions collaborating and contributing, including relevant technical support.
Technological/ infrastructural	Data integration issues, making it difficult to consolidate information from various systems: Although there are systems and tools for data collection and storage within FUA Sarajevo, disparate data sources lead to inefficiencies and a lack of actionable insights. Improving data integration will result in more streamlined operations and better-informed decision-making.	Continue to support improvement of unified data platforms with standardised protocols. It will be beneficial to implement data management frameworks that allow for seamless integration and analysis across different systems and platforms.
Technological/ infrastructural	Lack of standardisation and interoperability between different systems, devices or spatial data: The absence of shared standards may result in challenges and increased costs when incorporating new technologies. Greater consideration of standards is recommended, as	Encourage adoption of open standards and ensure interoperability, promoting collaboration between different authorities to ensure consistency. Additionally, spatial data collection and management should be aligned with international standards like ISO, OGC, and the INSPIRE Directive. Promoting data exchange and the use of Open Data platforms will



Table A-3.2: Barriers and opportunities		
System	Barrier	Opportunity
	adherence to uniform standards can facilitate the future integration of data, services, and applications.	further enhance the ability to share and utilise information effectively across various domains.

A summary overview of the identified stakeholders, including their influence and interest, is shown in Table A-3.3 below.

A-3.3: Systems & stakeholder mapping			
System	Stakeholders	Influence on the city’s climate neutrality ambition	Interest in the city’s climate neutrality ambition
Institutional/ regulatory	Cantonal ministries, State and entity level ministries, FUA Sarajevo	High influence: These stakeholders create and enforce regulations, which can either support or hinder the city’s climate neutrality efforts. They hold power over policy implementation and compliance.	Moderate to high interest: Their interest is centred around compliance with EU standards, national targets, and the ability to showcase the city as a leader in climate action, which can attract further support and investment.
Organisational	Cantonal ministries (including public companies), FUA Sarajevo	High influence: play a key role in coordinating and implementing climate initiatives at the local levels.	Moderate to high interest: FUA Sarajevo has a strong interest in achieving climate neutrality, including a strategic role in the project. Cantonal ministries and public companies may have a moderate interest, which could be influenced by political and economic priorities.
Technological/ infrastructural	Energy suppliers, public companies, private sector, academia, engineering clusters	Moderate to high influence: Their infrastructure and technological solutions are crucial for implementing climate actions, but they are subject to regulatory decisions.	Moderate to high interest: Their interest lies in modernising infrastructure to be more sustainable, which can lead to new business opportunities, regulatory compliance, and technological leadership.
Financial	Enterprise Alliance, IFI Net Zero Coalition Group, EU Commission, private sector, homeowner	Low to moderate influence: Stakeholders have significant financial resources and can directly fund or incentivise sustainable projects. Limited influence on	Moderate to high interest: These stakeholders are interested in funding projects that align with sustainability goals, as it aligns with their financial



A-3.3: Systems & stakeholder mapping			
System	Stakeholders	Influence on the city's climate neutrality ambition	Interest in the city's climate neutrality ambition
	associations/ building maintenance companies	decision making processes.	strategies and corporate social responsibility commitments. Improved coordination and information sharing about current and upcoming projects would be beneficial.
Social and behavioural	General public, media, NGOs, Citizens Assembly (CA), academia, homeowner associations/ building maintenance companies	Low to moderate influence: Social acceptance and public behaviour are critical for the adoption of sustainable practices. Media can amplify or diminish public support. Influence is <i>indirect</i> but powerful through societal norms and public pressure.	High interest: The public and media have a vested interest in improving the quality of life through better air quality, reduced pollution, and long-term sustainability, while NGOs and academia are interested in research and advocacy outcomes.



3 Part B – Pathways towards Climate Neutrality by 2030

Part B represents the core of the CCC Action Plan, shaped by local authorities, local businesses, and stakeholders, comprising of the most essential elements: scenarios, strategic objectives, impacts, action portfolios and indicators for monitoring, evaluation, and learning.

3.1 Module B-1 Climate Neutrality Scenarios and Impact Pathways

B-1.1: Description of impact pathways

The Sarajevo Functional Urban Area (FUA) aims to achieve its carbon reduction targets through the implementation of comprehensive **decarbonisation measures** across five key sectors, alongside the development and execution of a **residual emissions strategy**. The relationship between these pathways and the analysis in Part A lies in how each intervention addresses specific challenges like fossil fuel dependence, air pollution, and urban heat, with progress monitored using indicators focused on emission reductions and co-benefits like air quality. This integrated approach ensures that the decarbonisation efforts are strategically targeted, measurable, and aligned with broader sustainability goals.

The selected impact pathways for FUA Sarajevo CNAP represent a comprehensive and integrated approach to achieving climate neutrality by 2030, with a strong focus on addressing sector-specific challenges while creating synergies between sectors. These pathways were carefully chosen to reflect both the urgency of reducing emissions and the broader need to create a more liveable, resilient, and inclusive urban environment.

The transformation of Sarajevo's **1. Energy systems** lie at the heart of the CNAP Net Zero vision. With fossil fuels still dominating the energy mix and energy poverty affecting a significant portion of the population, the plan sets out a comprehensive path toward **clean, efficient, and inclusive energy systems**. The overall strategy for energy systems is grouped in two major groups of interventions:

1.1 Clean and Efficient Heating in the Built Environment- The first pillar of the energy transition targets the **built environment**, focusing on both **decarbonizing heating systems** and **increasing energy efficiency** in residential and public buildings. Key actions include the



B-1.1: Description of impact pathways

introduction of renewable energy technologies into heating—particularly **heat pumps** and **geothermal systems**—which will gradually displace the widespread use of coal and inefficient wood-burning stoves. Where biomass remains necessary, **modern biomass boilers** with high efficiency and low emissions will be promoted as a transitional solution.

To complement cleaner energy sources, the plan prioritizes **comprehensive building retrofits** to reduce heating and cooling demand. These retrofits will improve insulation, upgrade windows, and modernize building energy systems. In parallel, the introduction and enforcement of **Nearly Zero Energy Building (NZEB) standards** will ensure that new constructions meet stringent efficiency and sustainability criteria from the outset.

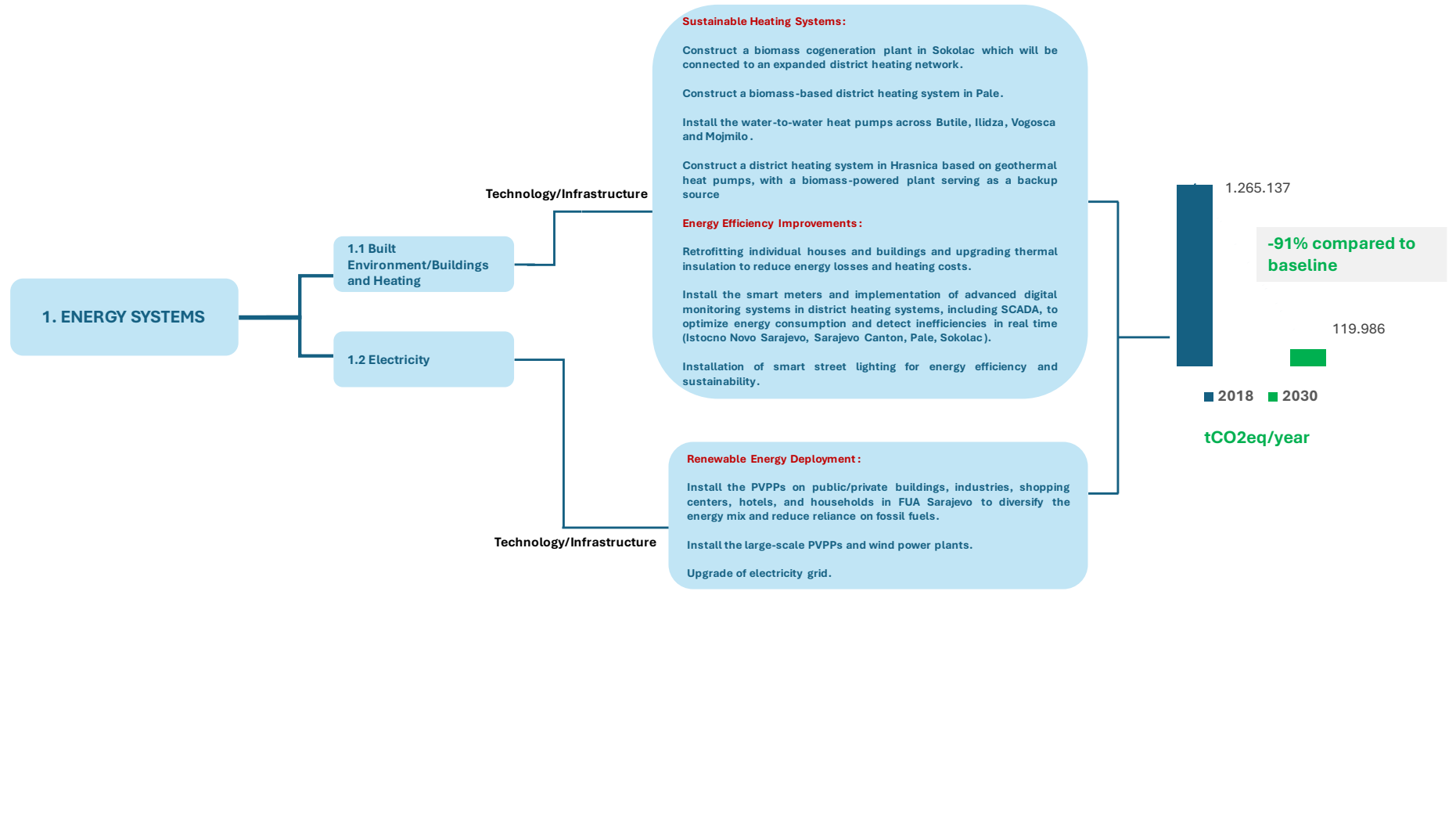
These measures are designed not only to **cut emissions and reduce energy costs**, but also to **improve indoor air quality**, address energy poverty, and boost the long-term resilience of the built environment.

1.2 Decarbonizing Electricity and Enabling Renewable Integration—The second pillar of the plan focuses on the **electricity system**, aiming to rapidly scale up **clean electricity generation** through **solar photovoltaics** and **wind farms**. These investments will reduce reliance on fossil-based electricity and lay the foundation for electrifying other sectors, including transport and heating. To support this shift, the plan calls for **modernization of the power distribution infrastructure**, including the development of **smart grids and microgrids**. These systems will enable better demand-side management, real-time load balancing, and local energy generation, creating a more flexible and resilient energy system. Crucially, the CNAP aims to democratize the energy transition by empowering **citizens, businesses, and local governments** to become **prosumers**—both producers and consumers of clean energy. This will be enabled through **simplified legal frameworks, financial incentives**, and the establishment of **energy communities** that promote shared ownership and local benefit. Finally, **public education and awareness campaigns** will ensure that citizens understand the benefits of energy efficiency and clean energy adoption, strengthening public support for climate action and fostering behaviour change.

Together, these measures form a strategic and people-centred approach to achieving net zero in Sarajevo's energy sector—**cleaner heating, smarter electricity, and empowered citizens** driving the transition to a sustainable urban future.



B-1.1: Description of impact pathways





B-1.1: Description of impact pathways

The industrial sector within the Sarajevo Functional Urban Area remains a **major source of greenhouse gas emissions**, largely due to its continued reliance on **natural gas** for generating steam, hot water, and for heating production facilities and administrative buildings. Additionally, the **extensive use of fluorinated gases (F-gases)** in industrial cooling operations further exacerbates the sector's climate impact, given their **high global warming potential**. These energy- and emissions-intensive practices contribute to **substantial CO₂ emissions, elevated operational costs, and local air pollution**, while also undermining long-term energy resilience.

In response, the CNAP outlines a comprehensive decarbonization pathway for **2. IPPU** sector focused on improving **energy efficiency**, transitioning to **low-carbon technologies**, and phasing out high-impact substances used in cooling systems. The planned interventions aim not only to reduce emissions but also to lower operational costs, improve industrial competitiveness, and enhance working conditions.

2.1 Clean and Climate-Safe Cooling- A critical issue in Sarajevo's industrial sector is the widespread use of **refrigeration and cooling systems based on fluorinated gases (F-gases)**—potent greenhouse gases with high global warming potential. To address this, the CNAP introduces measures to modernize cooling technologies and phase out climate-damaging refrigerants:

- Replacement of F-gases with **low-GWP (Global Warming Potential) alternatives**, aligned with EU regulatory standards.
- Improvement of **cooling system energy efficiency**, including better design, leak detection, and maintenance protocols.
- Integration of climate-safe cooling into broader energy efficiency programs to maximize emissions reductions.

These interventions represent a direct and impactful contribution to industrial decarbonization, especially in food processing, metallurgy, and logistics subsectors where cooling demand is high.

2.2 Energy-Efficient and Low-Carbon Industry

Decarbonizing industry also requires structural changes in how energy is consumed, managed, and recovered. The CNAP proposes a set of high-impact energy efficiency measures to reduce fossil fuel dependency and increase industrial resilience:

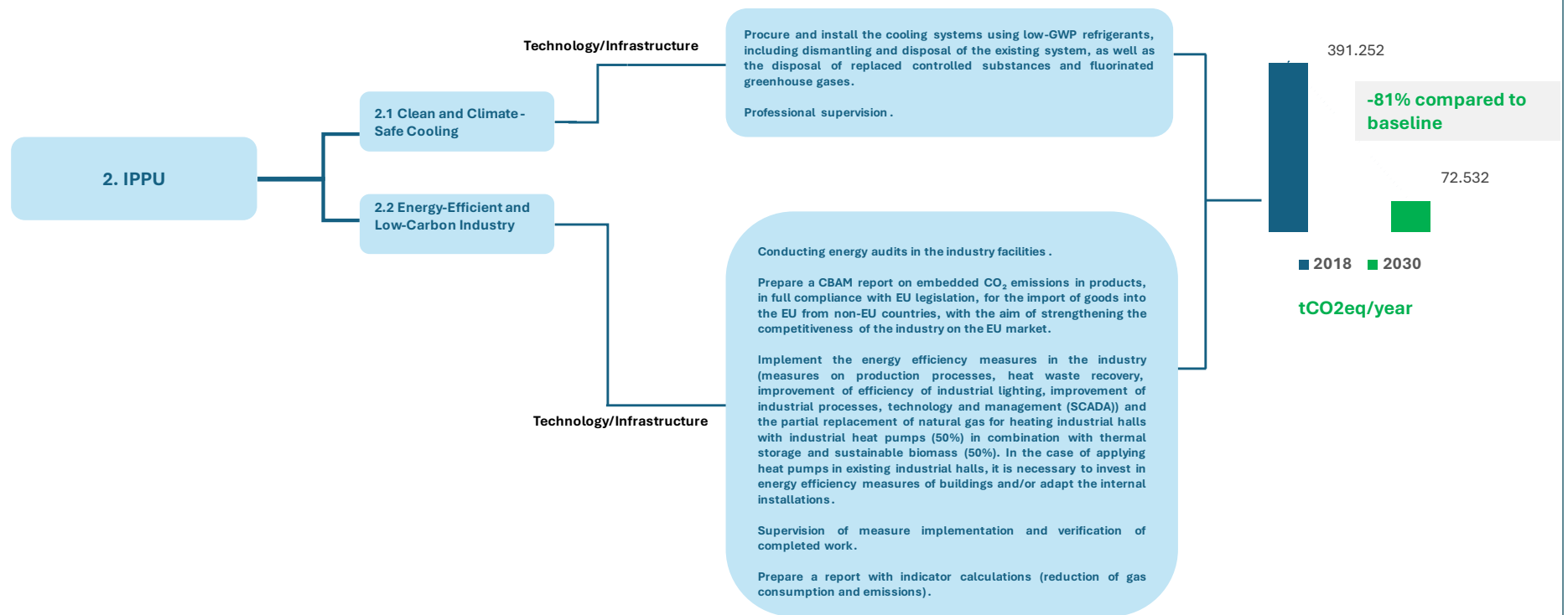
- **Reuse of waste heat** from industrial processes for space heating or process integration.
- **Modernization of industrial boilers and technological equipment** to improve performance and reduce energy losses.
- **Implementation of intelligent energy management systems** for real-time monitoring and optimization of energy use.
- **Thermal insulation upgrades** to reduce energy demand in industrial buildings and administrative facilities.
- **Installation of efficient lighting systems**, such as LEDs and occupancy-sensor-based lighting in production areas.
- **Reduction of air and steam leakages** to improve system efficiency and safety.

In parallel, the plan supports the gradual integration of **renewable energy technologies**—particularly **solar photovoltaic systems and heat pumps**—to provide clean, cost-effective energy for both thermal and electrical needs.



B-1.1: Description of impact pathways

These measures contribute to both **short-term emissions reductions** and the **long-term transformation** of Sarajevo’s industrial base toward sustainability. They also play a critical role in supporting climate-aligned economic growth by reducing exposure to fossil fuel volatility, cutting operational costs, and improving compliance with EU and international environmental standards.





B-1.1: Description of impact pathways

FUA Sarajevo **transport system** is heavily reliant on diesel-powered vehicles, making it a major source of pollution. Achieving net-zero emissions in Sarajevo's Functional Urban Area requires a fundamental shift in how people and goods move through the city. The **3. Mobility and Transport** component of the CNAP Net Zero plan outlines a comprehensive package of interventions aimed at reducing carbon emissions, promoting active and shared modes of transport, and transforming public mobility infrastructure for greater efficiency and sustainability.

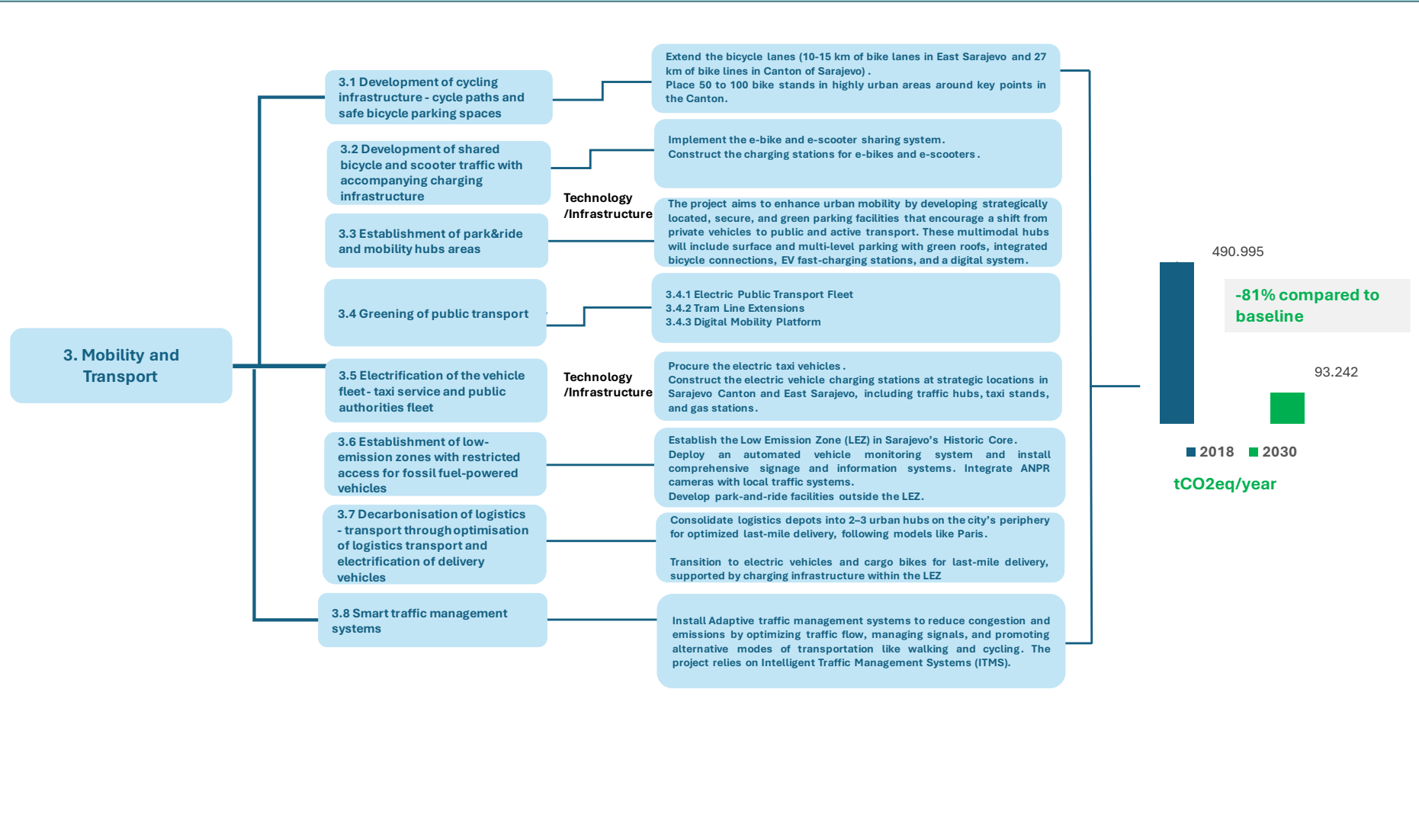
- The strategy begins with promoting **low-impact mobility** through the **3.1. development of cycling infrastructure**, including the expansion of dedicated cycle paths and installation of safe bicycle parking. This is complemented by the **3.2. Development of shared bicycle and scooter traffic** with accompanying charging infrastructure, supported by the deployment of charging stations to make shared micromobility a convenient and low-emission alternative for short trips.

To support multimodal connectivity, the plan includes the **3.3.1 establishment of park & ride facilities** at city entry points and **3.3.2 Mobility hubs in urban density areas**. The Park&Ride facilities will encourage commuters to leave their cars at the edge of the city and switch to low-emission public or shared transport, helping to reduce inner-city congestion and pollution. The mobility hubs serve as multimodal centres that integrate various transport modes in one location, such are: public transport, cycling, walking, car-sharing, e-scooters, taxis

- Central to the CNAP vision is the **3.4. greening of public transport**. This includes:
 - The **introduction of electric public transport vehicles** (3.4.1), including buses, trolleybuses, and trams, powered by modern charging infrastructure.
 - **Expansion of tram lines** (3.4.2) to underserved, densely populated areas such as Hrasnica, Dobrinja, and Šip, in accordance with the Urban Plan of Sarajevo Canton.
 - The launch of a **Digital Mobility Platform** (3.4.3) providing real-time travel information, journey planning, and e-ticketing for all mobility services—creating a seamless multimodal experience for users.
- The CNAP also emphasizes the **3.5. electrification of the vehicle fleet**, particularly for taxi transport and public-sector vehicles, underpinned by an expanded **electric vehicle charging network**.
- To further reduce air pollution and urban emissions, the plan foresees the **3.6. introduction of low-emission zones**, where access for fossil fuel-powered vehicles will be limited or restricted entirely.
- The strategy also addresses the carbon footprint of goods movement- **3.7. Decarbonisation of logistic transport** through 3.7.1 **Optimisation of logistics transport** through better planning and positioning of logistics centres, along with the 3.7.2 **deployment of electric delivery vehicles** thus minimizing emissions from urban freight transport.
- Finally, the entire system will be underpinned by **3.8. Smart traffic management systems**, using artificial intelligence, adaptive traffic signals, and real-time monitoring to reduce congestion, improve air quality, and enhance urban mobility efficiency.
- Together, these measures present a holistic approach to decarbonizing urban mobility, improving quality of life, and positioning Sarajevo as a forward-thinking, climate-resilient city.



B-1.1: Description of impact pathways





B-1.1: Description of impact pathways

Sarajevo's Functional Urban Area (FUA) is undertaking a fundamental shift in its approach to waste management—from a traditional linear system to a **circular economy model**. This transformation supports the city's climate neutrality goals by treating waste as a **valuable resource** rather than a burden. The strategy is rooted in prevention, reuse, and recycling, and guided by the EU waste hierarchy and zero-waste principles. To operationalize this vision, Sarajevo FUA will implement a series of targeted actions within the **4. Waste & Circular Economy** sector. At the core of Sarajevo's waste strategy is the launch of a **4.1. Zero-Waste Programme** that aims to reduce waste generation at the source while promoting the reuse and repair of goods. This initiative will foster **behavioural change** among residents, institutions, and businesses through:

- Awareness-raising campaigns,
- Financial and policy incentives, and
- Partnerships with civil society and the private sector.

The programme will introduce innovative urban initiatives such as **repair cafés**, **reuse hubs**, and **bring-your-own** campaigns to encourage citizens to actively participate in reducing waste. Ultimately, this action will establish the foundation for long-term waste prevention across all sectors.

To improve material recovery and reduce landfill dependence (**4.2 Increased Waste Recycling**), Sarajevo will **expand and modernize its recycling infrastructure**. Key interventions include:

- Improving **separation at source** through new sorting guidelines and bin systems,
- Investing in **modern collection vehicles and transport equipment**, and
- Upgrading recycling centres to process a wider variety of materials.

By increasing recycling rates, the city will not only reduce emissions from waste decomposition but also save energy and resources across the production-consumption chain.

Managing **special waste streams** like electronics, batteries, textiles, and bulky items remains a major challenge. To tackle this, Sarajevo FUA will implement **Localized Extended Producer Responsibility (EPR) schemes** that make manufacturers and importers responsible for the end-of-life management of their products. These schemes will:

- Encourage **eco-design** and circularity in product manufacturing,
- Create closed-loop systems for collection and recycling, and
- Promote **innovation and accountability** in waste management.

Local EPR implementation will be supported by a regulatory framework and monitoring mechanisms to ensure compliance and effectiveness.

The construction sector contributes significantly to urban waste. In response, Sarajevo will launch a **4.4 Circular Construction-and-Demolition-Waste (CDW) Programme** to:



B-1.1: Description of impact pathways

- Promote **selective demolition** and **reuse of materials**,
- Establish **secondary raw material markets**, and
- Embed circular principles into **urban planning and building codes**.

This programme will involve close collaboration with **developers, architects, and contractors**, ensuring that sustainable practices are mainstreamed into future construction activities. The result will be a significant reduction in resource extraction, landfill use, and associated emissions.

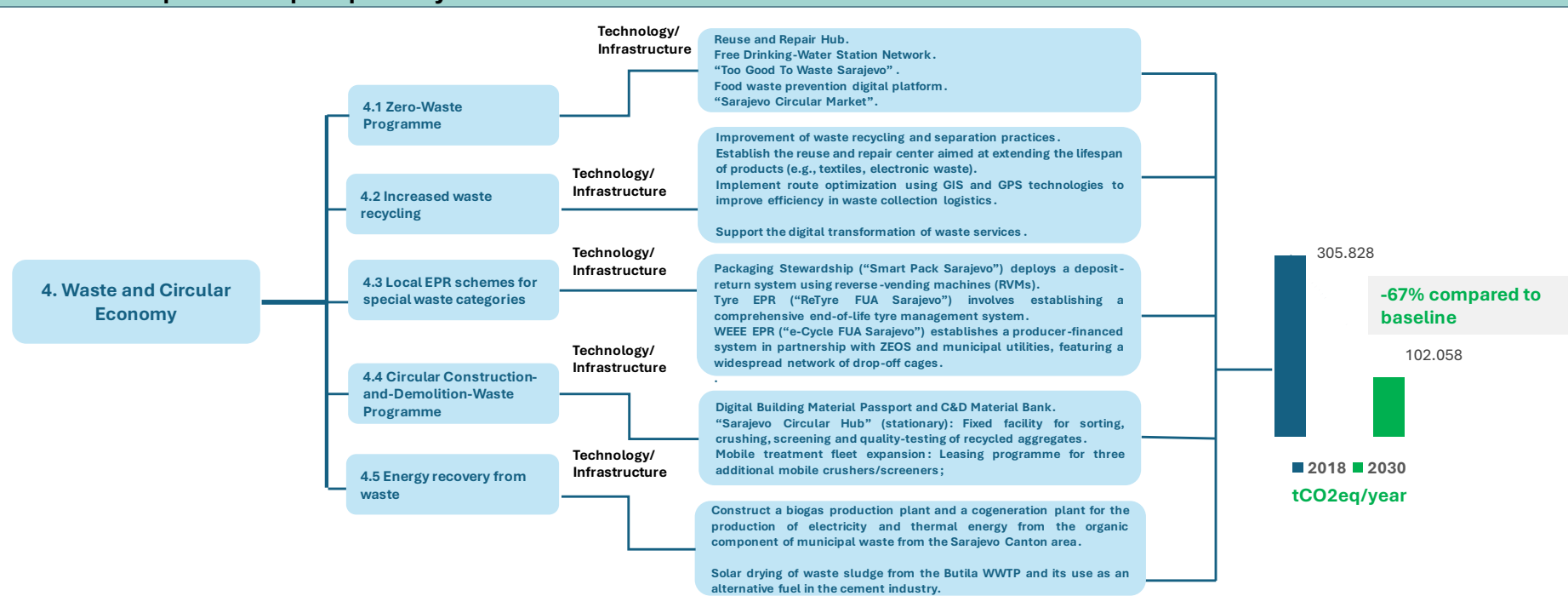
Recognizing that not all waste can be reused or recycled, Sarajevo will implement **4.5 Energy Recovery from Waste** processes for residual waste streams. This includes the development of **waste-to-energy facilities** that meet **strict EU environmental standards** and can:

- Convert waste into **electricity or heat**,
- Support **district heating networks**, and
- **Reduce fossil fuel consumption**.

Energy recovery will serve as the final step in the waste hierarchy, ensuring that all waste is utilized to its highest potential before final disposal. Together, these five actions form an **integrated waste and circular economy strategy** that strengthens Sarajevo's **climate resilience**, supports **resource efficiency**, and enhances **urban sustainability**. By closing material loops and investing in people, infrastructure, and innovation, Sarajevo FUA is building the foundation for a **regenerative, low-carbon urban economy**.



B-1.1: Description of impact pathways



The **agricultural sector** in Sarajevo’s Functional Urban Area (FUA) is a notable contributor to greenhouse gas emissions, primarily due to traditional manure management practices and fossil fuel-based energy use. In response, the Climate Neutral Action Plan (CNAP) introduces a comprehensive strategy for the **5.1. decarbonization of agriculture**, focused on integrating **renewable energy solutions** and promoting **circular resource use**. At the heart of this strategy is the development of an **anaerobic digestion (AD) facility** to convert livestock manure into **biogas**—a clean, renewable source of electricity and heat. This infrastructure will reduce methane emissions, displace fossil fuel consumption, utilize waste heat for farm operations, and recycle digestate as a biofertilizer, effectively closing the nutrient loop. To enable widespread adoption, the CNAP outlines:

- **Governance measures**, including feed-in tariffs or power purchase agreements (PPAs), streamlined permitting, and clear environmental guidelines.
- **Financial incentives**, such as targeted grants, favourable loans, and budget allocations to lower investment barriers.



B-1.1: Description of impact pathways

- **Capacity building efforts**, including training for plant operators, creation of dedicated operational structures, and support networks for ongoing technical assistance.

By combining infrastructure investment with supportive policy, financing, and skills development, Sarajevo FUA aims to reduce agricultural emissions, enhance rural energy independence, and support a transition toward a low-carbon, circular rural economy.

To address residual emissions, the Sarajevo Functional Urban Area (FUA) is adopting a strategic, nature-based approach focused on expanding natural carbon sinks and enhancing ecosystem services. These efforts are primarily captured under **Section 5.2: Green Infrastructure & Nature-Based Solution- Residual emission strategy**. In addition, these measures are integrated as cross-cutting priorities across other CNAP sectors. For example, the Mobility sector incorporates greening interventions at mobility hubs and park-and-ride facilities, while the Built Environment sector mandates green roofs and minimum green space requirements around new buildings, as defined by urban planning regulations. This integrated approach ensures that nature-based solutions contribute to climate neutrality, urban resilience, and overall environmental quality throughout the FUA. Key measures include: **5.2.1. Urban Greening** focuses on expanding tree cover, green roofs, and corridors in urban areas to mitigate heat islands, improve air quality, and increase biodiversity. The **5.2.2 Forest Land Restoration Program** aims to rehabilitate degraded forest ecosystems, reduce soil erosion, and enhance carbon sequestration, with a focus on sustainable forest management and community engagement. **5.2.3. Agroforestry for Carbon Sequestration** promotes the integration of trees into agricultural systems to improve soil health, enhance food security, and store atmospheric carbon in both trees and soils.

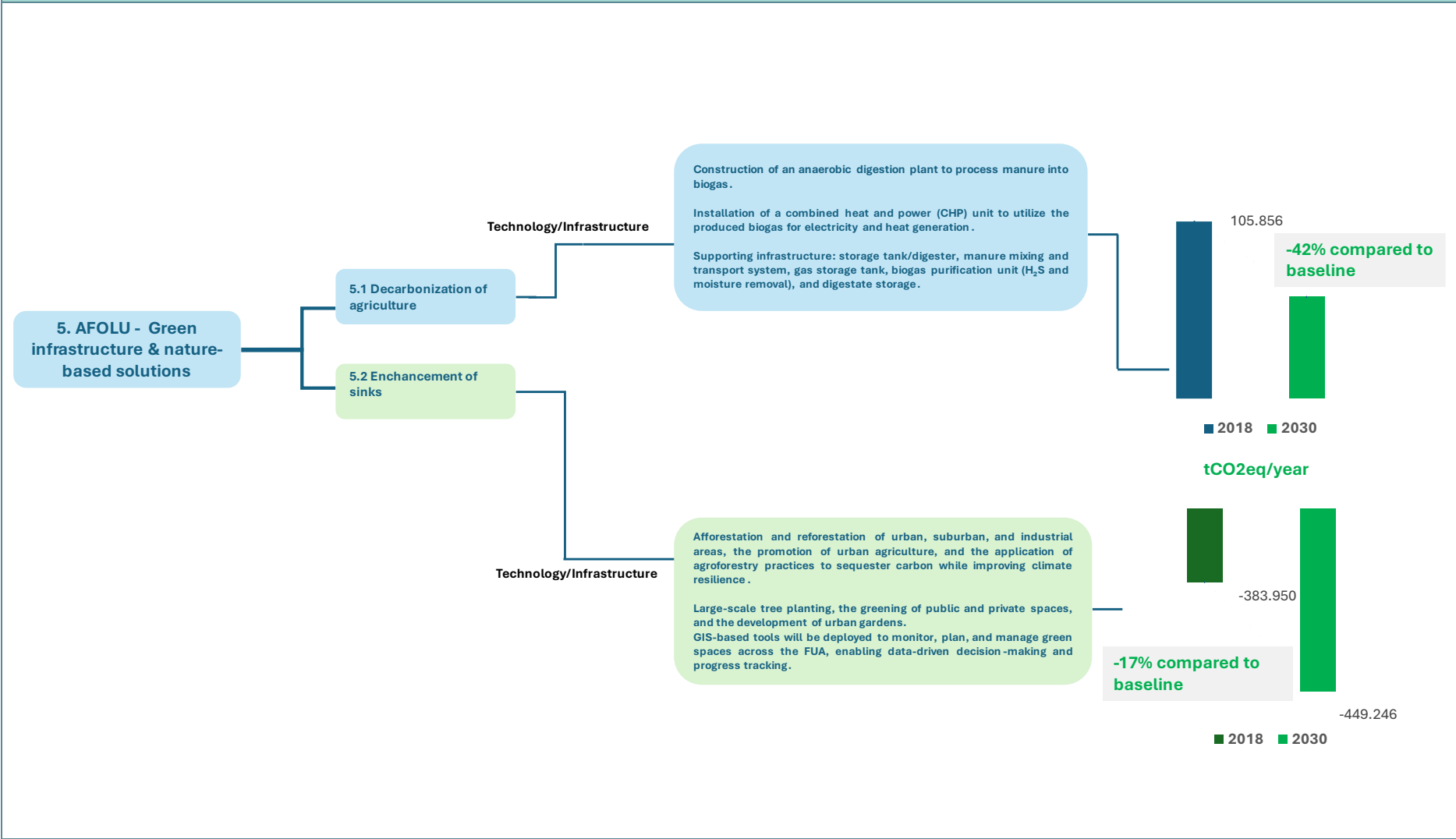
Complementing these are innovative urban interventions like **5.2.4 Urban Agriculture and Rooftop Beekeeping**, which utilize underused rooftops for food production and pollinator support, fostering biodiversity and food resilience in urban centres. The **5.2.5. A Fruit Tree in Every Yard Campaign** empowers citizens to plant fruit trees in homes, schools, and public spaces, creating microclimates, boosting nutrition, and encouraging grassroots participation in adaptation. Similarly, **5.2.6 Urban Gardens** provide space for community-led sustainable agriculture, improving access to healthy food, strengthening social cohesion, and offering low-cost adaptation options for vulnerable groups.

To ensure the sustainability of these land-based measures, CNAP includes the **5.2.7. Production of Planting Material for AFOLU Projects**—a strategy to develop high-quality nursery systems and planting material pipelines that support reforestation, agroforestry, and greening projects. Finally, the **5.2.8. Green Space Cadastre and Management System** introduces a geospatial platform for mapping and monitoring green assets in urban areas, supporting data-driven urban planning, ecosystem service management, and progress tracking of CNAP targets.

Together, these eight initiatives form a coherent package of nature-based solutions that align with CNAP's objectives to reduce climate risks, sequester carbon, restore ecosystems, and improve urban and rural resilience through inclusive, scalable, and locally relevant actions.



B-1.1: Description of impact pathways





B-1.1: Description of impact pathways

To accelerate Sarajevo's path to climate neutrality, the CNAP includes a dedicated innovation pillar focused on harnessing **digital technologies and participatory tools**. The following measures are designed to empower citizens, improve decision-making, and create smarter, more responsive urban systems. These interventions are presented under the **6. Digital and social innovation** portfolio:

6.1 Public Participation Innovations: A Digital Platform for Civic Engagement: Meaningful public participation is essential to the success of any climate transition. Sarajevo FUA will introduce a **dedicated digital platform for citizen engagement**, modelled on successful tools such as **Go Vocal**, to facilitate structured and transparent input from the public on climate and urban development policies. The platform will strengthen democratic governance, foster climate literacy, and ensure that local knowledge and preferences shape Sarajevo's transformation.

6.2 Smart Sarajevo: A Digital Twin for Climate Neutrality: A cornerstone of the innovation strategy is the development of the **Smart Sarajevo Digital Twin**, a real-time, data-integrated digital replica of the city that supports climate planning, scenario modelling, and impact assessment. The **Digital Twin** will:

- Integrate geospatial, environmental, and infrastructure data to simulate the effects of different CNAP interventions.
- Allow city planners to test low-emission transport routes, building energy retrofits, and green infrastructure placements before implementation.
- Monitor key climate metrics—such as air quality, emissions hotspots, energy consumption, and green space accessibility—across Sarajevo FUA.
- Support climate risk analysis and adaptive management through predictive tools and AI-based analytics.

By combining innovation in digital governance with participatory design, Sarajevo's Digital Twin will become a critical enabler of evidence-based climate action. It will also enhance transparency, accountability, and efficiency in the implementation of CNAP measures.

Regarding the time horizon, the impact pathways are designed to generate both short- and long-term benefits. In the short term, measures such as public awareness campaigns, legal reforms, data system development (e.g., GIS, waste registries), and pilot projects establish the foundation for more transformative change. These actions also build momentum and institutional readiness, helping to overcome the implementation barriers identified in the current state analysis.

In the long term, infrastructure development, regulatory overhauls, private sector engagement, and sustained investment across all key net-zero sectors—including renewable energy, sustainable mobility, energy efficiency in buildings, circular economy and waste management, low-emission agriculture and forestry, and climate-resilient industry—will deliver durable emissions reductions and systemic change. These comprehensive efforts will be essential not only for meeting the 2030 targets but also for sustaining climate neutrality well beyond that horizon.



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
1. Energy systems				
1.1 Built Environment/ Buildings and Heating				
<p>Technology/infrastructure</p>	<p>Conduct detailed feasibility studies for new boilers, pipelines, and heat substations.</p> <p>Facilitate the acquisition of grid connection approvals and supply contracts necessary for integrating heat pump systems into the district heating network (Butile, Ilidža, Vogošća, Hrasnica and Mojmiilo).</p> <p>Ensure the utilization of geothermal energy sources and their integration into existing or new heating systems wherever technically and economically feasible.</p>	<p>Sustainable Heating Systems:</p> <p>Construct a biomass cogeneration plant in Sokolac which will be connected to an expanded district heating network.</p> <p>Construct a biomass-based district heating system in Pale.</p> <p>Construct a district heating system in Hrasnica based on geothermal heat pumps, with a biomass-powered plant serving as a backup source.</p> <p>Install the water-to-water heat pumps across Butile, Ilidza, Vogosca and Mojmiilo settlements.</p> <p>Energy Efficiency Improvements:</p> <p>Retrofitting individual houses and buildings and upgrading thermal insulation, replace doors and windows to reduce energy losses and heating costs. Apply reflective or green roof technologies to reduce heat absorption, improve insulation, and manage stormwater.</p>	<p>692,196.73</p>	<p>Improved air quality (reduced air pollution).</p> <p>Reduced use of coal, firewood, and heating oil in households.</p> <p>Lower heating costs.</p> <p>Enhanced the overall efficiency and flexibility of the district heating system.</p> <p>Reduced cost of thermal energy production.</p> <p>Decreased dependence on energy sources.</p> <p>Reduced electricity and maintenance costs.</p> <p>Lower environmental impact due to energy-efficient solutions</p> <p>Improved indoor thermal comfort.</p>



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
1. Energy systems				
		<p>Install the smart meters and implementation of advanced digital monitoring systems in district heating systems, including SCADA, to optimize energy consumption and detect inefficiencies in real time (Istocno Novo Sarajevo, Sarajevo Canton, Pale, Sokolac).</p> <p>Installation of smart street lighting for energy efficiency and sustainability.</p> <p>Low carbon construction Promote use of sustainable, low embodied-carbon construction materials and low carbon construction methods during retrofits.</p> <p>Introduce and enforce NZEB (Nearly Zero-Energy Building) standards for all new constructions and major renovations.</p>		<p>Precise billing based on actual individual consumption through metering.</p> <p>Increased user satisfaction and transparency in energy use.</p>
Governance and Policy	<p>Secure necessary urban planning, environmental, and construction permits for upgrading networks and facilities in Sarajevo Canton and Republika Srpska.</p> <p>Introduce a phased ban on coal use for heating to reduce air pollution and carbon emissions.</p> <p>Address ownership issues in key infrastructure companies (e.g., BAGS d.d.) and ensure proper legal conditions for investment and expansion.</p>			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
1. Energy systems				
	<p>Enforce minimum technical standards for stoves and boilers to ensure only efficient and clean appliances are circulated and installed.</p> <p>Develop laws for the design and installation of individual heating systems, linked to occupancy permits, and a dedicated legal act regulating the chimney-sweeping profession.</p> <p>Amend planning documents to designate district heating areas, ensuring new buildings are connected and reducing inefficient individual heating systems.</p> <p>Amend regulations for multi-apartment buildings to lower the threshold for decision-making on energy retrofitting investments from unanimous consent to 60%.</p> <p>Enhance the regulatory and planning framework — including urban planning, land-use, urban design, and building codes — to facilitate a systemic shift towards energy-efficient buildings and a decarbonised built environment.</p>			
Finance and Funding	Establish municipal-level financing models with defined criteria, funding methods,			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
1. Energy systems				
	<p>monitoring, and verification processes for the replacement of individual coal and wood heating systems.</p> <p>Enable financial participation of local self-governments (JLS) in the cost of construction materials for insulating individual residential buildings through invoicing.</p> <p>Provide material subsidies directly to individuals for private homes, with installation costs covered by the beneficiaries.</p> <p>Create a central database to track types and statuses of heating systems, enabling targeted interventions and policy planning.</p>			
Learning and Capabilities	<p>Employ eco-advisors to directly engage with citizens, providing guidance on the advantages and benefits of solar panels and heat pumps. Launch educational campaigns on the impacts of particulate emissions and the benefits of switching to climate neutral heating solutions.</p> <p>Disseminate information on energy savings and available programs through utility bill inserts and public campaigns.</p>			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
1. Energy systems				
	<p>Provide training for construction and design companies on energy-efficient building and heating system design to improve standards across new developments.</p> <p>Strengthen staff capacities, provide necessary space and equipment for successful project management and monitoring.</p> <p>Integrate ecological and energy literacy into the formal education system, introducing relevant content in primary and secondary curricula and organizing creative school activities such as workshops and competitions.</p> <p>Collaborate with NGOs to deliver community-based energy education and awareness initiatives. This includes setting up a free advisory service for citizens, publishing informative materials, organizing workshops and public forums, and engaging volunteers through seasonal campaigns.</p>			
1.2 Electricity				



<p>Technology/infrastructure</p>	<p>Require integration of all larger generation facilities (>23 kW) into SCADA systems for real-time grid management. Invest in smart grid infrastructure to support decentralized RES and two-way energy flow.</p> <p>Strengthen grid infrastructure to accommodate increased generation from PVPPs, WPPs, and IPPs.</p> <p>Promote smart grid investments, automated substations, and the restructuring of networks into microgrids.</p> <p>Introduce energy storage solutions, particularly in public institutions.</p>	<p>Renewable Energy Deployment:</p> <p>Install the PVPPs on public/private buildings, industries, shopping centres, hotels, and households in FUA Sarajevo to diversify the energy mix and reduce reliance on fossil fuels.</p> <p>Install the large-scale PVPPs and wind power plants.</p> <p>Upgrade of electricity grid:</p> <p>Reconstruction of outdated sections of the distribution network, with capacity upgrades of 10(20)/0.4 kV distribution substations in locations experiencing increased electricity production and consumption.</p> <p>In suburban areas of the FUA, electricity generation from RES is expected to exceed local consumption. To accommodate this surplus and enable its transfer to urban centres, the MV network should be upgraded from 10 kV to 20 kV. Most existing transformers in suburban networks, that have not yet transitioned to 20 kV, are 10/20 kV switchable transformers, which once network adjustments are made, can be converted to 20 kV, thereby increasing distribution capacity.</p> <p>Deployment of smart technologies and systems, including smart electricity meters, AMI, SCADA systems, DSM platforms, power quality monitoring, automated substations, and energy storage solutions integrated with photovoltaic systems (PVPP–battery hybrids).</p> <p>Grid modelling of key MV areas to identify congestion points and prioritize network reconstruction and capacity enhancement. The modelling should consider electricity</p>	<p>991,543.28</p>	
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		<p>generation, energy injection from neighbouring transformer zones, and local consumption patterns.</p> <p>Integration of large-scale generation facilities (WPP and PVPP) will require the construction of new X/110 kV substations at generation sites.</p> <p>Development of local microgrids for decentralized electricity generation and consumption, where technical conditions allow, ranging from individual households to buildings, neighbourhoods, and entire communities.</p> <p>Advancement of DSM mechanisms to enable flexible and responsive energy consumption, including the use of multi-tariff systems and automated demand control.</p> <p>Implementation of smart grid components in line with international standards, such as the integration of ICT, AMI systems, EV charging infrastructure, advanced customer-side energy management systems, and real-time monitoring and control capabilities across the grid.</p>		
<p>Governance and Policy</p>	<p>Amend legal regulations to exempt PVPPs on existing buildings from urban planning and construction permits.</p> <p>Simplify and centralize permitting ("one-stop-shop" system) for faster approvals.</p> <p>Establish simplified grid-connection procedures for PVPPs and energy communities.</p>	<p>Updating spatial plans to support energy development.</p> <p>Alignment with the National Energy and Climate Plan and entity-level renewable energy laws.</p> <p>Development of a regulatory framework for microgrids and for managing energy production and consumption.</p>		<p>Enhanced active participation of individuals in the energy transition.</p> <p>Improved grid efficiency and flexibility</p> <p>Reduced reliance on conventional energy sources and fossil fuels.</p> <p>Lower electricity costs.</p>



	<p>Amend concession laws and spatial plans to facilitate PVPP and WPP development.</p> <p>Enable electricity sharing and surplus sales through regulatory updates.</p> <p>Provide technical assistance and streamlined permitting for rooftop PVPP installation.</p> <p>Prohibit commercial photovoltaic installations on high-quality agricultural land (Category P1 and P2), emphasizing caution with agrivoltaics to preserve arable land for food production.</p>			<p>Job creation in the renewable energy sector.</p>
Finance and Funding	<p>Establish cantonal and municipal funds for household prosumers and energy communities (grants, subsidies, low-interest loans).</p> <p>Offer financial incentives (tax breaks, grants, loans) for RES and WPP projects.</p>	<p>Participatory models for involving communities and consumers in energy projects.</p>		
Learning and Capabilities	<p>Conduct campaigns to promote PVPPs, WPPs, energy communities, and the benefits of smart meters and smart grids.</p> <p>Promote best-practice examples to inspire replication and scale-up.</p>	<p>Training of local authorities and technical personnel.</p>		



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
2. IPPU				
2.1 Clean and climate-safe cooling				
Technology/infrastructure	<p>Prepare the project documentation for the execution of cooling system replacement works.</p> <p>Implement the energy audits.</p> <p>Plant trees and establish a maintenance process</p>	<p>Procure and install the cooling systems using low-GWP refrigerants, including dismantling and disposal of the existing system, as well as the disposal of replaced controlled substances and fluorinated greenhouse gases.</p> <p>Professional supervision.</p>	67,746.78	<p>Improved energy efficiency and lower electricity consumption.</p> <p>Enhanced indoor comfort.</p>
Governance and Policy	<p>Implement the phased HFC reduction plan (2024-2030), considering energy-efficient and climate-friendly technologies.</p> <p>Align procurement policies with Kigali Amendment and national F-gas regulations, mandating the use of low-GWP alternatives.</p> <p>Establish clear permitting, compliance, and verification protocols for dismantling and disposal procedures.</p> <p>Mandate technician certification and licensing requirements for refrigerant handling.</p> <p>Include tree planting in plans</p>			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
2. IPPU				
Finance and Funding	Leverage climate finance and green bonds from international donors (e.g., GEF, GCF) or development banks focused on HFC phase-down.			
Learning and Capabilities	Educate the companies on energy-efficient technologies and cooling system management. Training programs for technical personnel on the maintenance and proper handling of new cooling systems.			
2.2 Energy efficient and low-carbon industry				
Technology/infrastructure	Conducting energy audits in the industry facilities. Prepare a CBAM report on embedded CO ₂ emissions in products, in full compliance with EU legislation, for the import of goods into the EU from non-EU countries, with the aim of strengthening the competitiveness of the industry on the EU market.	Implement the energy efficiency measures in the industry (measures on production processes, heat waste recovery, improvement of efficiency of industrial lighting, improvement of industrial processes, technology and management (SCADA)) and the partial replacement of natural gas for heating industrial halls with industrial heat pumps (50%) in combination with thermal storage and sustainable biomass (50%). In the case of applying heat pumps in existing industrial halls, it is necessary to invest in energy efficiency measures of buildings and/or adapt the internal installations. Supervision of measure implementation and verification of completed work.	38,982.36	Improved indoor thermal conditions support higher worker productivity and reduce sick leave-related costs. Enhanced competitiveness of industrial production and created favourable conditions for raising workers' wages.



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
2. IPPU				
		Prepare a report with indicator calculations (reduction of gas consumption and emissions).		
Governance and Policy	<p>Develop mandatory or incentivized energy audits and require implementation of identified cost-effective measures.</p> <p>Set performance standards or minimum energy performance requirements (MEPRs) for industrial processes, lighting, and heating systems.</p>			
Finance and Funding	Develop a model with criteria for granting incentives (incentives refer to conducting audits and grant co-financing of measure implementation).			
Learning and Capabilities	<p>Conduct sector-specific training for plant engineers, energy managers, and operators on process efficiency and hybrid heating systems.</p> <p>Document case studies and best practices to facilitate replication across industries.</p> <p>Support collaborative R&D with technology providers to optimize solutions for local industrial contexts.</p>			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
3. Mobility & transport				
3.1 Development of cycling infrastructure - cycle paths and safe bicycle parking spaces				
Technology/infrastructure		Extend the bicycle lanes (10-15 km of bike lanes in East Sarajevo and 27 km of bike lines in Canton of Sarajevo). Place 50 to 100 bike stands in highly urban areas around key points in the Canton.	21,530.67	Achieve the 'Modal Split' target, aiming for a balanced distribution of 30% public transport, 30% private vehicles, and 30% active mobility (cycling and walking). Reduced need for motorized passenger transport. Increased use of personal and shared bicycles. Greater adoption of intermodal travel options.
Governance and Policy	Establish clear legal frameworks that set comprehensive safety standards, define speed limits, and regulate the use of micromobility vehicles to ensure safe and efficient integration into the urban transport system.			
Finance and Funding	Cantonal and Municipal Budget World Bank (via Sustainable Mobility Program) Engage private sector partners for co-financing bicycle parking stations, shelters, or smart bike racks, especially near retail,			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
3. Mobility & transport				
	business parks, or transport hubs. Explore CSR contributions or branding/sponsorship agreements for high-visibility bike parking areas (e.g. "Company X Green Bike Hub").			
Learning and Capabilities	Educating citizens about the environmental, health, and economic benefits of cycling and public transport serves as a central component in promoting sustainable mobility.			
3.2 Development of shared bicycle and scooter traffic with accompanying charging infrastructure				
Technology/infrastructure		Implement the e-bike and e-scooter sharing system. Construct the charging stations for e-bikes and e-scooters.	2.080,40	Reduction of GHG emissions Increased Modal Shift Toward Active and Low-Carbon Mobility Increase in the number of users adopting intermodal travel Growth in the use of e-bikes and e-scooters due to the increased number of charging stations Improved Air Quality and Public Health Outcomes



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
3. Mobility & transport				
				Economic Development and Green Job Creation Shift to public & non-motorized transport
Governance and Policy	Establish clear legal frameworks that set comprehensive safety standards, define speed limits, and regulate the use of micromobility vehicles to ensure safe and efficient integration into the urban transport system.			
Finance and Funding	Consider PPP model with clear service-level agreements and shared revenues. Sponsorship and co-branding for public bike/scooter stations, especially near universities, parks, or business districts. Cantonal Environmental Protection Fund & Ministry of Transport Budget Tourism or Health Promotion Funds			
Learning and Capabilities	Public awareness campaign on sustainable mobility.			
3.3 Establishment of park & ride and mobility hubs areas				
Technology/infrastructure	3.3.1 Park & Ride Facilities Development:	3.3.1 Park & Ride Facilities Development: Construction of park-and-	10,277.29	Reduced Traffic and Emissions – Fewer cars in



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
3. Mobility & transport				
	<p>Identification of P&R sites at key urban entry points and public transport nodes (e.g. tram, BRT, bus lines).</p> <p>Prepare design documentation for P&R, obtain permits</p> <p>Identify key mobility hub locations and design them to support seamless multimodal transportation, integrating connections with existing and planned bicycle paths to promote active mobility options. Obtain permits.</p>	<p>ride facilities outside the LEZ (e.g., Dobrinja trolleybus station, Sarajevo Bus/Train Station, Ilidža district), and implement a unified ticketing system for public transport.</p> <p>Inclusion of EV parking spots and charging infrastructure.</p> <p>Apply permeable pavements green roofs and green landscaping to reduce runoff and urban heat.</p> <p>3.3.2 Mobility Hubs Facilities Development:</p> <p>Develop dedicated mobility hub spaces and equip them with essential infrastructure, including secure bicycle facilities, electric vehicle (EV) charging stations, public transport platforms, and designated zones for shared mobility services such as e-bikes, e-scooters, and car-sharing.</p> <p>Implement a comprehensive digital information and security system to provide real-time updates, facilitate user convenience, and enhance overall security across the parking and mobility network.</p>		<p>the city centre will ease congestion and lower pollution, supporting the Low Emission Zone (LEZ) with a significant shift to public & non-motorized transport while also contributing to increased carpooling.</p> <p>Better Public Transport – Higher Park & Ride usage will increase demand, leading to more frequent and reliable tram, bus, and trolleybus services.</p> <p>More Parking Availability – Redirecting commuters to designated Park & Ride locations will free up central parking spaces and reduce illegal parking.</p> <p>Cost Savings and Convenience – Lower parking fees, fuel savings, and integrated ticketing will make public transport a more attractive alternative.</p> <p>Improved Urban Mobility – Seamless connections between cars, public transport, and micromobility will support Sarajevo's long-term</p>



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
3. Mobility & transport				
				sustainable transport goals.
Governance and Policy	<p>A clear legal framework will be established to regulate the operation of Park & Ride / mobility hub facilities, including zoning laws, pricing policies, and user incentives.</p> <p>Regulations needed to define parking fees, duration limits, and discounts for commuters using public transport. Amendments to local transport laws will ensure seamless integration with existing public transport systems and the newly proposed LEZ regulations.</p>			
Finance and Funding	<p>A PPP model may be introduced to allow private investors to participate in the financing, maintenance, and management of Park & Ride facilities. This approach will reduce the financial burden on public authorities while ensuring efficient and sustainable operation under municipal oversight.</p>			
Learning and Capabilities	<p>A comprehensive public awareness campaign will be launched to educate commuters about the</p>			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
3. Mobility & transport				
	benefits of Park & Ride/ mobility hubs			
3.4 Greening of public transport				
Technology/infrastructure	<p>Install green roofs at bus stations</p> <p>Plant trees and understory vegetation around bus stations and charging hubs</p> <p>Feasibility studies and detailed technical designs for track extensions (Ilidža–Hrasnica, Šip, Dobrinja).</p> <p>Feasibility study to explore the possibility of building vertical transport systems in locations such as Žuč, Hum, and Sedrenik.</p> <p>Preparation of spatial planning amendments to reflect new infrastructure and integrate sustainable mobility corridors.</p>	<p>3.4.1 Electric Public Transport Fleet: A new generation of electric trolleybuses, trams, and buses will be introduced to reduce emissions and noise in the city. - Procure the smaller electric buses for urban routes and more challenging terrains (replacement of 15 older buses Euro standards 1 and 2 in East Sarajevo)</p> <p>Procure the 10 electric minibuses, 20 electric buses (including 3 electric solo buses provided through a World Bank pilot project), and 10 new trolleybuses for extended lines to Vogošća (Sarajevo Canton).</p> <p>Construct and install the charging stations for electric vehicles.</p> <p>3.4.2 Tram Line Extensions: To improve accessibility in high-density neighbourhoods, new tram lines will be constructed to connect areas such as Hrasnica, Dobrinja, and Šip, aligning with the Urban Plan for Sarajevo Canton.</p> <p>3.4.3 Digital Mobility Platform: A comprehensive Digital Mobility Platform will offer real-time information on all public transport and shared mobility</p>	133,107.30	<p>Improved public transport quality</p> <p>Increased network connectivity and coverage</p> <p>Enhanced service capacity and quality</p> <p>Promoted micromobility</p> <p>Reduced waiting times for public transport.</p> <p>Improved public transport connectivity between</p>



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
3. Mobility & transport				
		options (buses, trams, e-bikes, e-cars, etc.). This one-stop platform will enable multimodal journey planning, electronic payments, and service alerts, enhancing convenience and connectivity		<p>Sarajevo Canton and East Sarajevo</p> <p>Encouragement for users to switch from private cars to public transport, reducing road congestion</p> <p>Enhanced connectivity within the Sarajevo metropolitan area</p> <p>Decreased need for motorized passenger transport</p> <p>Increased carpooling</p> <p>Better integration of public transport with industrial areas</p>
Governance and Policy	<p>Develop the public-private partnership model and public transport integration model.</p> <p>Aligning legal and regulatory frameworks between the two administrative areas and establishing the necessary legal frameworks.</p> <p>Adjustments to spatial planning documentation and</p>			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
3. Mobility & transport				
	<p>updating land-use plans in the transition zone between the cities to enable the construction of the necessary infrastructure.</p> <p>Adjustments to spatial planning documentation to allow the construction of new tram tracks and electric vehicle charging stations,</p> <p>Adjustments of construction laws to simplify permitting procedure for charging infrastructure</p> <p>Implement the collaboration between municipal authorities, public transport bodies, and other relevant institutions and develop the joint strategies for integrating transport systems.</p>			
Finance and funding	<p>To support the implementation of electric public transport, tram extensions, integrated ticketing, and a digital mobility platform in Sarajevo FUA, a blended finance model will be used, combining EU grants (IPA III, Horizon Europe, EU4Green), concessional</p>			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
3. Mobility & transport				
	loans from international financial institutions (EBRD, EIB, World Bank), municipal and cantonal budget contributions, and strategic public-private partnerships, particularly for fleet operation, smart ticketing, and digital services.			
Learning and Capabilities	Public awareness campaign on sustainable transport options Develop a training programme for drivers, technical staff, and operators who will manage the new vehicles and infrastructure.			
3.5 Electrification of the vehicle fleet- taxi service and public authorities' fleet				
Technology/infrastructure	Construct the electric vehicle charging stations at strategic locations in Sarajevo Canton and East Sarajevo, including traffic hubs, taxi stands, and gas stations.	Procure the electric taxi vehicles and public authority vehicles	1,425.77	Improved air quality and noise reduction Promoted of sustainable transport Improved infrastructure
Governance and Policy	Establish a comprehensive monitoring system to track the number of electric taxis in operation, associated CO ₂ emission reductions, and user satisfaction levels.			
Finance and funding	Municipal, City and Cantonal budget for			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
3. Mobility & transport				
	procurement of institutional fleet. Develop financial incentives for both electric taxi users and operators to encourage the adoption of electric vehicles, highlighting their environmental and economic benefits.			
Learning and Capabilities	Organize workshops for taxi operators and associations on EV operations, charging logistics, incentives, and maintenance savings Upskill cantonal, municipal and city maintenance teams and mechanics in EV diagnostics, repair, and battery management.			
3.6 Establishment of low-emission zones with restricted access for fossil fuel-powered vehicles				
Technology/infrastructure		Establish the Low Emission Zone (LEZ) Deploy an automated vehicle monitoring system to enhance real-time tracking, operational efficiency, and data-driven decision-making. Install comprehensive signage and information systems. Expand the pedestrian and cycling infrastructure within the LEZ. Integrate ANPR cameras with local traffic systems, establish data-sharing	58,725.91	Cleaner air and better health Less traffic congestion Improved urban environment Electrification of cars, motorcycles, buses and trucks Optimized logistics



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
3. Mobility & transport				
		agreements for enforcement, develop an online portal for vehicle eligibility and fee payment, and gradually introduce penalties, starting with warnings before fines.		
Governance and Policy	<p>Develop the traffic regulation models for the LEZ (restriction and payment model).</p> <p>Amendments to local traffic laws to define LEZ rules, enforcement mechanisms, and penalty systems.</p> <p>Harmonization with national and EU environmental policies, ensuring compliance with best practices and potential funding opportunities.</p> <p>Develop a legal basis for fee collection, enabling transparent and enforceable charges for vehicle access.</p> <p>Create a governing body for the LEZ tasked with overseeing administration, monitoring, and system updates.</p> <p>Integrate LEZ with existing traffic and parking policies to</p>			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
3. Mobility & transport				
	avoid congestion in surrounding areas.			
Finance and Funding	<p>Public budget in combination with donor assistance for Feasibility studies, technical planning, regulatory design, initial infrastructure setup.</p> <p>IFIs Co-financing of digital enforcement infrastructure (e.g., ANPR cameras, signage)</p> <p>Public investment in road marking, signage, planning, and public outreach and maintenance</p> <p>Income is expected through fees for non-compliance or temporary fossil vehicle access, enabling reinvestment.</p>			
Learning and Capabilities	Launch information campaigns to educate drivers, residents, and businesses on LEZ goals, benefits, rules, fees, and provide clear access via online resources, mobile apps, and a pilot phase with public consultation for feedback.			
3.7 Decarbonisation of logistics - transport through optimisation of logistics transport and electrification of delivery vehicles				



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
3. Mobility & transport				
<p>Technology/infrastructure</p>	<p>Prepare a feasibility study for selection of optimized model</p>	<p>3.7.1. Consolidate logistics depots into 2–3 urban hubs on the city’s periphery for optimized last-mile delivery, following models like Paris.</p> <p>3.7.2. Transition to electric vehicles and cargo bikes for last-mile delivery, - Deploy dedicated EV charging stations at key logistics points and urban consolidation hubs, prioritizing fast-charging DC stations and ensuring compatibility with various van models.</p> <p>Develop smart logistics infrastructure with dedicated delivery zones and real-time data for efficient traffic flow, inspired by Stockholm and Barcelona.</p>	<p>8,959.96</p>	<p>Reduced Air Pollution: significant cut of NOx, SOx, and particulate matter.</p> <p>Noise Reduction</p> <p>Operational Cost Savings: EVs have lower maintenance and fuel costs.</p> <p>Market Development & Innovation: Stimulates growth in clean-tech sectors (EV infrastructure, battery storage, logistics software) and creates demand for skilled green jobs.</p> <p>Business Efficiency: A coordinated logistics platform improves routing and delivery timing, reducing delays, congestion, and fuel use—even for non-electric fleets.</p> <p>Improved Public Health: lower respiratory and cardiovascular disease risks,</p> <p>Increased Quality of Life: Quieter, cleaner streets enhance well-being for residents,</p>



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
3. Mobility & transport				
Governance and Policy	<p>Adjust spatial planning documentation to selected locations</p> <p>Enforce the Low Emission Zone (LEZ), limiting access to electric and low-emission vehicles during core delivery hours, supported by ALPR and real-time emissions monitoring.</p> <p>Establish a legal framework for urban consolidation, incentivizing collaboration among logistics providers through policies like reduced urban tolls or tax breaks, as seen in Vienna.</p>			
Finance and funding	<p>Private capital</p> <p>Consider potential public subsidizing to encourage purchase of electric vans,</p> <p>Facilitate public-private partnerships (PPPs) for charging infrastructure development and maintenance, ensuring accessibility and reliability.</p> <p>Integrate electric delivery vehicles into the LEZ framework, with exclusive access during peak hours and reduced fees to</p>			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
3. Mobility & transport				
	encourage fleet electrification.			
Learning and Capabilities	Promote digital tools and coordination platforms for smart logistics, supporting route optimization and real-time tracking to reduce urban freight traffic. Implement workforce training programs for electric vehicle operation and safety to support the transition to electric delivery fleets.			
3.8 Smart traffic management systems				
Technology/infrastructure	Prepare a feasibility study and project documentation for the system Obtain necessary permits	Install Adaptive traffic management systems to reduce congestion and emissions by optimizing traffic flow, managing signals, and promoting alternative modes of transportation like walking and cycling. The project relies on Intelligent Traffic Management Systems (ITMS).		Reduced greenhouse gas (GHG) emissions and improved air quality : Smoother traffic flow lowers fuel consumption and emissions from idling and stop-start driving. Supports public transport use and transition to e-mobility: Integrated systems can prioritize electric vehicles or public transport lanes, reinforcing low-emission strategies.
Governance and Policy	Adapt legislation to support the application of AI in traffic management. Collaborate with local authorities and regulatory			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
3. Mobility & transport				
	bodies for the implementation of new technologies. Ensure protection of privacy regarding data collected through sensors and cameras.			
Finance and Funding	Education for users and operators about new technologies and systems			
Learning and Capabilities	Train local technical staff on system maintenance and upgrades Build in-house capabilities for troubleshooting and optimization			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
4. Waste & circular economy				
4.1 Zero-Waste Programme				
Technology/infrastructure	<p>Free Drinking-Water Station Network. Restore existing fountains and install new water stations at high-footfall locations, supported by the “Bring-Your-Bottle” campaign; QR-codes record litres dispensed to estimate PET bottles avoided.</p> <p>“Sarajevo Circular Market”. B2B/B2C application for exchanging surplus materials, C&D off-cuts and equipment.</p>	<p>Reuse and Repair Hub. Convert an existing municipal warehouse into a “Reuse Lab” for functional goods (furniture, appliances); hold weekly repair workshops (Saturday repair-café) and sell refurbished items at symbolic prices.</p> <p>“Too Good To Waste Sarajevo”. Digital platform linking grocery stores and restaurants with food banks; utilities grant fee rebates to participating outlets.</p>		
Governance and Policy	<p>Green Public Procurement (GPP). Revise the cantonal/municipal procurement rulebooks so that multi-use or recycled packaging scores extra points; introduce a minimum recycled-content requirement in promotional materials and office paper; oblige cleaning and catering contracts to deliver without single-use plastic etc.</p> <p>Local Ban on Single-Use Plastics. City/Canton council decision prohibits distribution of plastic straws, cups and tableware at all publicly funded institutions and events.</p>	<p>Draft and adopt a Waste-Prevention and Reduction Programme with a five-year Action Plan for the FUA, including quantified KPIs, responsible entities and financing lines.</p> <p>Sign cooperation agreements with retailers, food-service associations and ICT firms for platform maintenance and voucher co-funding.</p> <p>Mandate public-event organisers to submit waste-prevention plans and disclose results in the WMIS.</p>		
Finance and Funding	<p>Introduce a cantonal incentive package for zero-waste start-ups (micro-grants, access to municipal premises).</p>			
Learning and Capabilities	<p>Zero-Waste Business Certification. Voluntary bronze-silver-gold scheme with waste-prevention criteria for companies, showcased at the events such as Sarajevo Trade Fair.</p>			
4.2 Increased waste recycling				



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
4. Waste & circular economy				
<p>Technology/infrastructure</p>	<p>Introduce the separate waste collection (green islands, dual-bin system, composters, recycling yards and recycling machines based on deposit scheme) along with the procurement of vehicles for separately collected waste.</p> <p>Establish the reuse and repair center aimed at extending the lifespan of products (e.g., textiles, electronic waste).</p> <p>Upgrade of the existing sorting facility at RCUO Smiljevići (Sarajevo Canton) with components to ensure high-efficiency separation (magnetic separators, near-infrared separators, air classifiers) and construction of a new sorting facility for recyclable waste in the area of East Sarajevo.</p> <p>Procurement of mechanical recycling equipment for construction waste, to be operated by the private sector, with the aim of enhancing source separation and recycling efforts, ultimately reducing the volume of construction waste sent to landfill.</p> <p>Develop and maintain a GIS database for green islands and recycling yards, enabling data-driven waste management.</p> <p>Implement route optimization using GIS and GPS technologies to improve efficiency in waste collection logistics.</p> <p>Support the digital transformation of waste services, including the creation of a waste exchange platform to enhance the market for secondary raw materials.</p>	<p>Construct a landfill area in East Sarajevo, short-term in nature, until a functional separate waste collection system is established.</p>	<p>67,746.78</p>	<p>Improved public health and hygiene</p> <p>Increased share of separately collected waste</p> <p>Better quality of secondary raw materials.</p> <p>Creation of new business opportunities with added value as well as green jobs.</p> <p>Lower environmental impact due to more efficient waste management.</p> <p>Reduced operational costs and vehicle maintenance costs.</p>



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
4. Waste & circular economy				
Governance and Policy	<p>Revise tariff policies to incentivize waste separation and recycling, including pay-as-you-throw mechanisms.</p> <p>Establish or amend regulations for construction, textile, and event-related waste, introducing mandatory recycling targets, clearer institutional responsibilities, and simplified permitting procedures.</p> <p>Promote regulatory enforcement by improving penalties for illegal dumping and enhancing inspection capacities.</p> <p>Encourage integrated planning through the identification and remediation of illegal dumpsites, especially in rural areas, ensuring alignment with the waste hierarchy.</p>			
Finance and Funding	<p>Introduce incentive schemes such as subsidies for circular economy operations and composting initiatives.</p>	<p>Provide financial support for circular startups, including workspace provision, startup capital, and operational subsidies.</p> <p>Enable financial mechanisms for implementing textile and construction waste regulations, including the application of the polluter pays principle.</p>		
Learning and Capabilities	<p>Launch public awareness campaigns focused on waste separation, benefits of recycling, and proper disposal at events.</p> <p>Run educational initiatives promoting the use of recycled materials, with a focus on public infrastructure and consumer safety standards.</p>	<p>Develop a business academy to support business planning and management for circular economy ventures.</p>		



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
4. Waste & circular economy				
	Promote capacity building within institutions and utilities to support new roles in composting, digital systems use, and enforcement practices.			
4.3 Local EPR schemes for special waste categories				
Technology/infrastructure	Packaging Stewardship (“Smart Pack Sarajevo”) deploys a deposit-return system using reverse-vending machines (RVMs) funded by environmental grants and operated by Eko Grad Sarajevo, enabling cash or digital refunds for returned PET and aluminium, real-time tracking of materials, and local reuse by start-ups and beverage producers—thus closing the material loop and strengthening packaging recovery without imposing new fiscal burdens.	Tyre EPR (“ReTyre FUA Sarajevo”) involves establishing a comprehensive end-of-life tyre management system through a long-term agreement with Negro Crown Sarajevo for shredding and granulating collected tyres, supported by performance-based incentives, expanded collection infrastructure, and public engagement campaigns to achieve a 75% collection rate by 2030 in line with environmental standards.--WEEE EPR (“e-Cycle FUA Sarajevo”) establishes a producer-financed system in partnership with ZEOS and municipal utilities, featuring a widespread network of drop-off cages, mobile collection for large appliances, digital tracking, and public outreach initiatives—including school programs and repair cafés—to ensure effective collection, reuse, and recycling of electronic waste across the FUA.		
Governance and Policy	Development and adoption of textile waste regulation at entity level. Voluntary stewardship MoUs for textiles - service annexes with existing PROs for WEEE & packaging. FUA Sarajevo EPR strategy and action plan for special waste categories.			
Finance and Funding	Environmental Funds’ public calls aligned to finance RVMs and tyre cages. Textile Stewardship Pilot (“Circular Loop Sarajevo”) introduces a voluntary agreement with major retailers and local brands to co-finance textile collection and sorting based on their market share,			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
4. Waste & circular economy				
	supported by a public recognition scheme and drop-off infrastructure across key urban locations, enabling reuse, industrial conversion, and recycling, with citizen engagement driven through retailer-sponsored incentives and seasonal repair events.			
Learning and Capabilities	Communication and stakeholder engagement strategy for local EPR to function			
4.4 Circular Construction- and-Demolition-Waste Programme				
Technology/infrastructure	Digital Building Material Passport and C&D Material Bank: Web/app platform where investors upload material inventories before demolition and contractors bid for salvaged elements; PPP with local IT firm for development and hosting. "Sarajevo Circular Hub" (stationary): Fixed facility for sorting, crushing, screening and quality-testing of recycled aggregates, wood and metals. Hub is built and operated via a 15-year PPP: canton/city provides land and planning permit, private consortium finances plant and earns gate fees plus aggregate sales. Mobile treatment fleet expansion: Leasing programme for three additional mobile crushers/screeners; equipment procured by a leasing company and rented to SMEs at subsidised rates.	Demonstration projects: Two pilot roads (rubberised asphalt + recycled concrete), one public building with reclaimed bricks; co-funded by IFIs to de-risk first movers.		
Governance and Policy	Digital Building-Material Passport ordinance – investors upload material inventories to the WMIS at the design stage and update them before demolition; data feed the online Material Bank. Green Public Procurement decree – all cantonal and city/municipal infrastructure contracts must specify ≥ 20 % certified recycled aggregate and give preference to products listed on the Material Bank. Quality-standard adoption – the Ministry of Spatial Planning recognises EN 12620 and EN 13242 for			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
4. Waste & circular economy				
	recycled aggregates; the cantonal laboratory is authorised to issue conformity certificates. PPP framework agreement – clarifies land-use rights, gate-fee structure and revenue-sharing for the Circular Hub, securing investor confidence			
Finance and Funding	<p>GPP & fiscal incentives: Green public procurement rule—all municipal infrastructure must use ≥ 20 % certified recycled aggregate; Landfill gate fee surcharge on mixed C&D waste, with a discount if pre-sorted.</p> <p>Financing window for start-ups: Revolving fund (2 M BAM seed) to issue low-interest loans to SMEs producing reclaimed building components (e.g. timber panels, insulation from mineral wool off-cuts).</p> <p>Fiscal support package – VAT exemption on secondary aggregates sold for public works and accelerated depreciation for mobile recycling equipment.</p>			
Learning and Capabilities	<p>Selective-demolition protocol & training: Mandatory pre-demolition audit and on-site separation checklist issued by the Canton/East Sarajevo competent entities; training courses for contractors co-financed through an industry levy.</p> <p>Capacity-building scheme – mandatory certification course on selective demolition and recycling for site managers, co-financed by the Chamber of Commerce and the Environmental Fund.</p> <p>Communication & compliance plan – joint campaign “Build Circular Sarajevo”, regular industry roundtables, and annual public performance reports summarising WMIS data, inspection findings and recycling rates.</p>			



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
4. Waste & circular economy				
4.5 Energy recovery from waste				
Technology/infrastructure	Develop a feasibility study for an integrated waste treatment facility capable of multi-feedstock processing of organic municipal waste, sewage sludge and animal waste, utilizing advanced technologies for multi-feedstock treatment.	Construct a biogas production plant and a cogeneration plant for the production of electricity and thermal energy from the organic component of municipal waste from the Sarajevo Canton area. Solar drying of waste sludge from the Butila WWTP and its use as an alternative fuel in the cement industry.		Improved public health. Strengthened cooperation between public and private enterprises.
Governance and Policy	Integrate site selection for waste treatment facilities into the future Spatial Plan of Sarajevo Canton, supported by professional studies covering strategic impact assessments, geological, ecological, and social analyses, and inclusive public consultation processes. Establish a comprehensive register of animal waste production in Sarajevo Canton as a foundation for informed policymaking and facility planning.			
Governance and Policy	Develop a legal framework for digital citizen participation, ensure cooperation with local authorities, protect user data, and comply with transparency and open data laws.	Establish data exchange agreements with municipal, cantonal departments, and external stakeholders, ensuring compliance with data protection regulations and international standards.		



Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
5. AFOLU - Decarbonization of agriculture				
5.1. Production of renewable energy from livestock manure from cattle farms				
Technology/infrastructure	Prepare a project documentation and obtain permits	<p>Construction of an anaerobic digestion plant to process manure into biogas.</p> <p>Installation of a combined heat and power (CHP) unit to utilize the produced biogas for electricity and heat generation.</p> <p>Supporting infrastructure: storage tank/digester, manure mixing and transport system, gas storage tank, biogas purification unit (H₂S and moisture removal), and digestate storage.</p>	44,786.00	<p>The possibility of selling excess electricity to the grid at incentive prices.</p> <p>Utilization of waste heat (from CHP) for heating farm buildings and facilities.</p> <p>Electricity generation from manure, reducing dependence on fossil fuels.</p>
Governance and Policy	Incentive framework for renewable energy (possibility of feed-in tariffs or power purchase agreements).			
Finance and Funding	Development of grants, favourable loans, and budget incentives.			
Learning and Capabilities	Organizational structure and qualified personnel for plant operation and equipment maintenance.			



Systematic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (sinks) (tCO2eq)	Indirect impacts (co-benefits)
5.2 AFOLU- Green infrastructure & nature-based solutions- Residual emission strategy				
5.2.1 Urban Greening				
Technology/infrastructure	<p>Maintenance and Restoration of Public Green Spaces Carry out cleaning and removal of unwanted vegetation and damaged structures in public areas. Enhance soil quality through the addition of organic matter and compost and improve drainage as needed. Repair erosion and other physical terrain damages to ensure healthy and sustainable green spaces.</p>	<p>Restoration of degraded parks and open spaces by planting native trees, shrubs, and groundcover to improve biodiversity and ecological function. Priority should be given to the planting of non-allergenic, native tall tree species, as well as the integration of medicinal plants and pollinator-friendly flower beds, to enhance urban biodiversity, support ecosystem services, and improve microclimatic conditions.</p> <p>Pavement removal and Urban Greening Interventions- removal of asphalt and concrete from selected squares, sidewalks, and other paved public areas, as well as industrial areas, followed by ecological rehabilitation through planned planting and landscaping.</p> <p>Ensure proper maintenance of planted trees.</p>	2,004.65	<p>Enhanced landscape and aesthetic and ecosystem services.</p> <p>Carbon sequestration: absorb CO₂, contributing to emissions reduction goals.</p> <p>Improved air quality through dust filtration and pollution reduction.</p> <p>Enhanced rainwater infiltration capacity, reducing flood risks and surface water retention.</p> <p>Improved urban liveability: Enhances the attractiveness and functionality of urban areas.</p>
Governance and Policy	<p>Develop and adopt a five-year strategic plan for greening urban areas within the Functional Urban Area (FUA) Sarajevo-Urban Nature Plan. This plan should integrate plans for all greening actions specified within the CNAP.</p> <p>Integrate the Urban Nature Plan into the Urban plan.</p>			



Systematic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (sinks) (tCO2eq)	Indirect impacts (co-benefits)
5.2 AFOLU- Green infrastructure & nature-based solutions- Residual emission strategy				
	<p>Adopt a regulation on Green Area Protection in FUA Sarajevo: Establish a legal framework mandating a minimum of 30% green space in total built-up areas and 5–10% on individual plots; limit building height to 20m and density ($K_i \leq 3$) in critical ventilation zones; require public referendums with prior consultations for any land-use changes affecting green areas.</p> <p>Develop clear regulations and guidelines for urban green roofs</p> <p>Define and regulate river protection zones in spatial plans to ensure legal enforcement and prevent incompatible land use.</p> <p>Resolve property and legal issues, particularly the removal of illegal structures on riverbanks</p>			
Finance and Funding	Consider combining public and private funds, EU funds, entity funds on environmental protection			
Learning and Capabilities	<p>Strengthen the capacity of public utility companies through increased budgets, employment of forestry engineers, staff training, and upgraded equipment to ensure effective green space maintenance.</p> <p>When necessary, engage qualified private companies to support cleaning and upkeep, ensuring knowledge transfer and quality control.</p>			



Systematic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (sinks) (tCO2eq)	Indirect impacts (co-benefits)
5.2 AFOLU- Green infrastructure & nature-based solutions- Residual emission strategy				
	Foster community learning and stewardship by organizing seasonal volunteer activities involving students and citizens, promoting hands-on experience and environmental awareness. Provide targeted training, improve planting techniques, ensure proper site preparation, and strengthen oversight by forestry authorities to increase tree seedling survival rates.			
5.2.2 Forest Land Restoration Program				
Technology/infrastructure		Rehabilitate degraded forest areas to restore ecological balance and biodiversity. Develop forestry information systems to enable digital monitoring, spatial data analysis, and real-time forest resource management. Promote remote sensing, GIS, and digital platforms for tracking afforestation, forest health, and illegal logging.	62,573.22	
Governance and Policy	Adopt a Federal Forestry Law to standardize forest governance, establish transparent funding mechanisms, and enforce sustainable forest practices. Establish private forest owners' associations to improve stakeholder coordination and participation in restoration initiatives.	Rehabilitate degraded forest areas to restore ecological balance and biodiversity. Develop forestry information systems to enable digital monitoring, spatial data analysis, and real-time forest resource management. Promote remote sensing, GIS, and digital platforms for tracking afforestation, forest health, and illegal logging.		Carbon Sequestration and improved air quality Enhanced water security Reduction in urban heat island effect Soil regeneration



Systematic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (sinks) (tCO2eq)	Indirect impacts (co-benefits)
5.2 AFOLU- Green infrastructure & nature-based solutions- Residual emission strategy				
				Job creation: green jobs in planting, maintenance, monitoring Increased resilience of rural communities Health improvements Reduced risk of landslides and floods: Buffer zones against wildfires Enhances connectivity between fragmented ecosystems
Finance and Funding	Consider combining public and private funds, EU funds, entity funds on environmental protection			
Learning and Capabilities	Build the capacity of local stakeholders—especially private forest owners—through training programs, technical support, and knowledge exchanges.	Promote community-based forest management and climate education initiatives to ensure long-term program sustainability.		
5.2.3 Agroforestry for Carbon Sequestration				
Technology/infrastructure	Identify suitable areas for agroforestation and develop a database of interested farmers to support targeted implementation, resource planning, and technical assistance.	Develop pilot demonstration projects to test and showcase agroforestry models adapted to regional conditions, serving as learning hubs for farmers, institutions, and policymakers. Continuously implement agroforestry measures through an annual action plan and structured implementation program to ensure sustained progress and scalability.	620.88	Increased CO ₂ sequestration in soils and biomass. Improved soil fertility and water retention. Diversified farmer incomes through multi-functional land use.



Systematic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (sinks) (tCO2eq)	Indirect impacts (co-benefits)
5.2 AFOLU- Green infrastructure & nature-based solutions- Residual emission strategy				
				Strengthened climate adaptation in vulnerable rural communities.
Governance and Policy	Integrate agroforestry into municipal rural development and land use plans .			
Finance and Funding	Local agro-environmental subsidies. Public-private partnerships with agri-businesses Cooperation with NGOs working in field of agriculture			
Learning and Capabilities	Provide technical training and incentives for farmers and landowners to adopt agroforestry practices.			
5.2.4 Urban Agriculture and Rooftop Beekeeping				
Technology/infrastructure	Select an appropriate green roof system for piloting, prepare comprehensive project documentation, and secure all necessary permits and approvals for implementation.	Implement pilot project on green roofs to promote urban agriculture and beekeeping in collaboration with local residents.	-	
Governance and Policy	Develop and enforce clear regulatory standards for green roof design, installation, and maintenance, including safety, structural integrity, and environmental criteria, while simplifying the permitting process to encourage adoption and ensure long-term project success.			
Finance and Funding	Secure seed funding from local government green initiatives and environmental funds			



Systematic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (sinks) (tCO2eq)	Indirect impacts (co-benefits)
5.2 AFOLU- Green infrastructure & nature-based solutions- Residual emission strategy				
	Explore partnerships with private sector sponsors or sustainability-focused grants from donors			
Learning and Capabilities	<p>Provide training workshops on green roof installation and maintenance for local contractors and community members.</p> <p>Conduct beekeeping training sessions covering hive management, pollination benefits, and honey harvesting.</p> <p>Facilitate knowledge exchange with other cities or programs that have successfully implemented similar projects.</p>			
5.2.5 A Fruit Tree in Every Yard- Campaign				
Technology/infrastructure	Develop a digital platform or mobile app for residents to register their interest in participating in the program	<p>Continually implement the action base on available annual budgets:</p> <p>Provide high-quality fruit tree saplings suited to the local climate and soil conditions.</p> <p>Distribute essential gardening tools and materials (mulch, compost, drip irrigation kits) to support tree planting and maintenance.</p>	97,93	<p>Microclimate Regulation and Stormwater Management:</p> <p>Local Food Production</p> <p>Community Empowerment:- planting and caring for trees builds a culture of environmental stewardship and collective climate action.</p> <p>Carbon Sequestration</p> <p>Reduced Transport Emissions: associated with transporting produce from other regions.</p>



Systematic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (sinks) (tCO2eq)	Indirect impacts (co-benefits)
5.2 AFOLU- Green infrastructure & nature-based solutions- Residual emission strategy				
Governance and Policy	<p>Enact local ordinances or incentives that encourage planting and caring for fruit trees on private properties.</p> <p>Collaborate with municipal agencies to incorporate fruit tree planting into urban greening and climate adaptation policies.</p> <p>Develop clear guidelines for tree maintenance responsibilities and pest management to ensure community safety and tree health.</p>			
Finance and Funding	<p>Allocate municipal budget for tree procurement, distribution, and public awareness campaigns.</p> <p>Seek funding from environmental funds, community foundations, and corporate social responsibility programs.</p>			
Learning and Capabilities	<p>Organize community workshops and training sessions on fruit tree planting, pruning, pest control, and harvesting.</p> <p>Develop educational materials (videos, brochures, online tutorials) tailored for different age groups and literacy levels.</p> <p>Establish community mentorship programs linking experienced gardeners with new participants.</p>			



Systematic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (sinks) (tCO2eq)	Indirect impacts (co-benefits)
5.2 AFOLU- Green infrastructure & nature-based solutions- Residual emission strategy				
5.2.6 Urban Gardens – Sustainable Urban Agriculture Solutions				
Technology/infrastructure	Identification and transformation of neglected or unused urban spaces into urban gardens.	Implementation of urban gardens Introduction of composting infrastructure in urban areas, including the installation of composting stations at strategic community locations. Establishing a network of distribution points to facilitate the sale or distribution of food produced in urban gardens		Carbon storage in soil: Sustainable practices, such as regenerative agriculture, improving soil health and increase carbon sequestration. Reduction of soil degradation: Techniques like crop rotation and composting reduce soil degradation and enhance carbon storage. Recycling organic waste: Composting organic waste reduces landfill waste and methane emissions
Governance and Policy	Integrate urban agriculture into urban planning and land use policies , allowing temporary or permanent use of public land for gardens. Provide regulatory support and guidelines for safe food production, soil testing, and compost use in urban settings. Develop municipal urban agriculture strategies aligned with climate action plans and CNAP. Establish mechanisms for community co-management or land stewardship agreements with local authorities.			



Systematic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (sinks) (tCO2eq)	Indirect impacts (co-benefits)
5.2 AFOLU- Green infrastructure & nature-based solutions- Residual emission strategy				
Finance and Funding	Offer microgrants or subsidies for initial garden setup (tools, seeds, compost).			
Learning and Capabilities	<p>Deliver hands-on training programs for residents on permaculture, composting, seed saving, and integrated pest management.</p> <p>Involve schools and youth groups through garden-based education and intergenerational knowledge exchange.</p> <p>Create community garden networks for peer learning, tool sharing, and cooperative harvesting or seed libraries.</p> <p>Promote research and monitoring partnerships with universities to document climate, food, and health benefits.</p>			
5.2.7. Production of Planting Material for AFOLU Projects				
Technology/infrastructure	Prepare a study on the potential of existing nurseries and the development of new nursery production, including necessary investments in infrastructure and equipment.	<p>Establish climate-resilient nurseries equipped with controlled environments (greenhouses, shade nets, misting systems) to produce high-quality seedlings year-round.</p> <p>Invest in decentralized community-based micro-nurseries to increase local access and reduce transport emissions.</p>		<p>Increased availability of high-quality planting material, which improves survival rates</p> <p>Enhanced biodiversity by supporting the propagation of native and climate-resilient species.</p> <p>Reduced carbon footprint by producing seedlings locally, minimizing transportation-related emissions.</p>



Systematic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (sinks) (tCO2eq)	Indirect impacts (co-benefits)
5.2 AFOLU- Green infrastructure & nature-based solutions- Residual emission strategy				
				<p>Job and income generation and encouragement of local entrepreneurship</p> <p>Empowers marginalized groups to participate in and benefit from green economy opportunities.</p>
Governance and Policy	<p>Create an official registry of approved nurseries to ensure traceability and accountability in AFOLU planting campaigns.</p> <p>Promote public-private partnerships (PPPs) between research institutions, forestry agencies, and local businesses for scaling up operations.</p>			
Finance and Funding	<p>Allocate public funds or green bonds to support initial infrastructure development of nurseries.</p> <p>Encourage local cooperative models for seedling production to reduce costs and share profits among smallholder producers,</p> <p>Engage NGOs focused on local business development to support entrepreneurship in this sector and encourage their target groups—particularly youth, women, and rural communities—to establish sustainable enterprises in planting material production</p>			
Learning and Capabilities	Education and Capacity Building: Organizing technical training for nursery			



Systematic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (sinks) (tCO2eq)	Indirect impacts (co-benefits)
5.2 AFOLU- Green infrastructure & nature-based solutions- Residual emission strategy				
	<p>operators focusing on best practices in plant production, aligned with the planting material production plan.</p> <p>Collaboration and Partnerships: Knowledge exchange and resource-sharing through partnerships with key associations, universities, and research institutions.</p>			
5.2.8 Green Space Cadastre and Management System				
Technology/infrastructure	<p>Establish a comprehensive digital GIS database of green spaces within the Functional Urban Area (FUA) of Sarajevo to support planning, monitoring, and management of green infrastructure. In terms of Monitoring & Evaluation the GIS-based platform should allow tracking implementation of greening measures, climate impact, and biodiversity indicators.</p>	<p>Integration with existing databases: Linking with spatial data and importing existing inventories and data</p> <p>Synchronization with urban planning and ecological regulations.</p> <p>Development of a mobile application- Possibility to report issues (e.g., poorly maintained areas) (integration with the citizen platform). Interoperability and web services for cadastre access</p>		<p>Data-driven adaptation: Provides accurate, up-to-date mapping and inventory of all green spaces (parks, trees, green roofs, gardens), helping urban planners prioritize areas for greening, restoration, or expansion.</p>
Governance and Policy	<p>Establish a regulatory framework that mandates inventorying and regular updating of green space data as part of municipal planning. Define institutional responsibilities between local government departments, utility services, and environmental agencies.</p> <p>Embed the cadastre into urban development policies, climate adaptation plans (CNAP), and land-use regulations.</p>			



Systematic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (sinks) (tCO2eq)	Indirect impacts (co-benefits)
5.2 AFOLU- Green infrastructure & nature-based solutions- Residual emission strategy				
Finance and Funding	Secure initial investment through cantonal and entity environmental funds Allocate municipal budget lines for data collection, system maintenance, and public outreach.			
Learning and Capabilities	Conduct training programs for municipal staff, urban planners, and NGOs on the use and interpretation of spatial green data. Develop user manuals and knowledge-sharing platforms for data input, analysis, and community use. Foster partnerships with universities and research institutions to co-develop the platform and conduct ongoing assessments. Promote community engagement programs where residents help monitor and report on green space status (citizen science)			



Systematic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
6. Digital and social innovation				
6.1 Public Participation Innovations: A Digital Platform for Civic Engagement				
Technology/infrastructure		introduce a dedicated digital platform for citizen engagement , modelled on successful tools such as Go Vocal , to facilitate structured and transparent input from the public on climate and urban development policies.		strengthen democratic governance, foster climate literacy
Governance and Policy	Institutionalize the platform within environmental decision-making processes , such as public consultations for urban greening, local environmental and climate action plans, spatial/ urban plans Mandate government response timelines to citizen inputs submitted through the platform to ensure accountability.			
Finance and Funding	Access digital governance and climate resilience funds from donors like UNDP, GCF, SECO, or the World Bank for platform development and outreach.			
Learning and Capabilities	Build digital literacy and environmental awareness among citizens, particularly marginalized groups, to enable meaningful participation. Train government officials and moderators in environmental dialogue facilitation and use of platform data for planning.	Use platform analytics to learn from citizen feedback and continuously refine both the platform and environmental policies.		
6.2 Smart Sarajevo: A Digital Twin for Climate Neutrality				
Technology/infrastructure	Platform design, data collection, and stakeholder workshops Phase 2 (24 months): Model development, sectoral integration, pilot applications	Develop a real-time, data-integrated digital replica of the city that supports climate planning, scenario modelling, and impact assessment.		



Systematic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions) (tCO2eq)	Indirect impacts (co-benefits)
6. Digital and social innovation				
	Phase 3 (Ongoing): Monitoring, optimization, and scaling	<ul style="list-style-type: none"> • Model development, sectoral integration, pilot applications • Monitoring, optimization, and scaling 		
Governance and Policy	Establish a governance framework for data ownership, privacy, and ethical use of predictive modelling.			
Finance and Funding	Access smart city innovation funds, climate adaptation finance, Horizon, SECO, UNDP, to fund development and expansion of the digital twin.			
Learning and Capabilities	<p>Develop capacity-building programs for city staff, planners, and engineers in data science, digital twin usage, and climate modelling.</p> <p>Engage universities and local tech communities in co-developing simulation tools and innovation challenges.</p>			



3.2 Module B-2 Climate Neutrality Portfolio Design

B-2.1: Description of action portfolios			
	No.	Portfolio description	
		List of actions	Descriptions
1. Energy systems	1.1 Built Environment/ Buildings and Heating	1.1.1 Replacement of existing households heating systems (wood and coal stoves and boilers) with sustainable heating systems (pellet stoves, heat pumps)	The widespread use of inefficient coal and firewood-based heating systems is the primary source of harmful air pollutants such as particulate matter and sulphur dioxide in FUA Sarajevo, severely impacting public health and air quality. With over 55,000 outdated systems in use across Sarajevo Canton and East Sarajevo, the transition to cleaner heating technologies is both urgent and essential. This project targets a large-scale replacement of inefficient systems - 50% with pellet boilers and 50% with heat pumps, directly addressing a key environmental and public health challenge. As a priority under the Sarajevo Canton's Strategy for Limiting the Use of Coal and Other Solid Fuels (2023–2033), this action t is expected to significantly reduce energy generation from fossil fuels, improve energy efficiency, lower household heating costs, and catalyse the development of a sustainable local market for certified biomass fuels and technologies.
		1.1.2 Transition to low-carbon heating in Pale through reconstruction, expansion, and modernization of the district heating system	The project to reconstruct, expand, and modernize the district heating system in Pale is essential for transitioning from inefficient and polluting household heating systems to a more sustainable, energy-efficient solution. The current district heating system is outdated and operating at full capacity, leaving many buildings dependent on coal, firewood, and electricity for heating. By 2030, the upgraded system, using sustainably sourced biomass, is expected to connect the majority of existing and new buildings, reducing annual heating demand and cutting CO ₂ emissions. This will significantly improve air quality, reduce reliance on solid



B-2.1: Description of action portfolios		
No.	Portfolio description	
	List of actions	Descriptions
		fuels, and lower heating costs for residents.
	1.1.3 Transformation to clean heating in Hrasnica by construction of district heating system based on geothermal heat pumps, with a biomass-powered plant serving as a backup source.	This project aims to expand the district heating network in Sarajevo Canton by constructing a new district heating system based on geothermal heat pumps, with a biomass-powered plant serving as a backup source and pipelines in the Hrasnica area, replacing inefficient individual heating systems that heavily rely on coal, firewood, and electricity. By transitioning to a centralized 10 MW geothermal heat pump system and 9 MW biomass-powered plant as a backup source, the project will generate 26.06 GWh of thermal energy annually, reducing CO ₂ emissions and significantly improving local air quality. The intervention not only supports climate neutrality goals but also lowers household heating costs and boosts energy efficiency.
	1.1.4 Sustainable district heating and biomass cogeneration in Sokolac	This project aims to establish a modern, sustainable district heating and cogeneration system in the Municipality of Sokolac by upgrading existing infrastructure and expanding service coverage. Currently, the municipal heating system relies on two outdated biomass boilers, with only the older one in operation at limited efficiency. The system serves a small portion of the urban area and suffers from high heat losses and a lack of metering. The project envisions expanding the district heating network to cover the full urban core and nearby suburban zones, increasing the heated area from 26,918 m ² to 131,592 m ² . As part of this transformation, a new cogeneration plant powered by wood biomass will be installed, enabling simultaneous production of electricity and heat. This will enhance energy self-sufficiency and reduce dependency on fossil fuels, while significantly lowering



B-2.1: Description of action portfolios		
No.	Portfolio description	
	List of actions	Descriptions
		pollutant emissions from inefficient individual heating units.
	1.1.5 Advancing sustainable district heating through heat pump integration	<p>The project aims to integrate water-to-water heat pumps into the district heating systems in Sarajevo Canton, specifically targeting multiple boiler plants currently reliant on natural gas and fuel oil (in Vogošća). Heat pumps will be installed across various locations, including:</p> <ul style="list-style-type: none"> • Butile wastewater treatment plant, to utilize treated wastewater as a low-temperature heat source, • Mojnilo water reservoir, to utilize drinking water as a low-temperature heat source, • Ilidža, to utilize existing geothermal water as a heat source • Vogošća, to utilize potable water as heat source. <p>By introducing heat pumps, the project will reduce consumption of fossil fuels in district heating systems and cut CO₂ emissions. This transition will lower heating production costs, reduce dependence on imported energy, and increase the flexibility of the systems. Though the heat pumps require electricity, leading to some indirect emissions, the overall impact will be a major step toward a more sustainable, cost-effective, and resilient energy system for Sarajevo.</p>
	1.1.6 Sustainable reconstruction, expansion and modernization of district heating system in Istočno Novo Sarajevo	<p>This project supports the sustainable modernization of the district heating system in Istočno Novo Sarajevo, responding to growing demand for thermal energy driven by the Municipality's continuous urban development. "Toplane-INS" currently supplies heating for around 64,000 m², a significant increase from its initial coverage in 1998. To ensure continued and efficient service delivery, the main boiler house was reconstructed in 2021,</p>



B-2.1: Description of action portfolios		
No.	Portfolio description	
	List of actions	Descriptions
		replacing outdated equipment with new, low-emission natural gas boilers and automated hydraulic optimization systems. To meet current and future heating needs, the next phase includes the reconstruction and partial expansion of the district heating pipeline, ensuring reliable service for the current and newly planned residential and commercial users. This investment will improve energy efficiency, reduce emissions, and enable sustainable urban growth, preventing the use of individual, inefficient heating units.
	1.1.7 Smart heat metering system for improved energy efficiency in district heating	This project will upgrade the district heating system by installing smart calorimeters for real-time monitoring of heat consumption. The existing system is outdated and lacks accurate consumption measurement, leading to energy losses. The new system will enable precise billing based on actual usage, reducing energy waste and improving transparency. It will also enhance the efficiency, reliability, and sustainability of the district heating systems, contributing to energy savings and better user satisfaction.
	1.1.8 Retrofitting residential buildings for energy efficiency and emission reduction	This project targets energy efficiency improvements in residential buildings (both individual and multi-apartment) across the whole FUA Sarajevo. With approximately 140,000 buildings requiring energy efficiency measures, the aim is to reduce energy consumption by up to 80%, leading to a significant decrease in GHG emissions. The retrofitting will lower heating costs, reduce pollution, and improve thermal comfort, while also creating jobs and boosting economic activity.
	1.1.9 Smart street lighting for energy efficiency and sustainability	This project focuses on replacing outdated street lighting with energy-efficient smart LED technology. The current system is



B-2.1: Description of action portfolios		
No.	Portfolio description	
	List of actions	Descriptions
		inefficient, causing high maintenance and energy costs, as well as indirect CO ₂ emissions. By upgrading to smart LED lighting, the project will reduce emissions, optimize energy use, and lower costs.
1.2 Electricity	1.2.1 Construction of photovoltaic power plants (PVPPs) for self-consumption on the rooftops of public educational buildings	Most public educational buildings within the FUA Sarajevo (including preschools, primary schools, secondary schools, universities, etc.) depend on electricity primarily generated from fossil fuels. Installing PVPPs on the rooftops of these buildings will significantly reduce electricity costs and CO ₂ emissions.
	1.2.2 Construction of PVPPs for self-consumption on the rooftops of private educational buildings, private companies (industries) within industrial zones, private shopping centres and hotels	Private educational buildings (including preschools, primary schools, secondary schools, universities, etc.), private companies (industries) within industrial zones, private shopping centres and hotels use electricity primarily generated from fossil fuels. Rooftops remain underutilized for renewable energy generation. These buildings suffer from high energy costs and significant CO ₂ emissions. The project enables large-scale, cost-effective production of clean electricity directly at the point of consumption, significantly reducing CO ₂ emissions and energy costs across key private sectors in FUA Sarajevo.
	1.2.3 Construction of PVPPs for self-consumption on the rooftops of individual housing (households)	Currently, the rooftops of households lack installed equipment for renewable energy utilization, with only a few exceptions. Installing PVPPs on the rooftops of these buildings will significantly reduce electricity costs and CO ₂ emissions.
	1.2.4 Establishing energy communities through construction of PVPPs for self-consumption on the rooftops of collective housing buildings	Establishing energy communities through the installation of PVPPs on collective housing rooftops is a key step toward energy democracy, allowing residents to jointly produce, consume, and manage renewable energy. These communities reduce dependency



B-2.1: Description of action portfolios		
No.	Portfolio description	
	List of actions	Descriptions
		on fossil fuels, cut CO ₂ emissions, and lower energy costs for residents, particularly in buildings that are currently energy inefficient.
	1.2.5 Construction of the grid-connected commercial large-scale PVPPs (independent power producers)	FUA Sarajevo's transition to a sustainable energy future is critically dependent on harnessing its untapped solar potential, particularly through the development of large-scale, grid-connected PVPPs by independent power producers. The current overreliance on fossil fuel-based electricity generation not only heightens CO ₂ emissions and environmental degradation but also undermines long-term energy security and economic resilience. The construction of PVPPs such as Sokolac (100 MW) and Šestaljivo (1 MW) in East Sarajevo, along with several sites in Sarajevo Canton (50 MW), will significantly boost clean electricity production.
	1.2.6 Construction of wind power plants (WPPs)	The designated sites for WPP Kočarin and WPP Crepoljsko Bukovik offer significant untapped wind energy potential, representing an opportunity for the transition of FUA Sarajevo's energy system away from its current reliance on fossil fuels. The development of these wind power plants, alongside the WPP Ivan Sedlo (currently under construction), marks a shift toward sustainable, locally sourced, and clean energy.
	1.2.7 Upgrade of electricity grid	The project aims to modernize and expand the electricity distribution network in the Sarajevo FUA, with a focus on enabling the integration of renewable energy sources (RES), improving energy security, and supporting decarbonization goals. The current grid, particularly in Sarajevo Canton, operates near capacity and is not equipped for decentralized energy production or advanced demand-side management (DSM). Key interventions include



B-2.1: Description of action portfolios			
	No.	Portfolio description	
		List of actions	Descriptions
			reconstructing outdated sections, upgrading substations to 20 kV in suburban areas, integrating smart technologies (e.g., SCADA, smart meters, energy storage), and introducing DSM and microgrid solutions. Legal and institutional measures include updating spatial plans, regulatory alignment with national energy.
2. Industrial Processes and Product Use (IPPU)	2.1	Clean and climate-safe cooling	In the FUA Sarajevo region, cooling systems mainly rely on outdated technologies that use refrigerants with high GWP, such as HFCs (hydrofluorocarbons). These systems significantly contribute to F-gas emissions, which have a strong greenhouse effect and a long-term impact on climate change. The aim of the project is to replace cooling systems that use HFC refrigerants with more environmentally friendly alternatives.
	2.2.	Energy efficient and low-carbon industry	<p>The project aims to reduce natural gas and electricity consumption in the industrial sector of the Functional Urban Area (FUA) Sarajevo by implementing targeted energy efficiency measures and modern heating solutions. Key interventions include:</p> <ul style="list-style-type: none"> • Optimization of production processes • Waste heat recovery • Upgrading industrial lighting efficiency • Modernization of industrial systems, technology, and management (including SCADA systems) <p>In parallel, the project promotes the transition to renewable and efficient heating by replacing outdated natural gas boilers with a mix of heat pump systems (50%) and biomass-based heating systems (50%). Currently, industrial facilities account for approximately 25% of Sarajevo's total natural gas consumption. Many rely on inefficient and aging</p>



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	No.	Portfolio description	
		List of actions	Descriptions
			gas boilers, often resulting in inadequate heating and higher operational costs. Through the integration of advanced technologies and cleaner energy sources, the project will: <ul style="list-style-type: none"> • Significantly reduce operational energy costs • Improve thermal comfort and working conditions for employees • Enhance overall industrial productivity • Achieve measurable reductions in annual air pollutant emissions
3. Mobility & transport	3.1	Development of cycling infrastructure - cycle paths and safe bicycle parking spaces	The project aims to promote sustainable urban mobility in Sarajevo by expanding cycling infrastructure, regulating micromobility, and encouraging behavioural change. It includes the development of 37–42 km of new bike lanes, installation of 50–100 bike stands in key urban areas, and the establishment of legal frameworks for micromobility safety and use. Public funding, World Bank support, and private sector partnerships—through co-financing and sponsorships—will be leveraged to implement infrastructure like smart bike racks and shelters. A public awareness campaign will promote the benefits of cycling and public transport. Together, these actions support Sarajevo’s goal of achieving a balanced modal split (30% public transport, 30% private vehicles, 30% active mobility), reducing car dependency and increasing intermodal and low-emission transport options.
	3.2	Development of shared bicycle and scooter traffic with accompanying charging infrastructure	The project promotes sustainable micromobility in Sarajevo through a comprehensive approach combining technology, governance, finance, and public engagement. Key actions include implementing an e-bike and e-scooter sharing system, supported



B-2.1: Description of action portfolios		
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		<p>by the construction of charging stations to ensure reliable operation. A strong legal framework will be established to regulate micromobility use, set speed limits, and enforce safety standards for safe integration into the urban transport network.</p> <p>To ensure financial sustainability, the project will explore public-private partnerships (PPPs) with clear service-level agreements and revenue-sharing models. Sponsorships and co-branding opportunities will also be pursued for high-visibility stations near universities, parks, and business districts. Funding sources include the Cantonal Environmental Protection Fund, Ministry of Transport, and potentially tourism or health promotion programs.</p> <p>A public awareness campaign will accompany these measures to educate citizens on the benefits of sustainable mobility and encourage adoption of low-emission travel options.</p>
3.3	Establishment of park&ride and mobility hubs areas	<p>The project aims to enhance urban mobility and reduce congestion in Sarajevo by developing a network of Park & Ride (P&R) facilities and multimodal mobility hubs at strategic locations near key urban entry points and public transport nodes. These facilities will offer secure parking for private cars, motorcycles, and vans—including dedicated EV charging spots—and promote the use of public and non-motorized transport through seamless integration with tram, BRT, and bus lines, as well as existing and planned bicycle paths.</p> <p>Mobility hubs will be equipped with infrastructure for shared mobility services (e.g., e-bikes, e-scooters, car-sharing), secure bike parking, EV charging stations, and real-time digital information systems to improve user experience and security. Sustainable design</p>



B-2.1: Description of action portfolios		
No.	Portfolio description	
	List of actions	Descriptions
		<p>features such as green roofs, permeable pavements, and landscaping will be included to mitigate urban heat and manage stormwater runoff.</p> <p>The initiative is expected to reduce traffic and emissions by diverting vehicles from the city centre, supporting Sarajevo's Low Emission Zone (LEZ) goals. It will improve public transport reliability and frequency through increased demand, free up central parking, reduce illegal parking, and offer commuters cost savings through integrated ticketing and lower parking fees.</p> <p>A strong governance framework will regulate facility operation, parking fees, commuter incentives, and ensure legal alignment with LEZ and public transport integration. A PPP model will be considered to engage private sector investment in construction, management, and maintenance, easing the financial burden on public budgets.</p> <p>Finally, a public awareness campaign will educate commuters on the environmental, economic, and practical benefits of using P&R and mobility hub services, supporting long-term modal shift and sustainable transport outcomes.</p>
3.4	Greening of public transport	<p>The project focuses on modernizing public transport system through the introduction of electric buses, along with supporting infrastructure such as charging stations and improved bus stops. The current diesel-based fleet is outdated, contributing to air and noise pollution and discouraging public transport use. By shifting to electric mobility, the project aims to significantly reduce GHG emissions, enhance air quality, and improve the overall experience for users. It includes the procurement of electric buses,</p>



B-2.1: Description of action portfolios		
No.	Portfolio description	
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		<p>upgrading transport infrastructure, and integrating smart systems for real-time passenger information. Additionally, it supports micromobility and sustainable behaviour change through incentives like integrated fare systems and subsidized tickets. The project aims to develop and implement a unified digital mobility platform across FUA Sarajevo to support public transport coordination, increase accessibility, and reduce CO₂ emissions. The new platform will enable route planning, real-time updates, and purchase of various ticket types (including multi-day and monthly) via a mobile application, while introducing contactless payment options. The expansion and modernization of the tram network in Sarajevo Canton aims to address the outdated public transport system and support sustainable urban mobility. By replacing the aging tram fleet with electric vehicles, this project seeks to improve service quality, reduce emissions, and alleviate traffic congestion. In order to reduce the number of cars used for transport from hilly areas, a feasibility study is planned to explore the possibility of building vertical transport systems in locations such as Žuč, Hum, and Sedrenik.</p>
3.5	<p>Electrification of the vehicle fleet- taxi service and public authorities' fleet</p>	<p>The project aims to accelerate the electrification of Sarajevo's vehicle fleet by focusing on taxis and public authority vehicles. This includes the installation of electric vehicle (EV) charging stations at strategic locations such as transport hubs, taxi stands, and gas stations across Sarajevo Canton and East Sarajevo. In parallel, electric taxis and institutional vehicles will be procured to reduce emissions and modernize the public sector fleet.</p>



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No.	Portfolio description	
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		<p>The initiative will lead to improved air quality, reduced noise pollution, and stronger promotion of sustainable transport. A comprehensive monitoring system will be established to track the number of electric taxis in operation, CO₂ emission reductions, and user satisfaction, ensuring data-driven decision-making and transparency.</p> <p>The project will be supported through municipal, city, and cantonal budgets, with additional financial incentives developed for taxi drivers and operators to encourage EV adoption. These incentives will emphasize both environmental impact and long-term cost savings.</p> <p>Capacity building is also a key component. Workshops will be organized for taxi operators and associations to guide them through EV operations, charging logistics, and maintenance benefits. At the same time, cantonal and municipal teams will receive specialized training in EV diagnostics, repair, and battery management to ensure long-term operational readiness and support.</p>
3.6	Establishment of low-emission zones with restricted access for fossil fuel-powered vehicles	<p>The project focuses on establishing a Low Emission Zone (LEZ) in Sarajevo to restrict access for fossil fuel-powered vehicles and promote cleaner, more sustainable urban mobility. Key infrastructure components include the deployment of automated vehicle monitoring systems, ANPR cameras for enforcement, expanded pedestrian and cycling paths, and the installation of clear signage and information systems. A phased penalty system will be implemented, starting with warnings and moving to fines, supported by an online portal for</p>



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No.	Portfolio description	
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		<p>vehicle eligibility checks and fee payments.</p> <p>Governance measures include the development of a clear regulatory framework, amendments to local traffic laws, and the creation of a dedicated LEZ governing body. These efforts will ensure alignment with national and EU environmental policies, enabling access to funding and long-term policy integration. The LEZ will also be coordinated with existing traffic and parking systems to avoid shifting congestion to surrounding areas.</p> <p>The project will be financed through a combination of public funds, donor support, and international financial institutions (IFIs), with future revenue generated through access fees for non-compliant vehicles. A public outreach campaign will raise awareness among drivers, residents, and businesses, using online tools, mobile apps, and a consultative pilot phase to ensure transparency and community support.</p> <p>Overall, the LEZ will contribute to cleaner air, reduced congestion, greater use of zero-emission vehicles, and improved quality of life in Sarajevo's urban core.</p>
3.7	Decarbonisation of logistics - transport through optimisation of logistics transport and electrification of delivery vehicles	<p>The project focuses on decarbonisation of city logistics in Sarajevo to address challenges such as infrastructural limitations, regulatory hurdles, and environmental concerns. The city's current logistics system struggles with congestion, limited road capacity, and inadequate loading and unloading facilities, while freight traffic exacerbates air and noise pollution, particularly in the winter. The proposed solution involves optimizing freight traffic flow and improving the logistics network by consolidating Urban</p>



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			Logistics Hubs and implementing timed delivery windows to reduce vehicle kilometres travelled and congestion. This will also enhance the efficiency of deliveries by improving load factors and route density through smart routing systems. In addition, the project will improve urban space utilization by rationalizing logistics depots into peripheral hubs and introducing dedicated loading/unloading zones, thus reducing illegal parking and freeing up valuable urban space.
	3.8	Smart traffic management systems	The project aims to modernize traffic management by introducing artificial intelligence for real-time traffic flow optimization. Currently dominated by fixed-phase signals without adaptive control, the existing infrastructure contributes to inefficiencies, delays, and increased emissions. By implementing AI-powered systems, including adaptive traffic lights, real-time traffic monitoring, and public transport prioritization, the project will reduce congestion and environmental impact while improving road user experience.
4. Waste & circular economy	4.1	Zero-Waste Programme	The project aims to establish a structured and measurable approach to waste prevention and reduction across Sarajevo Canton and East Sarajevo. In a context where no formal national or entity-level targets exist, this initiative will introduce a coordinated framework led by local governments to mainstream zero-waste practices in public institutions, businesses, and households. Key components include revising public procurement rules to prioritize reusable and recycled materials, banning single-use plastics in public settings, launching a Reuse and Repair Hub, installing free drinking-water stations, creating a food redistribution platform (“Too Good to Waste Sarajevo”), developing a material exchange



B-2.1: Description of action portfolios			
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			marketplace (“Sarajevo Circular Market”), and establishing a voluntary zero-waste certification scheme for businesses. Soft measures include the adoption of a five-year action plan, partnership agreements with retailers and IT firms, and support packages for zero-waste startups.
	4.2	Increased waste recycling	Currently, the waste management system is heavily reliant on landfilling, with insufficient infrastructure for separate collection and material recovery. In Sarajevo Canton, although around 40% of the total municipal waste is composed of recyclable dry fractions, only a fraction is actually collected separately. The infrastructure is outdated and insufficient, especially for bio-waste, which is not collected at all. In East Sarajevo, there is currently no established system for separate waste collection, resulting in valuable recyclable and organic materials being landfilled. The two operational landfills do not meet basic environmental and safety standards, and their overuse is accelerating the need for new disposal sites. The absence of waste separation not only increases GHG emissions and operational costs but also undermines opportunities for resource recovery and circular economy development. The proposed project will address these issues through the deployment of standardized infrastructure for the separate collection of dry recyclables, bio-waste, and construction waste, supported by the modernization of recycling yards and the expansion of logistical and digital systems. In addition to environmental benefits, the project will generate significant social and economic co-benefits: improved hygiene and public health, better quality of secondary raw materials, new business



B-2.1: Description of action portfolios		
No.	Portfolio description	
	List of actions	Descriptions
		opportunities in the recycling and recovery sectors, and the creation of green jobs.
4.3	Local EPR schemes for special waste categories	The project introduces a comprehensive, locally driven approach to Extended Producer Responsibility (EPR) for special waste categories in the FUA Sarajevo, targeting waste tyres, WEEE (waste electrical and electronic equipment), textiles, and packaging. It addresses regulatory and operational gaps by complementing existing national EPR schemes and launching new initiatives where none currently exist—such as for textile waste. The project supports landfill diversion, local material circularity, job creation, and improved environmental compliance. Key soft measures include textile waste regulation, EPR action plans, MoUs with producers, and digital monitoring systems.
4.4	Circular Construction-and-Demolition-Waste Programme	The project aims to establish a sustainable and circular approach to managing the growing volume of construction and demolition (C&D) waste, which is currently estimated at around 200,000 tonnes annually. Presently, most of this waste is landfilled due to the lack of dedicated infrastructure, regulatory requirements for source separation, certified markets for recycled materials, and economic incentives for reuse and recycling. The project seeks to achieve a target of at least 70% reuse or recycling of C&D waste by 2030. To this end, it will introduce selective demolition protocols, digital tools such as a Building Material Passport and online Material Bank, and construct a stationary Circular Hub for sorting, crushing, and certifying recycled materials. It also includes the expansion of mobile treatment capacity, the accreditation of recycled aggregates to meet construction standards, and the introduction of green public



B-2.1: Description of action portfolios		
No.	Portfolio description	
	List of actions	Descriptions
		procurement practices that require the use of certified secondary materials in public infrastructure projects.
4.5	Energy recovery from waste: Biogas Production and Waste Sludge Treatment in Sarajevo Canton	The project aims to improve waste management and environmental sustainability in Sarajevo Canton by addressing the disposal and treatment of organic waste and waste sludge. Currently, organic waste is landfilled, while sewage sludge from the city's Butile wastewater treatment plant is dewatered before being stored in a temporary landfill. The biogas produced during the sludge treatment process is used for thermal energy and electricity generation, but there is no permanent solution for the final disposal of the dewatered sludge. The expected improvements include a reduction in CO ₂ eq emissions, generation of energy, contribution to public health improvement, and reduction in the environmental impact of landfilling. The project will also provide a permanent solution for waste sludge disposal and promote collaboration between public and private enterprises.
4.6	Optimization of waste collection through smart route planning and navigation system	The project aims to reduce CO ₂ emissions and operational inefficiencies in Sarajevo Canton and East Sarajevo by introducing a smart waste collection system. Through the use of GPS, sensors, and real-time data, waste collection routes will be optimized based on container fill levels, traffic, and weather conditions. This will lower fuel consumption, improve service quality, and reduce environmental impact.



B-2.1: Description of action portfolios			
	No.	Portfolio description	
		List of actions	Descriptions
5. Green infrastructure & nature-based solutions	5.1	Production of renewable energy from livestock manure from cattle farms	This project focuses on transforming livestock manure from two farms: KJP Poljoprivredno dobro Butmir and Mujanovic into renewable energy through anaerobic digestion. With around 1,750 dairy cows producing 35 tons of manure daily, the current storage method results in significant uncontrolled methane emissions. By introducing a biogas plant, the farm could generate approximately 12,250 m ³ of biogas daily, which could be used for electricity and heat generation. This is expected to cut annual GHG emissions, reduce reliance on fossil fuels, and create additional value through heat recovery and the use of digestate as organic fertilizer.
6. Digital Transformation / Social Innovation	6.1	Public Participation Innovations: A Digital Platform for Civic Engagement	Currently, in FUA Sarajevo there is a lack of citizen participation, no centralized platform, limited transparency in decision-making, and insufficient data connection between institutions and the public. The platform will enhance citizen involvement in local policies and projects, improve transparency and access to information, and enable more efficient communication between citizens and authorities. It will also facilitate faster implementation of citizens' proposals, fostering more direct and effective participation in decision-making processes.



B-2.1: Description of action portfolios			
	No.	Portfolio description	
		List of actions	Descriptions
	6.2	Smart Sarajevo Digital Twin for Climate Neutrality	The Smart Sarajevo Digital Twin for Climate Neutrality project aims to develop a comprehensive Digital Twin platform for Sarajevo’s Functional Urban Area (FUA) to support the city’s transition toward climate neutrality. Aligned with the Climate Neutral Action Plan (CNAP), the project will enable data-driven urban planning, real-time simulation, and effective monitoring of emissions-reduction strategies across sectors such as energy, transport, buildings, waste, and land use. The Digital Twin will act as a dynamic virtual model integrating data from infrastructure, energy systems, mobility, and environmental conditions to optimize decision-making, enhance transparency, and foster public engagement. Key components include upgrading Sarajevo’s GIS platform, designing a robust data centre, integrating climate and emission data, simulating sustainable energy and mobility solutions, supporting circular economy initiatives, and modelling green infrastructure. Interactive dashboards will empower stakeholders with tools for participatory planning and real-time feedback, while automated monitoring systems will track progress toward EU-aligned climate goals. The project, led by Sarajevo’s urban planning departments and supported by local institutions and potential international funders, will unfold over three phases—initial design and data collection, full model deployment, and continuous monitoring and scaling—with the goal of creating a replicable model for other cities in the region.



Residual emissions strategy

B-2.1: Description of action portfolios			
Fields of action	No.	Portfolio description	
		List of actions	Description
5. Agriculture, forestry and other land use	5.2 Green Infrastructure & Nature-Based Solution-Residual emission strategy	5.2.1 Urban Greening	The project focuses on restoring and protecting degraded riverbank zones across the FUA Sarajevo through the establishment of protective forests. Also, the project includes pavement removal and urban greening interventions- removal of asphalt and concrete from selected squares, sidewalks, and other paved public areas, as well as industrial areas, followed by ecological rehabilitation through planned planting and landscaping. About 110 km of suitable riverbanks will be afforested with native deciduous species like alder, poplar, willow, and birch. This nature-based solution will reduce CO ₂ emissions, enhance biodiversity, stabilize riverbanks against erosion, and mitigate flood risks in vulnerable areas. Hence, the project plays a key role in adapting to climate change, improving water quality, and reclaiming neglected natural corridors within an increasingly urbanized landscape.
		5.2.2 Forest Land Restoration Program	The aim is to restore degraded land in FUA Sarajevo through large-scale afforestation, contributing significantly to carbon sequestration, ecosystem resilience, and soil stabilization. Project targets barren land, degraded forests, and shrubland, with an emphasis on conifer-dominant planting and enhanced seedling survival. It aligns with forestry strategies and local plans, leveraging existing forest management plans and legal frameworks to ensure feasibility and long-term sustainability. Sarajevo Canton and the City of East Sarajevo collectively manage over 165,000 hectares of forest land, yet afforestation remains underutilized



B-2.1: Description of action portfolios			
Fields of action	No.	Portfolio description	
		List of actions	Description
			due to institutional and technical gaps. This program addresses those challenges by reinforcing legal frameworks, improving planting and maintenance practices, and expanding efforts to private forest areas. A total of 1,000,000 seedlings will be planted. Complementary measures include technical improvements in degraded forest stands, transformation of shrublands into mixed forests, and implementation of contour planting to reduce erosion by 40%. The project also contributes to biodiversity preservation, microclimate stabilization, and long-term ecological sustainability.
		5.2.3 Agroforestry for Carbon Sequestration	This project focuses on the development of agroforestry practices, aimed at enhancing soil health, increasing biodiversity, and significantly reducing CO ₂ emissions. Despite favourable conditions, agroforestry practices are currently absent in BiH. The project will implement sustainable farming methods by integrating tree planting with agricultural production, emphasizing soil conservation, erosion control, and protection from extreme weather events. Key activities include educational workshops for farmers on agroforestry techniques and sustainable practices, such as no-till farming and the use of organic fertilizers, alongside the potential use of renewable energy technologies. By planting 100,000 trees by 2030, the project will sequester CO ₂ , enhance water retention in the soil, and improve resilience against climate change.
		5.2.4 Urban Agriculture and Rooftop Beekeeping	The project is aimed at establishing a climate-smart model of urban agriculture across FUA Sarajevo. While urban gardening remains underdeveloped in the region, this project builds on recent pilot efforts and strategic planning to promote local food production, reduce environmental impacts, and improve urban liveability. The project includes



B-2.1: Description of action portfolios			
Fields of action	No.	Portfolio description	
		List of actions	Description
			mapping existing and potential green spaces, providing public training in sustainable urban farming methods (e.g., vertical gardening, composting), and integrating modern irrigation systems. By empowering residents, municipalities, and organizations to convert small plots, rooftops, and community spaces into productive green areas, the project strengthens community resilience, fosters environmental awareness, and supports decarbonization through localized food systems, organic waste recycling, and soil carbon storage. Though small in emissions impact, the project has strong educational and social value and supports Sarajevo's climate neutrality targets through citizen-driven sustainability actions.
		5.2.5 A Fruit Tree in Every Yard-Campaign	This project promotes the greening of densely built hillside neighbourhoods in the FUA Sarajevo by encouraging the planting of fruit trees in private residential yards. Given the spatial constraints and limited opportunities for traditional afforestation in these areas, this initiative taps into the potential of underutilized private green spaces. Through GIS-based mapping, community outreach, and provision of high-quality indigenous fruit tree seedlings, the project aims to plant at least 20,000 new trees. Beyond enhancing visual appeal, these trees will provide ecosystem services such as improved air quality, increased biodiversity, soil stabilization, and reduced heat island effects. The integration of small-scale sustainable agriculture and smart irrigation technologies contributes to climate adaptation and long-term environmental resilience. Although carbon sequestration from individual trees is relatively modest, the collective impact will support the broader goals of climate neutrality and liveability across the FUA Sarajevo.
		5.2.6 Urban Gardens – Sustainable Urban Agriculture Solutions	The project is aimed at establishing a climate-smart model of urban agriculture across FUA Sarajevo.



B-2.1: Description of action portfolios			
Fields of action	No.	Portfolio description	
		List of actions	Description
			While urban gardening remains underdeveloped in the region, this project builds on recent pilot efforts and strategic planning to promote local food production, reduce environmental impacts, and improve urban liveability. The project includes mapping existing and potential green spaces, providing public training in sustainable urban farming methods (e.g., vertical gardening, composting), and integrating modern irrigation systems. By empowering residents, municipalities, and organizations to convert small plots, rooftops, and community spaces into productive green areas, the project strengthens community resilience, fosters environmental awareness, and supports decarbonization through localized food systems, organic waste recycling, and soil carbon storage. Though small in emissions impact, the project has strong educational and social value and supports Sarajevo's climate neutrality targets through citizen-driven sustainability actions.
		5.2.7 Production of planting material for AFOLU projects	This project addresses the critical gap in the availability of high-quality, climate-adapted planting material for afforestation, reforestation, and urban greening initiatives in FUA Sarajevo. Currently, the region faces low seedling survival rates, averaging only 50% for forestry species, due to unsuitable or low-quality planting stock and a lack of species adapted to changing climate conditions. The situation is further constrained by insufficient production capacities of local nurseries, particularly for horticultural varieties suitable for urban environments. By revitalizing and expanding local nursery operations, this project aims to support the long-term implementation of AFOLU projects.
		5.2.8 Green space cadastre and management for sustainable urban development	The project aims to create a digitized, publicly accessible system for mapping and managing urban green spaces in FUA Sarajevo. Currently, green spaces are fragmented and lack precise data, hindering effective



B-2.1: Description of action portfolios			
Fields of action	No.	Portfolio description	
		List of actions	Description
			planning and maintenance. This project will develop a centralized platform to store and update information on green spaces, supporting better decision-making for sustainable urban development.



3.2.1 Energy systems

The Energy Systems actions portfolio incorporates a comprehensive approach to the energy transition, prioritizing solar and wind energy while also addressing critical enablers such as energy storage, grid stability, and demand-side management. This ensures a secure and resilient energy supply, particularly in light of increasing electrification across transport and buildings and reduces dependence on gas to meet peak demand. The portfolio also considers the role of biomass within net-zero pathways, acknowledging potential negative impacts such as unsustainable land-use changes, biodiversity loss, and emissions from combustion, thereby supporting only sustainable and responsible bioenergy solutions. When it comes to built environment, the portfolio places clear emphasis on phasing out fossil-fuel-based heating systems—through measures such as district heating, electrification via heat pumps, and incentives for energy efficiency and building insulation—recognizing heating as a major source of emissions and air pollution. At the same time, the portfolio adopts a broader, more integrated perspective on the built environment, particularly in the context of anticipated urban growth. In addition to improving insulation in existing buildings, the strategy promotes a shift toward more sustainable construction practices and materials, especially those that are locally sourced or linked to carbon-intensive industries like cement and steel. Urban planning, land use, and urban design are also incorporated as key levers for climate action—not only in terms of buildings themselves, but in shaping the urban environment to reduce heat-island effects, support temperature regulation and climate adaptation, and enhance carbon and pollutant sequestration through nature-based solutions.

The Action Plan includes projects that will enable a shift to clean energy and improve energy efficiency, aiming to reduce fossil fuel generated emissions and secure long-term sustainability. Through modernisation of the energy sector, environmentally friendly and cost-effective solutions will be available to citizens and businesses for energy production and consumption. Special emphasis is placed on **retrofitting individual houses and buildings** and upgrading **thermal insulation** to reduce energy losses and heating costs. At the same time, obsolete heating systems will be replaced with environmentally friendly alternatives—biomass state of the art boilers, and heat pumps. So far, FUA Sarajevo has provided substantial incentives and subsidies to support the adaptation of residential and commercial buildings, as well as the replacement of heating systems, with the aim of improving energy efficiency and reducing heating demand. This effort is set to continue through the development of innovative financial mechanisms designed to enable citizens and businesses to actively participate in the energy decarbonization program.

To institutionalize sustainability, NZEB (Nearly Zero-Energy Building) standards will be introduced for all new construction and major renovations, alongside a push for low-carbon construction materials and methods.

Projects also include upgrading existing district heating networks to improve efficiency and reduce losses and integration of renewable energy into the district heating system (e.g., biomass or geothermal).

District heating operators plan to continue the installation of smart metering and implement advanced digital monitoring systems to optimize energy consumption and detect inefficiencies in real time. Installation of SCADA systems will contribute to improved energy efficiency by optimizing the operation of the district heating system based on real-time data and demand patterns. This helps reduce energy waste and operational costs.

Geothermal energy will be integrated into district heating system via heat pumps at Iliđža, Vogošća and Hrasnica. Parts of the water-supply and wastewater-treatment infrastructure at Mojmiilo and Butile will also serve as heat sources, again using heat pumps. A biomass-based district heating system is planned for Pale, while in Sokolac, a biomass cogeneration plant is



proposed, which will be connected to an expanded district heating network. In the agriculture and farming sector, plans are underway to produce biogas from municipal waste and manure from the Butmir and Mujanovići farm. This biogas will be used for the generation of electricity and heat in cogeneration plants. The surplus thermal energy is intended to be integrated into the district heating system.

In Pale and the settlement of Hrasnica, heating in individual residential and public buildings predominantly relies on solid fuels burned in inefficient systems. To reduce emissions from this source, the construction of a modern biomass-powered district heating system is planned for Pale, while Hrasnica will transition to a geothermal heat pump system—both offering more efficient and environmentally sustainable alternatives.

FUA Sarajevo intends to accelerate renewable energy deployment and to increase investments in solar and wind energy infrastructure to diversify the energy mix and reduce reliance on fossil fuels. This measure targets both public and private investors. Solar panels will be installed on public and private buildings, industrial facilities, hotels, business centres and individual houses, greatly increasing clean-energy production. At the Kočarin, Crepoljsko-Bukovik and Ivan Sedlo sites wind energy will also be harnessed. To accelerate solar development, citizens and companies will be able to invest jointly in renewables through energy communities and share the electricity generated, giving them energy independence.

The deployment of smart grid infrastructure—including automated substations, SCADA systems, distributed storage, demand-side management (DSM), and smart meters—will allow for two-way energy flows, grid flexibility, and integration of distributed renewable sources. Grid modelling will identify bottlenecks and guide targeted investments in high-growth areas.

Microgrids will be developed where technically feasible, supporting decentralized generation and consumption at the neighbourhood level. Regulatory reforms will facilitate this transformation, including streamlined permitting, simplified grid connection, and updated laws to enable energy sharing and sales.

Smart grid standards aligned with EU and international best practices will enhance system efficiency, support EV integration, and promote active consumer participation in the energy transition.

On the governance side, the plan includes legislative reforms such as gradually phasing out coal use, resolving ownership issues in key infrastructure, enforcing standards for heating appliances, and amending regulations to simplify energy retrofitting decisions in multi-apartment buildings. In line with recent legal changes governing independent energy producers, further efforts are needed to streamline permitting procedures and remove remaining barriers to enable broader adoption of prosumer-based projects. This also includes the development of a comprehensive legal framework for energy communities, aimed at promoting local renewable energy production and consumption. Energy community is a group of people, organisations, or entities that come together to collectively produce, consume, share, or manage energy, often from renewable sources like solar, wind, or biomass.

To support & incentivize the transition, it will be necessary to implement a comprehensive set of governance measures including legal and financial measures. Implementation of campaigns to educate citizens on the benefits of energy efficiency and renewable energy adoption, fostering a culture of sustainability is of utmost importance. These projects will bring long-term benefits to citizens by cutting energy bills, improving air quality and increasing energy security.



1.1 Built Environment/ Buildings and Heating

B-2.2: Individual action outlines – 1.1.1		
Action outline	Action name	1.1.1 Replacement of existing households heating systems (wood and coal stoves and boilers) with sustainable heating systems (pellet stoves, heat pumps)
	Action type	Technical interventions Other interventions
	Action description	The widespread use of inefficient coal and firewood-based heating systems is the primary source of harmful air pollutants such as particulate matter and sulphur dioxide in FUA Sarajevo, severely impacting public health and air quality. With over 55,000 outdated systems in use across Sarajevo Canton and East Sarajevo, the transition to cleaner heating technologies is both urgent and essential. This project targets a large-scale replacement of inefficient systems - 50% with pellet boilers and 50% with heat pumps, directly addressing a key environmental and public health challenge. As a priority under the Sarajevo Canton's Strategy for Limiting the Use of Coal and Other Solid Fuels (2023–2033), this action is expected to significantly reduce energy generation from fossil fuels, improve energy efficiency, lower household heating costs, and catalyse the development of a sustainable local market for certified biomass fuels and technologies.
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Technology/Infrastructure Governance and Policy Finance & Funding Learning & Capabilities
	Outcome (according to module B-1.1)	Individual coal and wood heating systems replaced with heat pumps and pellet boilers, resulting in increased energy efficiency and reduced emissions of pollutants
Implementation	Responsible bodies/person for implementation	In Sarajevo Canton: <ul style="list-style-type: none"> • Ministry of Communal Economy, Infrastructure, Spatial Planning, Construction, and Environmental Protection of KS • Municipalities in KS • Ministry of Finance of KS In East Sarajevo: <ul style="list-style-type: none"> • Ministry of Spatial Planning, Construction, and Ecology of the Republic of Srpska • Municipalities
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Inefficient heating systems using solid fuels
	Involved stakeholders	Owners of individual residential buildings Pellet producers and distributors Subcontractors/suppliers of heat pumps, boilers, and stoves Local design and construction companies
	Comments on implementation – consider mentioning resources, timelines, milestones	The implementation of this large-scale heating system replacement program will be structured through a detailed and replicable model that ensures transparency, efficiency, and accountability. The approach will include not only technical interventions but also necessary legal, regulatory, and organizational frameworks, such as



B-2.2: Individual action outlines – 1.1.1		
		<p>municipal decisions, updated legislation, and eco-advisor roles. The program is underpinned by a combination of local public funds, private contributions, and potential international donor or credit financing, making it financially sustainable. Soft measures play a crucial role in supporting uptake, including public awareness campaigns, eco-advisory services, educational initiatives and legal enforcement mechanisms (e.g. introduction of stove and boiler standards).</p> <p>The components of the project are:</p> <ul style="list-style-type: none"> • Development and adoption of a model for encouraging the replacement of heating systems, defining activities, responsible parties (rights and responsibilities), sources of financing, general and technical eligibility criteria for awarding incentives, required documentation for each building, evaluation and ranking of applications, implementation of energy efficiency measures, supervision, and reporting. • Formation of a project management team and necessary evaluation committees. • Preparation and publication of public calls based on the defined Model (for manufacturers/suppliers of equipment/contractors/owners of individual residential buildings). • Evaluation of received applications according to the criteria defined in the Model and informing applicants of the outcome. • Visual verification of the top-ranked buildings and checking the technical conditions for implementing energy efficiency improvements. • Designing heating systems for users/applicants who applied for replacing the existing heating system with an air-to-water heat pump, and providing other equipment based on preliminary designs and quotes from pre-selected manufacturers/suppliers of equipment/contractors. • Implementation of energy efficiency improvement measures in individual residential buildings. • Supervision and verification of the successful implementation of the heating system replacement measure and gathering data on individual completed projects. • Payment of part of the grant funds for the implementation costs of energy efficiency measures. • Monitoring and reporting on the achieved reduction in emissions and other project benefits. <p>Key Legal and Other Assumptions (Soft Measures):</p>



B-2.2: Individual action outlines – 1.1.1		
		<ul style="list-style-type: none"> • Adoption of the Regulation on the gradual phase-out of coal for heating. • Employment of eco-advisors who work with the population and provide them with information to encourage them to replace their stoves. • Adoption of a Decision at the level of the competent Municipality regarding the establishment and functioning of the mechanism - Model for granting funds for replacing heating systems in individual buildings. This requires the development of a financing mechanism, including the method of financing, criteria for fund allocation, monitoring and verification of results, and other necessary segments for the successful implementation of the project. • Applicable to Sarajevo Canton: The new Air Protection Law of the FBiH regulates the minimum standards for the use and installation of stoves and boilers (putting them into circulation) for household heating systems, which must be adhered to. Compliance with the ban on the circulation of stoves and boilers that do not meet the requirements of the Air Protection Law of the FBiH and defined standards must be ensured. • Definition of legal acts and guidelines for designing and installing heating systems for individual buildings, with the requirement that these conditions be checked when obtaining occupancy permits (by authorized service providers). • Establishment of a unified register of household heating systems. • Enforce minimum technical standards for stoves and boilers to ensure only efficient and clean appliances are circulated and installed. • Develop laws for the design and installation of individual heating systems, linked to occupancy permits, and a dedicated legal act regulating the chimney-sweeping profession. • The assumption foreseen by the project includes the replacement of 50% of existing coal boilers and 50% of wood boilers with efficient pellet boilers, while 50% of each system is planned to be replaced with heat pumps. • Raising awareness about the importance of reducing particulate emissions and how to contribute to it. • Continuous information to consumers on potential energy-saving methods on the back of utility bills.



B-2.2: Individual action outlines – 1.1.1		
		<ul style="list-style-type: none"> • Education of construction and design companies on energy efficiency principles in construction and design. • Integrate ecological and energy literacy into the formal education system, introducing relevant content in primary and secondary curricula and organizing creative school activities such as workshops and competitions. • Collaborate with NGOs to deliver community-based energy education and awareness initiatives.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	Reduction of 470 TJ/year of energy from coal and 1989 TJ/year of energy from firewood
	GHG emissions reduction estimate (total) per emission source sector	281,774 tCO _{2eq}
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO _{2e} unit	CAPEX: 275,596,938 EUR OPEX: 70,558 EUR/year Total costs by CO _{2e} unit: 978 EUR /tCO _{2eq}

B-2.2: Individual action outlines – 1.1.2		
Action outline	Action name	1.1.2 Transition to low-carbon heating in Pale through reconstruction, expansion, and modernization of the district heating system
	Action type	Technical interventions Other interventions
	Action description	The project to reconstruct, expand, and modernize the district heating system in Pale is essential for transitioning from inefficient and polluting household heating systems to a more sustainable, energy-efficient solution. The current district heating system is outdated and operating at full capacity, leaving many buildings dependent on coal, firewood, and electricity for heating. By 2030, the upgraded system, using sustainably sourced biomass, is expected to connect the majority of existing and new buildings, reducing annual heating demand and cutting CO ₂ emissions. This will significantly improve air quality, reduce reliance on solid fuels, and lower heating costs for residents.
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Technology/Infrastructure Governance and Policy Learning & Capabilities
	Outcome (according to module B-1.1)	Modernized and expanded district heating system in Pale to ensure a reliable, energy-efficient, and sustainable



B-2.2: Individual action outlines – 1.1.2		
		heat supply for residential and public buildings. Through the transition to biomass-based heating, energy security will be enhanced, GHG emissions reduced, and service quality improved,
Implementation	Responsible bodies/person for implementation	Municipality of Pale KP "Gradske toplane" Pale
	Action scale & addressed entities	FUA Sarajevo (East Sarajevo) Pale East Sarajevo District heating system
	Involved stakeholders	Ministry of Spatial Planning, Construction, and Ecology of the Republic of Srpska Ministry of Energy and Mining of the Republic of Srpska
	Comments on implementation – consider mentioning resources, timelines, milestones	The project will involve the full reconstruction and expansion of Pale's district heating system, including the installation of a new biomass plant and upgraded pipeline infrastructure to meet growing thermal demand. Its successful implementation will depend on securing necessary permits and funding, efficient procurement processes, and strong coordination across stakeholders. Introducing consumption-based billing and promoting awareness among residents will be essential to support the transition from individual heating systems to modern district heating, while maximizing energy savings and climate benefits.
Impact & cost	Generated renewable energy (if applicable)	28 GWh of thermal energy per year (from sustainable biomass)
	Removed/substituted energy, volume, or fuel type	57,252 GWh of electricity used for heating
	GHG emissions reduction estimate (total) per emission source sector	71,995 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 14,240,306 EUR OPEX: 693,127 EUR/year Total costs by CO ₂ e unit: 207 EUR/tCO ₂ eq

B-2.2: Individual action outlines – 1.1.3		
Action outline	Action name	1.1.3. Transformation to clean heating in Hrasnica through the construction of a geothermal heat pump-based district heating system with a biomass-powered plant serving as a backup source
	Action type	Technical interventions Other interventions
	Action description	This project aims to expand the district heating network in Sarajevo Canton by constructing a new geothermal heat pump plant and pipelines in the Hrasnica area, replacing inefficient individual heating systems that heavily rely on coal, firewood, and electricity. By transitioning to a



B-2.2: Individual action outlines – 1.1.3		
		centralized 10 MW geothermal heat pump system with a biomass-powered plant serving as a backup source, the project will reduce CO ₂ emissions and significantly improving local air quality. The intervention not only supports climate neutrality goals but also lowers household heating costs and boosts energy efficiency.
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Technology/Infrastructure Governance and Policy
	Outcome (according to module B-1.1)	Constructed district heating system in Hrasnica providing reliable and efficient heating for residential and public buildings. Reducing reliance on conventional energy sources and supporting sustainability in the area by using new geothermal heat pump-based plant with a biomass-powered plant serving as a backup source.
Implementation	Responsible bodies/person for implementation	Ministry of Communal Economy, Infrastructure, Spatial Planning, Construction, and Environmental Protection of Sarajevo Canton Municipality of Ilidža KJKP Toplane Sarajevo
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton) Hrasnica area District heating system
	Involved stakeholders	Sarajevo Canton Development Planning Institute Federal Ministry of Environment and Tourism Federal Ministry of Energy, Industry, and Mining
	Comments on implementation – consider mentioning resources, timelines, milestones	Key measures will include the development of a feasibility study and complete project documentation, construction of a hot water distribution network and heat substations, building of the geothermal heat pumps-based plant with storage and auxiliary systems, and with a biomass-powered plant serving as a backup source and final commissioning of the system. Buildings in the area will be connected to the new network progressively. To ensure smooth implementation, the project will require several soft measures. Authorities will need to secure all necessary permits and define the spatial coverage of the district heating network through planning documents. It will also be essential to adopt an updated energy strategy at the cantonal level to prioritize district heating expansion. Additionally, a consumption-based billing system will be introduced to incentivize energy savings among users and promote broader uptake. Integrated urban planning will ensure new buildings are designed for connection to the district heating system, supporting long-term system optimization and preventing reliance on inefficient individual heating systems.
Impact & cost	Generated renewable energy (if applicable)	-
	Removed/substituted energy, volume, or fuel type	54 TJ of firewood and 13.5 TJ of coal
	GHG emissions reduction estimate (total) per emission source sector	7,308 t/year



B-2.2: Individual action outlines – 1.1.3		
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	CAPEX: 17,857,142 EUR OPEX: 663,584 EUR/year Total costs by CO2e unit: 2,534 EUR/tCO _{2eq}
B-2.2: Individual action outlines – 1.1.4		
Action outline	Action name	1.1.4 Sustainable district heating and biomass cogeneration in Sokolac
	Action type	Technical interventions Physical/spatial intervention Other interventions
	Action description	This project aims to establish a modern, sustainable district heating and cogeneration system in the Municipality of Sokolac by upgrading existing infrastructure and expanding service coverage. Currently, the municipal heating system relies on two outdated biomass boilers, with only the older one in operation at limited efficiency. The system serves a small portion of the urban area and suffers from high heat losses and a lack of metering. The project envisions expanding the district heating network to cover the full urban core and nearby suburban zones, increasing the heated area from 26,918 m ² to 131,592 m ² . As part of this transformation, a new cogeneration plant powered by wood biomass will be installed, enabling simultaneous production of electricity and heat. This will enhance energy self-sufficiency and reduce dependency on fossil fuels, while significantly lowering pollutant emissions from inefficient individual heating units.
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Technology/Infrastructure Governance and Policy
	Outcome (according to module B-1.1)	Establishment of a cogeneration plant powered by wood biomass, resulting in the production of electricity and heat to meet the energy needs of the urban area of the Municipality of Sokolac, contributing to sustainable energy solutions for the community.
Implementation	Responsible bodies/person for implementation	Municipality of Sokolac
	Action scale & addressed entities	Urban area of the Municipality of Sokolac District heating system
	Involved stakeholders	Municipality of Sokolac, Ministry of Energy and Mining of the Republic of Srpska, RERS (Regulatory Commission for Energy of Republika Srpska), District heating users
	Comments on implementation – consider mentioning resources, timelines, milestones	Key measures will include updating the existing feasibility study, preparing main project documentation, and constructing a biomass cogeneration plant next to the current boiler facility. Implementation will be carried out through a public-private partnership, with a private partner selected via public tender. The project will also involve expanding the district heating network to fully cover the



B-2.2: Individual action outlines – 1.1.4		
		urban and nearby suburban areas. Successful execution will require securing all necessary permits for the plant and network expansion, concluding an electricity purchase agreement, and obtaining grid access.
Impact & cost	Generated renewable energy (if applicable)	27,479 MWh (from biomass)
	Removed/substituted energy, volume, or fuel type	110 TJ of thermal energy produced from fossil fuels
	GHG emissions reduction estimate (total) per emission source sector	9,783 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 7,964,286 EUR OPEX: 920,325 EUR/year Total costs by CO ₂ e unit: 908 EUR/tCO ₂ eq

B-2.2: Individual action outlines – 1.1.5		
Action outline	Action name	1.1.5. Advancing sustainable district heating through heat pump integration
	Action type	Technical interventions Other interventions
	Action description	<p>The project aims to integrate water-to-water heat pumps into the district heating systems in Sarajevo Canton, specifically targeting multiple boiler plants currently reliant on natural gas and fuel oil (in Vogošća). Heat pumps will be installed across various locations, including:</p> <ul style="list-style-type: none"> • Butile wastewater treatment plant, to utilize treated wastewater as a low-temperature heat source, • Mojnilo water reservoir, to utilize drinking water as a low-temperature heat source, • Ilidža, to utilize existing geothermal water as a heat source • Vogošća, to utilize potable water as heat source. <p>By introducing heat pumps, the project will reduce consumption of fossil fuels in district heating systems and cut CO₂ emissions. This transition will lower heating production costs, reduce dependence on imported energy, and increase the flexibility of the systems. Though the heat pumps require electricity, leading to some indirect emissions, the overall impact will be a major step toward a more sustainable, cost-effective, and resilient energy system for Sarajevo.</p>
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Technology/Infrastructure Governance and Policy



B-2.2: Individual action outlines – 1.1.5		
	Outcome (according to module B-1.1)	Reduction of natural gas and fuel oil consumption in the district heating systems by installing water-to-water heat pumps and connecting them to the existing heating network
Implementation	Responsible bodies/person for implementation	Ministry of Communal Economy, Infrastructure, Spatial Planning, Construction, and Environmental Protection of Sarajevo Canton
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton) District heating systems
	Involved stakeholders	Toplane Sarajevo, KJKP Vodovod i kanalizacija, BAGS Energotehnika Vogošća, Institute for Planned Development of Sarajevo Canton, Municipal urban planning departments, District heating users, Project designers, contractors, and equipment suppliers
	Comments on implementation – consider mentioning resources, timelines, milestones	In addition to development of project documentation, installation of heat pumps and their connection to the district heating pipelines, the project will also require several soft measures, including ensuring sufficient power supply for the heat pumps, obtaining necessary permits for installation and construction, and completing procurement processes for services and equipment.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	1,096 TJ of energy from natural gas per year 18.5 TJ of energy from fuel oil per year
	GHG emissions reduction estimate (total) per emission source sector	60,568 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	<p>Butile: CAPEX: 41,581,632 EUR OPEX: 3,170,009 EUR/year Total costs by CO₂e unit: 1,467 EUR/tCO₂eq</p> <p>Mojmilo: CAPEX: 20,816,326 EUR OPEX: 1,953,646 EUR/year Total costs by CO₂e unit: 1,335 EUR/tCO₂eq</p> <p>Ilidža: CAPEX: 4,653,061 EUR OPEX: 244,398 BAM/year Total costs by CO₂e unit: 519 EUR/tCO₂eq</p> <p>Vogošća: CAPEX: 1,862,245 EUR OPEX: 178,952 EUR/year Total costs by CO₂e unit: 862 EUR/tCO₂eq</p>



B-2.2: Individual action outlines – 1.1.6		
Action outline	Action name	1.1.6 Sustainable reconstruction, expansion and modernization of district heating system in Istočno Novo Sarajevo
	Action type	Technical interventions
	Action description	This project supports the sustainable modernization of the district heating system in Istočno Novo Sarajevo, responding to growing demand for thermal energy driven by the Municipality's continuous urban development. "Toplane-INS" currently supplies heating for around 64,000 m ² , a significant increase from its initial coverage in 1998. To ensure continued and efficient service delivery, the main boiler house was reconstructed in 2021, replacing outdated equipment with new, low-emission natural gas boilers and automated hydraulic optimization systems. To meet current and future heating needs, the next phase includes the reconstruction and partial expansion of the district heating pipeline, ensuring reliable service for the current and newly planned residential and commercial users. This investment will improve energy efficiency, reduce emissions, and enable sustainable urban growth, preventing the use of individual, inefficient heating units.
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Technology/Infrastructure
	Outcome (according to module B-1.1)	The reconstruction of the existing district heating pipeline in Istočno Novo Sarajevo, enhancing the reliability, efficiency, and capacity of the heating system. The upgraded infrastructure will ensure a stable and uninterrupted heat supply for existing consumers while accommodating future residential and commercial developments.
Implementation	Responsible bodies/person for implementation	"Toplana-INS" a.d. Istočno Novo Sarajevo
	Action scale & addressed entities	Urban area of the Municipality of Istočno Novo Sarajevo District heating system
	Involved stakeholders	Ministry of Spatial Planning, Construction, and Ecology of the Republika Srpska, Ministry of Energy and Mining of the Republic of Srpska, Toplana-INS, Municipality of Istočno Novo Sarajevo, District heating users, Designers, contractors, and equipment suppliers
	Comments on implementation – consider mentioning resources, timelines, milestones	Key measures will include a comprehensive assessment of the existing district heating distribution network to identify critical issues and inform future planning. The reconstruction will focus on replacing the main pipeline from the boiler house to end users along Branch I, addressing the current high pressure drop in the system and enhancing operational reliability. The intervention will significantly reduce the need for extensive mechanical and construction works, contributing to a more efficient and sustainable district heating system aligned with the Municipality's growth and energy goals.



B-2.2: Individual action outlines – 1.1.6		
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	629 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO _{2e} unit	CAPEX: 2,457,750.79 EUR Total costs by CO _{2e} unit: 4,103 EUR/tCO _{2eq}

B-2.2: Individual action outlines – 1.1.7		
Action outline	Action name	Smart heat metering system for improved energy efficiency in district heating
	Action type	Technical interventions
	Action description	This project will upgrade the district heating system by installing smart calorimeters for real-time monitoring of heat consumption. The existing system is outdated and lacks accurate consumption measurement, leading to energy losses. The new system will enable precise billing based on actual usage, reducing energy waste and improving transparency. It will also enhance the efficiency, reliability, and sustainability of the district heating systems, contributing to energy savings and better user satisfaction.
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Technology/Infrastructure Governance and Policy Learning & Capabilities
	Outcome (according to module B-1.1)	Improved efficiency and transparency in district heating through the deployment of smart meters, enabling real-time consumption monitoring, optimized energy distribution, and enhanced user cost control.
Implementation	Responsible bodies/person for implementation	Sarajevo Canton: <ul style="list-style-type: none"> KJKP Toplane Sarajevo, Ministry of Communal Economy, Infrastructure, Spatial Planning, Construction, and Environmental Protection of Sarajevo Canton East Sarajevo: <ul style="list-style-type: none"> City of East Sarajevo, City Development Agency of East Sarajevo
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) District heating systems in FUA Sarajevo
	Involved stakeholders	Private investors and donors. Users of the district heating systems Regulatory bodies
	Comments on implementation – consider mentioning	Legal framework to support the digitalization of the heating sector must be adopted. Additionally, securing subsidies for consumers will incentivize the transition to



B-2.2: Individual action outlines – 1.1.7		
	resources, timelines, milestones	smart meters, making the system more accessible and promoting widespread adoption.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 4,744,898 EUR OPEX: 102,041 EUR/year

B-2.2: Individual action outlines 1.1.8		
Action outline	Action name	1.1.8 Retrofitting residential buildings for energy efficiency and emission reduction
	Action type	Technical interventions Other interventions
	Action description	This project targets energy efficiency improvements in residential buildings (both individual and multi-apartment) across the whole FUA Sarajevo. With approximately 140,000 buildings requiring energy efficiency measures, the aim is to reduce energy consumption by up to 80%, leading to a significant decrease in GHG emissions. The retrofitting will lower heating costs, reduce pollution, and improve thermal comfort, while also creating jobs and boosting economic activity.
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Technology/Infrastructure Governance and Policy Finance & Funding Learning & Capabilities
	Outcome (according to module B-1.1)	Increased energy efficiency of residential buildings (individual and multi-apartment buildings) leading to a reduction in air emissions
Implementation	Responsible bodies/person for implementation	Sarajevo Canton: Ministry of Communal Affairs, Infrastructure, Spatial Planning, Construction, and Environmental Protection of Sarajevo Canton East Sarajevo: Ministry of Spatial Planning, Construction, and Ecology of the Republic of Srpska
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Individual and multi-apartment buildings
	Involved stakeholders	Owners of individual residential buildings, Municipal services for urban planning, Design and construction companies, Manufacturers and traders of construction materials
	Comments on implementation – consider mentioning	The program will include various energy efficiency measures, such as façade and roof thermal insulation, and the replacement of existing windows and doors with



B-2.2: Individual action outlines 1.1.8		
	resources, timelines, milestones	<p>energy-efficient alternatives. Key components of the project include the development and adoption of an energy efficiency incentive model, which will define activities, responsibilities, funding sources, criteria for awarding incentives, and required documentation. Additionally, a public awareness campaign will be conducted to inform property owners about the benefits of investing in energy efficiency.</p> <p>The project components are:</p> <ul style="list-style-type: none"> • Development and adoption of an energy efficiency incentive model, which defines activities, activity holders (responsibilities and rights), sources of funding, criteria for awarding incentives, required documentation at the level of a single building, implementation of energy efficiency measures, supervision, and reporting. • Announcement of a public call for owners of individual residential buildings. • Enable financial participation of local self-governments (JLS) in the cost of construction materials for insulating individual residential buildings through invoicing. • Provide material subsidies directly to individuals for private homes, with installation costs covered by the beneficiaries. • Review and ranking of applications. • Preparation of necessary documentation for buildings for which there is available budget for investing in energy efficiency measures. • Implementation of energy efficiency measures. • Supervision. • Reimbursement of part of the costs of energy efficiency measures. • Monitoring and reporting on the achieved reduction in emissions and other project benefits. <p>Key legal and other assumptions:</p> <ul style="list-style-type: none"> • Adoption of the model by the Government of CS and the Government of RS • Signing of agreements between the Ministry and municipalities. • Amend regulations for multi-apartment buildings to lower the threshold for decision-making on energy retrofitting investments from unanimous consent to 60%. • Enhance the regulatory and planning framework — including urban planning, land-use, urban design, and building codes — to facilitate a systemic shift towards



B-2.2: Individual action outlines 1.1.8		
		<p>energy-efficient buildings and a decarbonised built environment.</p> <ul style="list-style-type: none"> Promote use of sustainable, low embodied-carbon construction materials and low carbon construction methods during retrofits. Introduce and enforce NZEB (Nearly Zero-Energy Building) standards for all new constructions and major renovations. Capacity building for project implementation and monitoring (staff, space, and equipment). Public awareness campaign on the benefits of investing in energy efficiency for property owners. Collaborate with NGOs to deliver community-based energy education and awareness initiatives.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	Reduction of: <ul style="list-style-type: none"> - 728.28 TJ/year of energy from coal, - 208.48 TJ/year of energy from firewood, - 2,313.82 TJ/year of energy from natural gas, and - 134.11 TJ/year of energy from heating oil.
	GHG emissions reduction estimate (total) per emission source sector	239,928 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 182.30 million EUR/year OPEX: 244,398 EUR/year Total costs by CO ₂ e unit: 761 EUR/tCO ₂ eq

B-2.2: Individual action outlines – 1.1.9		
Action outline	Action name	1.1.9 Smart street lighting for energy efficiency and sustainability
	Action type	Technical interventions
	Action description	This project focuses on replacing outdated street lighting with energy-efficient smart LED technology. The current system is inefficient, causing high maintenance and energy costs, as well as indirect CO ₂ emissions. By upgrading to smart LED lighting, the project will reduce emissions, optimize energy use, and lower costs.
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Technology/Infrastructure Governance and Policy Learning & Capabilities
	Outcome (according to module B-1.1)	Enhanced energy efficiency and sustainability through the implementation of a smart street lighting system.



B-2.2: Individual action outlines – 1.1.9		
Implementation	Responsible bodies/person for implementation	Sarajevo Canton: Ministry of Communal Economy, Infrastructure, Spatial Planning, Construction, and Environmental Protection of Sarajevo Canton Project Implementers East Sarajevo: City of East Sarajevo
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Street lighting
	Involved stakeholders	Local government units. Public enterprises for street lighting maintenance. Private sector. Citizens and non-governmental organizations.
	Comments on implementation – consider mentioning resources, timelines, milestones	Legal and soft measures are crucial for the project's success, including the development of a legal framework for the management and maintenance of smart lighting, establishing local government monitoring obligations, public education on the benefits of energy-efficient lighting, and alignment with energy efficiency standards.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	21,417 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 2,882,653 EUR OPEX: 51,129EUR/year Total costs by CO ₂ e unit: 137 EUR/tCO ₂ eq

1.2. Electricity

B-2.2: Individual action outlines – 1.2.1		
Action outline	Action name	1.2.1 Construction of photovoltaic power plants (PVPPs) for self-consumption on the rooftops of public educational buildings
	Action type	Technical interventions Other interventions
	Action description	Most public educational buildings within the FUA Sarajevo (including preschools, primary schools, secondary schools, universities, etc.) depend on electricity primarily generated from fossil fuels. Installing PVPPs on the rooftops of these buildings will significantly reduce electricity costs and CO ₂ emissions. The total usable roof area is 178,182 m ² and expected installed capacity is 37.28 MWp.
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Technology/Infrastructure Governance and Policy Finance & Funding



B-2.2: Individual action outlines – 1.2.1		
	Outcome (according to module B-1.1)	Increased onsite renewable energy generation at public educational buildings in FUA Sarajevo, leading to reduced reliance on conventional energy sources and fossil fuels.
Implementation	Responsible bodies/person for implementation	<p>Sarajevo Canton</p> <ul style="list-style-type: none"> Ministry of Education of Sarajevo Canton (public institutions under the jurisdiction of this ministry, founded by Sarajevo Canton) Ministry of Science, Higher Education, and Youth of Sarajevo Canton (University of Sarajevo as a public institution) and its faculties as organizational units founded by Sarajevo Canton <p>East Sarajevo:</p> <ul style="list-style-type: none"> Users of public buildings
	Action scale & addressed entities	<p>FUA Sarajevo (Sarajevo Canton and City of East Sarajevo)</p> <p>Public educational institutions in Sarajevo Canton and public institutions of quaternary sector in East Sarajevo</p>
	Involved stakeholders	<p>Users of public educational institutions in Sarajevo Canton where photovoltaic power plants will be installed for self-consumption</p> <p>Electricity suppliers (distribution operators)</p> <p>Government of Sarajevo Canton</p> <p>Local communities – municipalities</p> <p>City of East Sarajevo</p>
	Comments on implementation – consider mentioning resources, timelines, milestones	In addition to infrastructure installation, efforts are needed in terms of regulatory simplification (e.g. permit exemptions, one-stop-shop approach), promoting surplus electricity buy-back, as well as conducting a campaign to support renewable energy projects in FUA Sarajevo.
	Impact & cost	Generated renewable energy (if applicable)
	Removed/substituted energy, volume, or fuel type	39,192 MWh (removed energy from fossil fuels (produced in thermal power plant))
	GHG emissions reduction estimate (total) per emission source sector	39,192 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	<p>CAPEX: 25,679,789 EUR</p> <p>OPEX: 256,798 EUR/year</p> <p>Total costs by CO₂e unit: 662 EUR/tCO₂eq</p>

B-2.2: Individual action outlines – 1.2.2		
Action outline	Action name	1.2.2. Construction of PVPPs for self-consumption on the rooftops of private educational buildings, private companies (industries) within industrial zones, private shopping centres and hotels
	Action type	<p>Technical interventions</p> <p>Other interventions</p>



B-2.2: Individual action outlines – 1.2.2		
	Action description	Most private educational buildings (including preschools, primary schools, secondary schools, universities, etc.), private companies (industries) within industrial zones, private shopping centres and hotels within the FUA Sarajevo depend on electricity primarily generated from fossil fuels. Rooftops remain underutilized for renewable energy generation. These buildings suffer from high energy costs and significant CO ₂ emissions. The project enables large-scale, cost-effective production of clean electricity directly at the point of consumption, significantly reducing CO ₂ emissions and energy costs across key private sectors in FUA Sarajevo. Expected installed capacity 157.45 MWp, at the total usable roof area of 755,235 m ² .
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Technology/Infrastructure Governance and Policy Finance & Funding
	Outcome (according to module B-1.1)	Increased onsite renewable energy generation at private buildings in FUA Sarajevo, leading to reduced reliance on conventional energy sources and fossil fuels.
Implementation	Responsible bodies/person for implementation	Owners of private educational buildings, private companies (industries) within industrial zones, private shopping centres and hotels
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Private educational buildings, private companies (industries) within industrial zones, private shopping centres and hotels
	Involved stakeholders	Electricity suppliers (distribution operators) Government of Sarajevo Canton Local communities – municipalities City of East Sarajevo
	Comments on implementation – consider mentioning resources, timelines, milestones	To streamline the implementation process, legal amendments are recommended to simplify permitting for existing buildings and introduce a centralized "one-stop-shop" for permit issuance. Simplified grid connection procedures, incentives for surplus electricity purchase, SCADA integration for larger systems, and concession arrangements for capacities above 23 kW are also essential. Additional soft measures include awareness campaigns, best practice promotion, smart grid and metering investments, capacity-building for private sector actors, integration of EV charging infrastructure, and consideration of energy storage and microgrid restructuring in future phases.
Impact & cost	Generated renewable energy (if applicable)	165,512 MWh
	Removed/substituted energy, volume, or fuel type	165,512 MWh
	GHG emissions reduction estimate (total) per emission source sector	165,512 t/year
	GHG emissions compensated	N/A



B-2.2: Individual action outlines – 1.2.2		
	(natural or technological sinks)	
	Total costs and costs by CO2e unit	CAPEX: 108,448,330 EUR OPEX: 1,084,483 EUR/year Total costs by CO2e unit: 662 EUR/tCO2eq

B-2.2: Individual action outlines – 1.2.3		
Action outline	Action name	1.2.3. Construction of PVPPs for self-consumption on the rooftops of individual housing (households)
	Action type	Technical interventions Other interventions
	Action description	Most households within the FUA Sarajevo depend on electricity generated from fossil fuels. Currently, the rooftops of these proposed households lack installed equipment for renewable energy utilization, with only a few exceptions. Installing PVPPs on the rooftops of these buildings will significantly reduce electricity costs and CO ₂ emissions. The total number of households included is 24,000, with the usable roof area of 1,200,000m ² . The expected installed capacity is 250.80 MWp.
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Technology/Infrastructure Governance and Policy Finance & Funding Learning & Capabilities
	Outcome (according to module B-1.1)	Increased onsite renewable energy generation, leading to reduced reliance on conventional energy sources and fossil fuels. Enhanced active participation of individuals in the energy transition, fostering greater awareness.
Implementation	Responsible bodies/person for implementation	Owners of households in FUA Sarajevo
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Individual housing (households)
	Involved stakeholders	Electricity suppliers (distribution operators) Local community Sarajevo Canton City of East Sarajevo
	Comments on implementation – consider mentioning resources, timelines, milestones	Successful implementation depends on legal reforms to simplify permitting, enable surplus electricity sales, and streamline grid connection procedures for prosumers. A centralized "one-stop-shop" for permitting, SCADA integration for systems over 23 kW, and compliance with concession regulations are essential. Additional support includes awareness campaigns, financial incentives, technical assistance, and investments in smart grids and automated substations to enhance system efficiency and citizen participation in the energy transition.
Impact & cost	Generated renewable energy (if applicable)	300,995 MWh



B-2.2: Individual action outlines – 1.2.3		
	Removed/substituted energy, volume, or fuel type	300,995 MWh
	GHG emissions reduction estimate (total) per emission source sector	300,995 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO _{2e} unit	CAPEX: 197,220,126 EUR OPEX: 1,972,201 EUR/year Total costs by CO _{2e} unit: 662 EUR/tCO _{2eq}

B-2.2: Individual action outlines – 1.2.4		
Action outline	Action name	1.2.4 Establishing energy communities through construction of PVPPs for self-consumption on the rooftops of collective housing buildings
	Action type	Technical interventions Other interventions
	Action description	Establishing energy communities through the installation of PVPPs on collective housing rooftops is a key step toward energy democracy, allowing residents to jointly produce, consume, and manage renewable energy. These communities reduce dependency on fossil fuels, cut CO ₂ emissions, and lower energy costs for residents, particularly in buildings that are currently energy inefficient. Projected number of collective housing buildings included is 703, while the expected installed capacity is 30.83 MWp, on 147,567 m ² of roof area.
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Technology/Infrastructure Governance and Policy Finance & Funding Learning & Capabilities
	Outcome (according to module B-1.1)	Increased onsite renewable energy generation, leading to lower GHG emissions and reduced dependence on conventional energy sources. Enhanced citizen participation in the energy transition through the establishment of energy communities, fostering local engagement in sustainable energy production.
Implementation	Responsible bodies/person for implementation	Owners of collective housing buildings Local communities
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Collective housing buildings
	Involved stakeholders	Electricity suppliers (distribution operators)
	Comments on implementation – consider mentioning resources, timelines, milestones	The implementation of rooftop PVPPs on collective housing buildings to establish energy communities requires both robust infrastructure and enabling legal frameworks. Key technical steps include detailed project analysis, installation of PV systems and smart meters, and system commissioning. However, the success of energy



B-2.2: Individual action outlines – 1.2.4		
		communities also hinges on regulatory reforms, such as enabling collective energy production, simplifying permitting, and allowing intra-community energy sharing. Centralized permit issuance and simplified grid connection processes will streamline implementation, while integration into the SCADA system ensures efficient energy management. Equally important are soft measures: public awareness, funding mechanisms, and smart grid investments, all of which foster citizen participation and long-term sustainability of energy communities.
Impact & cost	Generated renewable energy (if applicable)	32,409 MWh
	Removed/substituted energy, volume, or fuel type	32,409 MWh
	GHG emissions reduction estimate (total) per emission source sector	32,409 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 21,235,641 EUR OPEX: 212,809 EUR/year Total costs by CO ₂ e unit: 662 EUR/tCO ₂ eq

B-2.2: Individual action outlines – 1.2.5		
Action outline	Action name	1.2.5. Construction of wind power plants (WPPs)
	Action type	Technical interventions Other interventions
	Action description	The designated sites for WPP Kočarin and WPP Crepoljsko Bukovik offer significant untapped wind energy potential, representing an opportunity for the transition of FUA Sarajevo's energy system away from its current reliance on fossil fuels. The development of these wind power plants, alongside the WPP Ivan Sedlo (currently under construction), marks a shift toward sustainable, locally sourced, and clean energy. Once all WPPs are operational, the combined installed capacity will be 105 MW.
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Technology/Infrastructure Governance and Policy Finance & Funding Learning & Capabilities
	Outcome (according to module B-1.1)	Increased share of renewable energy in the overall energy mix, leading to lower GHG emissions and optimized utilization of wind energy potential. Strengthened technological capacities and infrastructure for wind energy production, driving innovation and supporting the long-term growth of the renewable energy sector.



B-2.2: Individual action outlines – 1.2.5		
Implementation	Responsible bodies/person for implementation	A public enterprise or business entity founded or co-founded by a public body, or a privately owned company Private companies
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton) WPP Ivan Sedlo SC, WPP Kočarin SC, WPP Crepoljsko Bukovik SC
	Involved stakeholders	Federation of Bosnia and Herzegovina (FBiH) Transmission system operator Elektroprenos BiH Government of Sarajevo Canton Electricity traders/suppliers
	Comments on implementation – consider mentioning resources, timelines, milestones	The successful implementation of wind power plants in FUA Sarajevo involves a multi-phase approach that begins with site-specific wind potential measurements and feasibility studies, followed by the preparation of detailed investment and technical documentation and securing all required permits. Streamlining administrative procedures and updating the Spatial Plan of Sarajevo Canton are essential legal preconditions. Integration of WPPs into the SCADA system is necessary for effective grid management. Additionally, strong public-private partnerships, financial incentives, and awareness campaigns will be critical in securing investment, gaining community support, and ensuring sustainable development.
Impact & cost	Generated renewable energy (if applicable)	257,544 MWh
	Removed/substituted energy, volume, or fuel type	257,544 MWh
	GHG emissions reduction estimate (total) per emission source sector	257,544 t/year.
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 160,204,082 EUR OPEX: 3,204,082EUR/year Total costs by CO ₂ e unit: 634 EUR/tCO ₂ eq

B-2.2: Individual action outlines – 1.2.6		
Action outline	Action name	1.2.6. Construction of the grid-connected commercial large-scale PVPPs (independent power producers)
	Action type	Technical interventions Other interventions
	Action description	FUA Sarajevo's transition to a sustainable energy future is critically dependent on harnessing its untapped solar potential, particularly through the development of large-scale, grid-connected PVPPs by independent power producers. The current overreliance on fossil fuel-based electricity generation not only heightens CO ₂ emissions and environmental degradation but also undermines long-term energy security and economic resilience. The



B-2.2: Individual action outlines – 1.2.6		
		construction of PVPPs such as Sokolac (100 MW) and Šestaljivo (1 MW) in East Sarajevo, along with several sites in Sarajevo Canton (50 MW), will significantly boost clean electricity production.
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Technology/Infrastructure Governance and Policy Learning & Capabilities
	Outcome (according to module B-1.1)	Increased share of solar energy in the overall energy mix, leading to reduced GHG emissions and decreased reliance on fossil fuels for electricity generation. Strengthened energy infrastructure and enhanced capacity of independent power producers, contributing to a more sustainable and resilient energy system. Accelerated innovation in clean energy technologies, fostering long-term growth in the renewable energy sector.
Implementation	Responsible bodies/person for implementation	A public enterprise or business entity founded or co-founded by a public body, or a privately owned company
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) PVPP Sokolac East Sarajevo, PVPP Šestaljivo East Sarajevo, Commercial PVPPs in SC
	Involved stakeholders	Electricity traders/suppliers
	Comments on implementation – consider mentioning resources, timelines, milestones	The successful implementation of this action hinges on a combination of well-planned infrastructure development and supportive regulatory and institutional frameworks. This includes the preparation of detailed feasibility and environmental studies, securing multiple permits, and constructing and commissioning the PVPPs. Streamlining and accelerating administrative procedures across FUA Sarajevo (both in FBiH and Republika Srpska) is essential to reduce project delays, while spatial plans must be updated to accommodate large-scale solar developments. Technically, all PVPPs must be integrated into the SCADA system for effective grid management. Additional measures, such as promoting best-practice examples, running RES awareness campaigns, and upgrading local grid infrastructure, are crucial to ensuring grid readiness, improving public perception, and fostering a more favourable investment environment for commercial solar energy projects.
Impact & cost	Generated renewable energy (if applicable)	195,891 MWh
	Removed/substituted energy, volume, or fuel type	195,891 MWh
	GHG emissions reduction estimate (total) per emission source sector	195,891 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 134,506,020 EUR OPEX: 1,345,060 EUR/year



B-2.2: Individual action outlines – 1.2.6		
		Total costs by CO2e unit: 694 EUR/tCO2eq

B-2.2: Individual action outlines – 1.2.7		
Action outline	Action name	1.2.7 Upgrade of electricity grid
	Action type	Technical interventions Other interventions
	Action description	<p>Current situation: The electricity distribution network in the FUA, particularly in Sarajevo Canton, is operating near its capacity limits, especially during the winter months when a significant number of buildings depends on electricity for heating. Currently, almost all electricity is sourced from the transmission grid and distributed via the local distribution network. However, a large portion of the distribution infrastructure is outdated, requiring reconstruction and capacity upgrades to support the planned integration of RES. Most energy generated from RES, especially from PVPP, will be consumed either on-site or in the immediate vicinity. Most new generation facilities will be connected to the medium-voltage (MV) and low-voltage (LV) networks, while WPP and larger commercial PVPP will be connected directly to the transmission grid. In some suburban areas, parts of the distribution network have already been upgraded to the 20 kV voltage level. The grid is not yet prepared for decentralized energy production via microgrids or for active demand management through advanced Demand Side Management (DSM) mechanisms. The implementation of a DSM system is currently underway. A SCADA system has already been deployed, and a significant number of metering points are equipped with smart meters.</p> <p>Expected improvement</p> <ul style="list-style-type: none"> • Reconstruction of outdated sections of the distribution network, including capacity upgrades in distribution substations to support increased demand and integration of RES. • Deployment of a 20 kV voltage level in suburban areas to enhance network capacity and enable efficient evacuation of surplus electricity from RES toward urban centres. • Integration of smart technologies, such as SCADA systems, smart meters, and energy storage solutions, to modernize grid operations. • Improved network flexibility and capability to accommodate distributed energy resources. • Implementation of active DSM mechanisms to optimize electricity consumption and load balancing. • Decentralization of energy production and consumption through microgrids, aimed at ensuring reliable power supply and advancing decarbonization goals. • Enhanced grid resilience to peak loads, energy crises, and emergency situations through various



B-2.2: Individual action outlines – 1.2.7		
		<p>measures: implementation of multi-tariff systems leveraging smart meter functionalities, introduction of DSM systems, incentives for prosumer-based electricity generation and industrial self-consumption, deployment of hybrid PV–battery storage systems.</p> <ul style="list-style-type: none"> • Full alignment of the power system with smart grid principles, encompassing generation, transmission, distribution, and end-use, and including integration of information and communication technologies (ICT), advanced metering infrastructure (AMI), electric vehicle charging infrastructure, advanced customer-side energy management systems.
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Technology/Infrastructure Governance and Policy Finance & Funding
	Outcome (according to module B-1.1)	Reliable and secure energy supply from locally produced sources, support decarbonization and electrification, and enhance grid flexibility through smart technologies and active demand management.
Implementation	Responsible bodies/person for implementation	Sarajevo Canton in cooperation with the Distribution System Operator (DSO), City of East Sarajevo, The entity ministries of energy and environment in the Federation of BiH and Republika Srpska
	Action scale & addressed entities	FUA
	Involved stakeholders	DSO Transmission system operator (Elektroprenos BiH) Regulatory Commission for Energy in the Federation of Bosnia and Herzegovina (FERK) State Electricity Regulatory Commission (SERC) the entity ministries of energy and environment in the Federation of BiH and Republika Srpska Investors in PVPP and WPP Energy communities and the citizens
	Comments on implementation – consider mentioning resources, timelines, milestones	<p>Project components description (infrastructure measures):</p> <ul style="list-style-type: none"> • Reconstruction of outdated sections of the distribution network, with capacity upgrades of 10(20)/0.4 kV distribution substations in locations experiencing increased electricity production and consumption. • In suburban areas of the FUA, electricity generation from RES is expected to exceed local consumption. To accommodate this surplus and enable its transfer to urban centres, the MV network should be upgraded from 10 kV to 20 kV. Most existing transformers in suburban networks, that have not yet transitioned to 20 kV, are 10/20 kV switchable transformers, which once network adjustments are made, can be converted to 20 kV, thereby increasing distribution capacity.



B-2.2: Individual action outlines – 1.2.7		
		<ul style="list-style-type: none"> • Deployment of smart technologies and systems, including smart electricity meters, AMI, SCADA systems, DSM platforms, power quality monitoring, automated substations, and energy storage solutions integrated with photovoltaic systems (PVPP–battery hybrids). It is anticipated that private businesses installing PVPP for self-consumption will lead the adoption of energy storage technologies, followed by commercial RES investors aiming to support market balancing. • Grid modelling of key MV areas will be necessary to identify congestion points and prioritize network reconstruction and capacity enhancement. The modelling should consider electricity generation, energy injection from neighbouring transformer zones, and local consumption patterns. • Integration of large-scale generation facilities (WPP and PVPP) will require the construction of new X/110 kV substations at generation sites. In accordance with regulatory requirements, this responsibility lies with the investors. The transmission network in the FUA currently has sufficient capacity to absorb energy from the planned generation assets. • Development of local microgrids for decentralized electricity generation and consumption, where technical conditions allow, ranging from individual households to buildings, neighbourhoods, and entire communities. • Advancement of DSM mechanisms to enable flexible and responsive energy consumption, including the use of multi-tariff systems and automated demand control. • Implementation of smart grid components in line with international standards, such as the integration of ICT, AMI systems, EV charging infrastructure, advanced customer-side energy management systems, and real-time monitoring and control capabilities across the grid. <p>Key legal and other preconditions (soft measures):</p> <ul style="list-style-type: none"> • Updating spatial plans to support energy development. • Alignment with the National Energy and Climate Plan and entity-level renewable energy laws. • Development of a regulatory framework for microgrids and for managing energy production and consumption. • Training of local authorities and technical personnel. • Participatory models for involving communities and consumers in energy projects. <p>Capital costs by project components</p> <p>Reconstruction of the distribution network, expansion of substation capacity, transition to a 20 kV voltage level, deployment of SCADA systems, smart metering, network</p>



B-2.2: Individual action outlines – 1.2.7		
		<p>automation, pilot-phase energy storage, development of microgrids, implementation of DSM technologies and flexible grid solutions, integration of ICT, and customer-side systems (including EV infrastructure and AMI)</p> <p>Estimated total investment: approximately EUR 115 million.</p> <p>Operational costs by project components Maintenance of the reconstructed network and equipment, operation and servicing of SCADA systems and smart meters, battery management, management of microgrids and DSM systems, management of AMI and EV user systems</p> <p>Estimated cost: EUR 3.5 million per year</p> <p>Funding options:</p> <ul style="list-style-type: none"> ➤ International funds and grants ➤ International financial institutions (EBRD, EIB, KfW, World Bank) through favourable loans ➤ Environmental Protection Fund of FBiH for co-financing this type of project ➤ Environmental Protection and Energy Efficiency Fund of RS ➤ Development Bank of FBiH ➤ Specialized bank credit lines in BiH for investments in renewable energy sources (RES) ➤ Own budgets of local authorities and the DSO ➤ Public-private partnerships (PPP) <p>Project timeline: Preparatory phase (2025-2026), Implementation phase (2027-2029), Operational phase (2030).</p>
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	Total costs: 115 million EUR

3.2.2 Industrial Processes and Product Use

The IPPU sector in Sarajevo FUA is set to advance significantly through targeted interventions aimed at reducing greenhouse gas emissions and enhancing industrial competitiveness by modernizing cooling technologies and industrial energy systems. The project Clean and



Climate-Safe Cooling will replace outdated cooling systems with advanced, energy-efficient units utilizing low-GWP refrigerants, in compliance with the Kigali Amendment and national F-gas regulations. This includes safe dismantling and disposal of existing equipment and fluorinated gases, ensuring environmental safety and regulatory adherence. Alongside the technical upgrades, a tree planting initiative will support local climate mitigation efforts and urban cooling. Governance measures include implementing a phased HFC reduction plan (2024–2030), mandating technician certification for refrigerant handling, and establishing strict permitting and compliance protocols. The project will leverage international climate finance sources such as the GEF and GCF, complemented by capacity building programs for companies and technicians on sustainable cooling technologies and maintenance best practices.

Industrial facilities will undergo comprehensive energy audits, identifying opportunities for process optimization, heat waste recovery, and efficiency improvements in lighting and heating. A key measure involves replacing half of the natural gas heating with industrial heat pumps combined with thermal storage, and the other half with sustainable biomass heating, improving the sector’s energy profile and reducing emissions. To boost international market access, the project includes preparing a Carbon Border Adjustment Mechanism (CBAM) compliance report on embedded CO₂ emissions in products, aligning local industry practices with EU requirements. Governance frameworks will require mandatory or incentivized energy audits and establish minimum energy performance standards for industrial processes and systems. Financial incentives will be designed to support audit implementation and energy efficiency upgrades. Sector-specific training for plant engineers, energy managers, and operators will drive knowledge transfer, while documented case studies and collaborative R&D will promote scalable solutions across industries. These measures will improve indoor thermal conditions, increasing worker productivity and reducing absenteeism, while strengthening industrial competitiveness and fostering favourable wage conditions.

B-2.2: Individual action outlines – 2.1.		
Action outline	Action name	2.1 Clean and climate-safe cooling
	Action type	Technical interventions
	Action description	In the FUA Sarajevo region, cooling systems mainly rely on outdated technologies that use refrigerants with high GWP, such as HFCs (hydrofluorocarbons). These systems significantly contribute to F-gas emissions, which have a strong greenhouse effect and a long-term impact on climate change. The aim of the project is to replace cooling systems that use HFC refrigerants with more environmentally friendly alternatives.
Reference to impact pathway	Field of action	IPPU
	Systemic lever	Technology/Infrastructure Governance and policy Learning & capabilities Finance & Funding
	Outcome (according to module B-1.1)	Decreased emissions of fluorinated gases (F-gases) through the implementation of energy-efficient, environmentally friendly cooling systems
Implementation	Responsible bodies/person for implementation	MVTEO BiH - Ozone Unit of BiH
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Buildings using outdated cooling systems
	Involved stakeholders	Government of Sarajevo Canton City of East Sarajevo



B-2.2: Individual action outlines – 2.1.		
		Private companies Public institutions
	Comments on implementation – consider mentioning resources, timelines, milestones	The project involves the preparation of documentation, procurement, and installation of energy-efficient cooling systems, including the dismantling and environmentally safe disposal of old systems and controlled substances. Professional supervision will be needed to ensure proper execution. Soft measures, such as implementation of the phased HFC reduction plan (2025-2030), education of companies on energy-efficient technologies and cooling system management, implementation of energy audits and organization of training programs for technical personnel, will be needed as well.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	40,725 tCO _{2eq}
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO _{2e} unit	CAPEX: 14,968,087 EUR OPEX: 150,000 EUR/year Total costs by CO _{2e} unit: 371 EUR/tCO _{2eq}

B-2.2: Individual action outlines – 2.2.		
Action outline	Action name	2.2. Energy efficient and low-carbon industry
	Action type	Technical interventions
	Action description	The project targets the reduction of natural gas consumption in the industrial sector of FUA Sarajevo by introducing energy efficiency measures and integrating heat pumps and biomass-based heating systems. Industrial facilities currently consume about a quarter of total consumption of natural gas. Many rely on outdated natural gas boilers, with limited heating in some cases. By retrofitting heating systems with efficient technologies and switching to cost-effective biomass solutions, the project will lower operational costs, enhance worker comfort and productivity, and reduce annual air emissions.
Reference to impact pathway	Field of action	IPPU
	Systemic lever	Technology/Infrastructure Finance & Funding
	Outcome (according to module B-1.1)	Reduced natural gas consumption in the industry achieved through implemented energy efficiency measures (measures on production processes, heat waste recovery, improvement of efficiency of industrial lighting, improvement of industrial processes, technology and management (SCADA)) and substitution of gas with



B-2.2: Individual action outlines – 2.2.		
		heat pumps (50%) and biomass (50%) for heating industrial halls.
Implementation	Responsible bodies/person for implementation	Ministry of Economy of SC, Ministry of Economy and Entrepreneurship of RS
	Action scale & addressed entities	The intervention targets the industrial sector within the FUA Sarajevo area, with a focus on industrial enterprises requiring heating. The project will cover a range of buildings and production facilities, particularly those using natural gas boilers for heating.
	Involved stakeholders	Entrepreneurs, equipment manufacturers, auditors, commercial banks
	Comments on implementation – consider mentioning resources, timelines, milestones	The project implementation involves a phased approach to support industrial decarbonization through energy efficiency upgrades and heat pumps and biomass-based heating. It begins with the development of a grant model that includes criteria for co-financing energy audits and implementation measures. Public calls and application rankings will follow, enabling targeted support to selected industrial enterprises. Audits will identify suitable measures and opportunities for installing heat pumps and efficient biomass boilers. The transition to biomass, which is significantly more cost-effective than natural gas, is planned for 50% of the halls, while the remaining 50% are expected to switch to heat pumps, complemented by energy efficiency actions that can cut consumption by 20%. Soft measures include the development of financing models, coordination with industry, and ensuring sustainable biomass sourcing practices. In the case of applying heat pumps in existing industrial halls, it is necessary to invest in energy efficiency measures and/or adapt the internal installations. For each specific case, an energy audit must be conducted to select and properly size the heating energy source.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	532 TJ of energy from natural gas 84 GWh of electricity
	GHG emissions reduction estimate (total) per emission source sector	38,982 tCO _{2eq}
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO _{2e} unit	CAPEX: 46,306,122 EUR OPEX: 25,565 EUR/year Total costs by CO _{2e} unit: 1,189 EUR/tCO _{2eq}



3.2.3 Mobility & Transport

As previously noted, transport within Sarajevo FUA is predominantly reliant on **motorised private and commercial vehicles** powered by fossil fuels—**mainly diesel**—making it **the largest contributor to air pollution** in the area. Improving air quality will require a shift toward non-motorised modes of transport, such as walking and cycling, as well as the widespread adoption of electric mobility solutions.

The Cantonal government is currently implementing a project aimed at expanding and modernising public transportation. Efforts include the continuous replacement of outdated vehicles, with the goal of improving the frequency, coverage, and reliability of the public transport system. Plans are underway to replace part of the bus fleet with electric buses. In addition to enhancing fleet efficiency, the government is also working to extend the reach of public transport services by developing new tram lines and expanding bus and trolleybus routes to underserved areas. According to the draft urban development plan of Sarajevo Canton, tram lines are planned to connect Dobrinja and Šip, in addition to the line to Hrasnica, which is currently under construction. The City of East Sarajevo plans to establish public transport services through a public-private partnership and procurement of electric buses.

These efforts aim to improve accessibility and encourage greater use of public transportation. It will be necessary to deploy adaptive traffic control systems that prioritize public transport and reduce congestion.

To support public transport users, plans are in place to enhance the ticketing system, ensuring affordability and seamless integration across multiple modes of transport (e.g., a single ticket for various services). Access to real-time public transport information is crucial, so the plan includes developing mobility-as-a-service platforms. These platforms will integrate public transit, bike-sharing, car-sharing into a single application, encouraging multimodal journeys (e.g., train + shared bike). As an example, this approach involves arriving by train from a remote area to the central station, and then continuing the journey by tram, bus, rental bicycle, or other modes of transport, depending on the passenger's needs. Citizens will be offered flexible, multimodal transport options that integrate seamlessly with public transit. This will help reduce traffic congestion and decrease reliance on private vehicles. Aiming to offer flexible, low-emission transportation alternatives it is planned to encourage expansion of shared transport like Next Bike, e-car-sharing and e-scooter-sharing programs, like E-Go and BinBin, as well as introduction of e-bike sharing system. This measure should be accompanied with adopting new legislation on mobility in order to better regulate scooter and bike transport.

Cycling will play an increasingly important role. New cycle lanes will be built, and the safety of existing routes improved, making cycling a practical option for everyday journeys. A major step is the shift to environmentally friendly vehicles. Through financial incentives citizens and businesses will be encouraged to switch to electric vehicles while a wide network of charging stations will be developed at key locations and mobility hubs in the FUA. This will require a new transport regulation particularly emphasizing the safety of non-motorized transport and pedestrians.

Once the necessary prerequisites for the transition from fossil fuel-powered car transport to more sustainable modes of transport are in place, the implementation of low-emission zones will begin. A study for this initiative has already been completed. It is planned to implement low emission zones in high-traffic urban areas to limit the entry of high-polluting vehicles, thereby improving air quality. This measure will be supported by the introduction of new financial instruments—specifically, fees for vehicles entering the low-emission zone, calculated in proportion to the vehicle's Euro emission standard. To accommodate passengers who commute daily from distant areas to work in FUA Sarajevo, the construction of park-and-ride facilities is planned. Investment in park-and-ride facilities will allow passengers from sub-urban areas to shift to another transport mode. Some of the considered locations for park-and-ride



facilities are as follows: in the municipality of Hadžići, near the Pazarić settlement and railway station; in the municipality of Ilijaš, close to the Ilijaš railway station and the Centrotrotrans bus station; in the municipality of Ilidža, near the Ilidža tram terminal; and in the municipality of Vogošća, near the main trolleybus station in the centre of Vogošća. However, these proposed locations have not yet been incorporated into the spatial planning documentation. To support the transition toward climate-neutral, people-centered urban transport, Sarajevo FUA will implement a network of strategically placed mobility hubs designed to enable seamless multimodal travel across Sarajevo Canton and East Sarajevo. These hubs will serve as integrated points connecting public transport, cycling, electric mobility, and shared mobility services in a single, user-friendly environment. Several locations have been considered: Bus station and Vojkovići in East Sarajevo; Railway Station (City Center), Austria Square, Ilidža and Nova Otoka. Sarajevo Airport in Sarajevo Canton. The final selection of the location will be subject of the feasibility studies. The final decision has to be aligned with spatial documentation.

Prepare a feasibility study to explore the possibility of building vertical transport systems (cable car, funicular) in hilly areas such as Žuč, Hum, and Sedrenik, with the goal of reducing car transport.

Logistics consolidation into mobility hubs with EV and cargo bike last-mile delivery, supported by dedicated charging infrastructure and smart delivery zones, will optimize freight flows. LEZ policies will limit delivery vehicle emissions during peak hours. Financing mixes private capital and public subsidies, with PPPs encouraged for infrastructure development. Training programs and digital logistics platforms will enhance efficiency.

It is crucial to support these efforts with ongoing education for citizens on the health benefits of reducing vehicle emissions and promoting sustainable transportation options.

B-2.2: Individual action outlines – 3.1.		
Action outline	Action name	3.1 Development of cycling infrastructure
	Action type	Physical/Spatial intervention Technical interventions
	Action description	The project aims to transform urban mobility in FUA Sarajevo by developing cycling infrastructure. Currently, cycling is underutilized, representing only 0.6% of total traffic, due to inadequate lane networks and poor connectivity, limiting its function to recreation rather than daily commuting. This project addresses these systemic issues by expanding the cycling lane network, adding bike stands and integrating these upgrades into mobility hubs that connect with public transport, e-scooters, and shared e-vehicles. The implementation of this project involves an ambitious expansion of cycling and e-mobility infrastructure throughout FUA Sarajevo, combining physical investments with supportive soft measures to ensure long-term success. Key infrastructure includes the construction of 47 km of new bike lanes connecting major urban points and the establishment of 50–100 bike stands. In East Sarajevo, planned routes will connect key areas including Pale, Jahorina, and riverside zones, while in Sarajevo Canton, significant upgrades like the 14 km Nedžarići–Skenderija lane will support the wider cycling network. Establishing clear legal frameworks will define safety standards, speed limits, and usage rules. Soft measures also include public



B-2.2: Individual action outlines – 3.1.		
		<p>education campaigns highlighting the health, environmental, and economic benefits of active transport.</p> <p>This approach tackles one of the largest sources of GHG emissions in FUA - transport, while enhancing accessibility, safety, and the attractiveness of sustainable modes of travel. It is pivotal to Sarajevo’s Net Zero strategy, ensuring a shift from private car use to low-emission, active, and public transport, supporting the modal split goal of 30% active mobility, 30% public transport, and 30% private vehicles.</p>
Reference to impact pathway	Field of action	Mobility & transport
	Systemic lever	Technology/Infrastructure Governance and policy Finance & funding Learning & capabilities
	Outcome (according to module B-1.1)	Enhanced cycling infrastructure developed through collaboration with Sarajevo Canton and East Sarajevo
Implementation	Responsible bodies/person for implementation	N/A
	Action scale & addressed entities	The intervention targets the urban areas of Canton Sarajevo and East Sarajevo, focusing on the expansion of cycling infrastructure. The project will cover various city districts, public transport stations, business areas, and residential zones.
	Involved stakeholders	N/A
	Targeted groups	The project targets daily commuters, students, young adults, tourists, and residents of suburban areas.
	Comments on implementation – consider mentioning resources, timelines, milestones	<p>This project requires significant human resources like</p> <ul style="list-style-type: none"> Urban mobility planners and engineers Communication and outreach teams Legal teams for regulation development and enforcement <p>It can be implemented in several phases: Phase 1: Planning, Design & Regulatory Setup (2025–2026)-</p> <ul style="list-style-type: none"> Conduct detailed technical and route design studies for all planned cycling corridors, with special attention to safety, land ownership, and integration with public transport. Finalize inter-municipal coordination agreements, especially between Sarajevo Canton and East Sarajevo. Draft and adopt legal frameworks for micromobility regulation: safety standards, speed limits, designated zones, and enforcement mechanisms. This includes suggestions given by citizen Assembly: Define a minimum age requirement (14 years) for operating electric scooters and e-bikes, establish a registration system for micromobility vehicles, requiring visible ID plates, Mandate use of safety equipment (helmets, protective gear).



B-2.2: Individual action outlines – 3.1.		
		<ul style="list-style-type: none"> Launch pilot awareness campaigns and educational materials on cycling and e-mobility benefits. <p>Phase 2: Infrastructure Construction and Equipment Installation (2026–2028) Begin phased construction of 47 km of new bike lanes, including priority corridors:</p> <ul style="list-style-type: none"> 14 km Nedžarići–Skenderija route East Sarajevo links to Pale, Jahorina, and riverside areas <p>Install 50–100 new bike parking stands and micromobility hubs with e-bike/scooter charging points.</p> <p>Ensure connectivity with public transport hubs and park-and-ride facilities.</p> <p>Phase 3: System Activation and Scaling (2028–2030)</p> <ul style="list-style-type: none"> Operationalize the network with clear signage, digital routing tools, and community mapping. Expand soft measures: city-wide campaigns on cycling culture, safety, and benefits. Integrate bike lanes into integrated mobility apps
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	21.531 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 23,970,950 EUR OPEX: 1,198,547 EUR Total costs by CO ₂ e unit: 1,169 EUR/tCO _{2eq}

B-2.2: Individual action outlines – 3.2		
Action outline	Action name	3.2 Development of shared bicycle and scooter traffic
	Action type	Physical/Spatial intervention Technical interventions
	Action description	Sarajevo is expanding its shared e-mobility services (e-scooters and e-bikes) as part of its strategy to reduce transport emissions, ease congestion, and encourage a shift away from private vehicle use. Current services, operated by BeeBee, BinBin, and Nextbike, are already improving first- and last-mile connectivity and supporting low-carbon travel behaviour. The integration of e-bikes in the bike-sharing network, especially in hilly areas, and plans for expanding charging infrastructure and bike fleets, further reinforce this shift. These developments



B-2.2: Individual action outlines – 3.2		
		<p>have an important role in meeting Net Zero Cities goals by cutting emissions and improving air quality. A key project objective is to achieve a more sustainable modal split, targeting equal shares for public transport, private vehicles, and active mobility. The project will have three major components:</p> <p>Component 1 – Bike, E-Bike and E-Scooter Sharing System: A public micromobility system will be launched with strategically located rental stations and added bike parking to promote multimodal, low-emission transport and reduce car use. The model allows for future privatization to lower public costs.</p> <p>Component 2 – Charging Infrastructure: Smart locker charging stations (e.g. Bikeep) will be installed at key locations, providing secure, weatherproof charging for personal e-mobility devices. Regulatory changes will support faster deployment, enhancing user convenience and system scalability.</p> <p>Component 3 – Public Awareness Campaign: A city-wide campaign will raise awareness about the benefits of cycling and sustainable mobility, encouraging behavioural change and wider adoption of low-carbon transport options.</p>
Reference to impact pathway	Field of action	Mobility & transport
	Systemic lever	Technology/Infrastructure Governance and policy Finance & funding Learning & capabilities
	Outcome (according to module B-1.1)	Enhanced e-mobility infrastructure
Implementation	Responsible bodies/person for implementation	N/A
	Action scale & addressed entities	The intervention targets the urban areas of Canton Sarajevo and East Sarajevo, focusing on the expansion of e-mobility options. The project will cover various city districts, public transport stations, business areas, and residential zones.
	Involved stakeholders	N/A
	Targeted groups	The project targets daily commuters, students, young adults, tourists, and residents of suburban areas.
	Comments on implementation – consider mentioning resources, timelines, milestones	The project’s implementation requires a combination of infrastructure investments and supportive regulatory measures to ensure successful adoption of shared e-bikes and e-scooters. Efficient rollout will depend on simplified permitting procedures and consistent technical standards. On the soft side, clear micromobility regulations, covering safety features, speed limits, usage zones, and parking rules, must be adopted to ensure safe integration into urban mobility. A public awareness campaign will be needed to



B-2.2: Individual action outlines – 3.2		
		<p>build user trust and promote the environmental and health benefits of active mobility.</p> <p>The project should be implemented following this timeline:</p> <p>Phase 1: Planning and Regulatory Preparation (2026-2027)</p> <ul style="list-style-type: none"> • Finalize system design, select rental station locations, and develop operational framework. • Draft and adopt necessary regulatory changes to streamline installation of charging infrastructure and define operational rules for micromobility. • Evaluate opportunities for privatization or public-private partnerships to reduce public costs. • Engage stakeholders including municipalities, private sector, and community groups. • Develop initial content and strategy for public awareness campaign. <p>Phase 2: Deployment of Infrastructure and Launch of Sharing System (2027–2028)</p> <ul style="list-style-type: none"> • Install rental stations and bike parking across strategic urban locations. • Begin rollout of the bike, e-bike and e-scooter sharing system, including procurement or partnership agreements. • Install smart locker charging stations (such as Bikekeep) at transport hubs, universities, and commercial areas. • Launch the public awareness campaign to promote the system and sustainable mobility benefits. <p>Phase 3: System Optimization and Expansion (2029-2030)</p> <ul style="list-style-type: none"> • Monitor usage data and user feedback to optimize station placement and service quality. • Plan for system scaling and integration into broader urban mobility platforms.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	2,080 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO _{2e} unit	CAPEX: 2,704,950 EUR OPEX: 135,247 EUR Total costs by CO _{2e} unit: 1,365 EUR/tCO _{2eq}



B-2.2: Individual action outlines 3.3.		
Action outline	Action name	3.3 Establishment of park&ride and mobility hubs areas- 3.3.1.Park & Ride
	Action type	Technical interventions Physical/spatial intervention Other interventions
	Action description	<p>The Park&Ride initiative aims to address the city's parking and traffic congestion challenges while improving air quality and promoting sustainable urban mobility. With the city's parking demand surpassing supply and resulting in congestion, the project will introduce designated Park&Ride facilities at strategic locations. These facilities will encourage commuters to park outside the city centre and use public transport, reducing car usage in the core. This shift will not only ease congestion but also support the LEZ by reducing pollution levels. The development of Park & Ride facilities at strategically located hubs, such as in the municipality of Hadžići- near the Pazarić settlement and railway station; in the municipality of Ilijaš-close to the Ilijaš railway station and the Centrotrotrans bus station; in the municipality of Ilidža-near the Ilidža tram terminal; and in the municipality of Vogošća, near the main trolleybus station in the centre of Vogošća. This will provide commuters with an easy way to park and continue their journey using public transport, thus easing congestion in the city centre. The implementation includes multilevel parking structures equipped with a smart parking system, offering features such as digital occupancy tracking and automated payments to streamline operations. Additionally, the facilities will cater to multimodal transport, including bicycle parking and e-scooter docking stations, promoting sustainable transport options. Electric vehicle charging stations and green infrastructure like solar-powered lighting will further align with eco-friendly goals. Key implementation components also involve integrating the Park & Ride system with public transport networks and the LEZ initiative. A user-friendly digital information system and robust security measures will ensure convenience and safety. The public-private partnership model will support the financial sustainability of the project, while public awareness campaigns and behavioural change efforts will encourage widespread adoption. It is expected that the integration with the LEZ and a unified ticketing system will offer an attractive alternative to private car use. This project will also explore integrating green infrastructure and greening activities, such as green roofs, tree planting, or wildflower strips or living hedges into construction of infrastructure.</p> <p>Key expected improvements include reduced traffic and emissions, better availability of central parking, cost savings for commuters, and enhanced public transport reliability. The project aligns with the goal of achieving a balanced "Modal Split" with 30% public transport, 30% private vehicles, and 30% active mobility, contributing to Sarajevo's long-term sustainable transport vision.</p>
Reference to impact pathway	Field of action	Mobility & transport
	Systemic lever	Technology/Infrastructure Finance & funding



B-2.2: Individual action outlines 3.3.		
		Learning & capabilities Governance and policy
	Outcome (according to module B-1.1)	Establishing Park & Ride facilities enhancing public transportation accessibility, reducing traffic congestion, and promoting sustainable commuting by providing convenient parking options at key transit hubs
Implementation	Responsible bodies/person for implementation	N/A
	Action scale & addressed entities	FUA Sarajevo - Sarajevo Canton Regulatory framework, public awareness, spatial development
	Involved stakeholders	N/A
	Targeted Groups	The project targets suburban and peri-urban commuters, daily drivers entering the city, and public transport users seeking convenient transfer points.
	Comments on implementation – consider mentioning resources, timelines, milestones	
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	10,277 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 7,800,000 EUR OPEX: 312,000 EUR Total costs by CO ₂ e unit: 789 EUR/tCO ₂ eq

B-2.2: Individual action outlines 3.3		
Action outline	Action name	3.3 Establishment of park&ride and mobility hubs areas - 3.3.2. Mobility hubs areas
	Action type	Physical/spatial intervention Technical interventions
	Action description	To support the transition toward climate-neutral, people-centred urban transport, Sarajevo FUA will implement a network of strategically placed mobility hubs designed to enable seamless multimodal travel across Sarajevo Canton and East Sarajevo. These hubs will serve as integrated points connecting public transport, cycling, electric mobility, and shared mobility services in a single, user-



B-2.2: Individual action outlines 3.3		
		<p>friendly environment. Several locations have been considered: Bus station and Vojkovići in East Sarajevo; Railway Station (City Center), Austria Square, Ilidža and Nova Otoka. Sarajevo Airport in Sarajevo Canton. The final selection of the location will be subject of the feasibility studies. The final decision has to be aligned with spatial documentation.</p> <p>Each mobility hub will be equipped with essential infrastructure, including secure bicycle parking, EV charging stations, designated boarding platforms for public transport, and zones for e-bike, e-scooter, and car-sharing services. These facilities aim to reduce dependency on private vehicles, improve first/last-mile connectivity, and promote active and low-emission transport options.</p> <p>To complement the physical infrastructure, a comprehensive digital information and security system will be deployed. This system will provide real-time updates on public transport arrivals, vehicle availability, charging station occupancy, and traffic conditions. It will also integrate smart surveillance and lighting to ensure user safety and system resilience.</p> <p>Mobility hubs will be strategically located at key transit nodes and cross-jurisdictional corridors to support efficient commuting, reduce emissions, and facilitate sustainable economic integration within the functional urban area.</p> <p>By combining physical infrastructure with smart digital systems, this measure directly supports CNAP goals of emission reduction, transport decarbonization, and regional cooperation, while enhancing convenience, accessibility, and safety for all users.</p>
Reference to impact pathway	Field of action	Mobility & transport
	Systemic lever	Technology/Infrastructure Governance and policy Finance & funding Learning & capabilities
	Outcome (according to module B-1.1)	Enhanced public transport connectivity across the entire FUA Sarajevo through the construction of mobility hubs aligned with the SUMP (Sustainable Urban Mobility Plan)
Implementation	Responsible bodies/person for implementation	Ministry of transport of Canton Sarajevo Cantonal Road directorate Urban planning department of City of East Sarajevo
	Action scale & addressed entities	The project targets both Sarajevo Canton and East Sarajevo, ensuring cross-jurisdictional integration and mobility interoperability across entity boundaries. The project links cycling, e-mobility, shared mobility, and public transport, serving as a backbone for sustainable urban transport. It includes hard infrastructure (parking, EV chargers, bike stands, platforms) and smart systems (real-time info, mobility apps, surveillance).
	Involved stakeholders	Landowners Municipalities Bus station and railway station management Federal Railways



B-2.2: Individual action outlines 3.3		
	Targeted Groups	The project targets daily public transport users, commuters from suburban and peri-urban areas, and underserved communities within FUA Sarajevo
	Comments on implementation – consider mentioning resources, timelines, milestones	<p>The development of mobility hubs across Sarajevo FUA is a high-impact infrastructure and systems integration project aimed at facilitating seamless multimodal transport, reducing car dependency, and supporting the region’s shift toward climate-neutral mobility. Successful implementation will require coordination between Sarajevo Canton and East Sarajevo, along with robust planning, investment, and stakeholder engagement. The project implementation phases:</p> <p>Phase 1: Planning and Design (2025–2026)</p> <ul style="list-style-type: none"> • Site identification and feasibility studies for 5–7 priority locations across Sarajevo Canton and East Sarajevo. • Development of mobility hub design standards, including space requirements for public transport, shared mobility, cycling, EV infrastructure, and digital systems. • Begin regulatory and permitting procedures, including land use approvals and mobility integration guidelines. • Develop inter-municipal agreements for governance, maintenance, and data sharing. <p>Phase 2: Infrastructure Development and Installation (2026–2030)</p> <ul style="list-style-type: none"> • Construction of initial pilot mobility hubs, focusing on high-traffic nodes (e.g., central bus terminals, university zones, park-and-ride locations). <p>Installation of:</p> <ul style="list-style-type: none"> • Bike racks and secure storage lockers • EV charging stations (smart lockers for e-bikes/e-scooters, Level 2/3 chargers for cars) • Designated public transport platforms • Smart signage and digital info systems • Integration of real-time mobility management tools and user applications <p>The location of the mobility hub at Sarajevo Airport should be considered with utmost importance, especially in the context of expanding the tram line to Dobrinja. According to recommendations from the Association of Architects, linking the airport with the tram line—combined with other mobility options—will significantly reduce dependence on cars.</p> <p>Financing may come from a combination of cantonal and East Sarajevo budgets, private funding, concessional loans (e.g. EBRD, World Bank), EU pre-accession funds, and climate finance mechanisms (e.g. GCF, NAMA Facility).</p> <p>Technical expertise in design of mobility hubs will be essential.</p>



B-2.2: Individual action outlines 3.3		
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	77,679 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	CAPEX: 22,678,300.00 EUR OPEX: 907,132.00 EUR .
		Total costs by CO2e unit: 304 EUR/tCO2eq

B-2.2: Individual action outlines 3.4		
Action outline	Action name	3.4. Greening of public transport- 3.4.1 Electric Public Transport Fleet
	Action type	Technical interventions Physical/spatial intervention
	Action description	<ul style="list-style-type: none"> As part of the CNAP’s vision to decarbonize urban mobility and improve the quality of life in Sarajevo, a new generation of electric public transport vehicles will be introduced across the Functional Urban Area. This action aims to significantly reduce greenhouse gas emissions, air pollution, and urban noise levels, while modernizing the city’s aging fleet and improving transport accessibility. The plan includes the procurement of smaller electric buses to serve urban routes and navigate the more demanding topography of East Sarajevo. Specifically, 15 outdated Euro 1 and Euro 2 standard buses will be replaced with zero-emission alternatives, marking a major step toward climate neutrality in public transit. In the wider Sarajevo Canton, the initiative involves the procurement of 10 electric minibuses, 20 electric buses, and 10 new trolleybuses. This includes 3 electric solo buses funded through a pilot project with the World Bank, reflecting strong international cooperation and commitment to innovation. These vehicles will enhance service on existing routes and enable the extension of trolleybus lines to suburban areas such as Vogošća, promoting modal shift and connectivity for peripheral communities. To support the operational viability of these electric fleets, charging infrastructure will be constructed and strategically deployed at depots, terminal stations, and other high-demand nodes. This



B-2.2: Individual action outlines 3.4		
		<p>infrastructure investment is critical for ensuring reliable service, managing energy loads, and enabling efficient fleet rotation.</p> <ul style="list-style-type: none"> In line with draft urban plan and Association of architects recommendation it is envisaged to prepare a feasibility study to explore the possibility of building vertical transport systems in hilly areas such as Žuč, Hum, and Sedrenik, with the goal of reducing car transport. In line with the Citizen Assembly's priorities to enhance accessibility, improve road safety, and reduce reliance on private vehicles, it is recommended that public transport services across the Sarajevo Functional Urban Area (FUA) be extended to operate 24/7. Priority should be given to routes currently lacking night-time service. Expanding service hours will not only promote more sustainable mobility and equitable access to transport but also support tourism development and stimulate night-time economic activity. Expand a priority lane for public transport to improve efficiency, reduce travel time, and encourage a shift from private car use to more sustainable mobility options. Engage traffic police as key stakeholders to enforce traffic rules more effectively and support public transport improvements. <p>These measures are aligned with the Net Zero Cities initiative and are expected to contribute to achieving a balanced "Modal Split" of 30% public transport, 30% private vehicles, and 30% active mobility (cycling and walking).</p>
Reference to impact pathway	Field of action	Mobility & transport
	Systemic lever	Technology/Infrastructure Governance and policy Learning & capabilities Finance & Funding
	Outcome (according to module B-1.1)	Improved sustainability of public transport through the implementation of green transportation initiatives
Implementation	Responsible bodies/person for implementation	N/A
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Transport network, infrastructure (charging stations, bus stops, adaptation of roads and infrastructure), fleet modernization, environmental & technical infrastructure
	Involved stakeholders	N/A
	Targeted Groups	The project targets daily public transport users, environmentally conscious citizens, commuters from urban and peri-urban areas, and vulnerable groups relying on affordable mobility options.
	Comments on implementation – consider mentioning resources, timelines, milestones	<p>Significant upfront investment is needed for vehicle procurement, charging infrastructure, and grid upgrades.</p> <p>Financing may come from a combination of cantonal and East Sarajevo budgets, private funding, concessional loans (e.g. EBRD, World Bank), EU pre-accession funds,</p>



B-2.2: Individual action outlines 3.4		
		<p>and climate finance mechanisms (e.g. GCF, NAMA Facility).</p> <p>Technical expertise in electric vehicle systems, fleet logistics, and energy management will be essential.</p> <p>Local capacity building will be required for transit authorities, drivers, and maintenance personnel.</p> <p>Key milestones are:</p> <ul style="list-style-type: none"> • 2025 – Secured financing and tendering process initiated • 2026 – First charging stations installed; World Bank pilot launched • 2027 – First full electric bus and minibus lines operational • 2028 – All vehicles procured and delivered; charging network functional • 2030 – Measurable reduction in emissions from public transport sector; evaluation completed for scaling or replication
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	89,231 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	CAPEX: 33,600,000 EUR OPEX: 2,688,000 EUR Total costs by CO2e unit: 407 EUR/tCO _{2eq}

B-2.2: Individual action outlines		
Action outline	Action name	3.4. Greening of public transport- 3.4.2 Tram line extensions
	Action type	Technical interventions Physical/spatial intervention
	Action description	The expansion and modernization of the tram network in Sarajevo Canton aims to address the outdated public transport system and support sustainable urban mobility. The focus will be on modernizing the tram fleet with the addition of 10 new trams. This will expand the network on the Ilidža–Hrasnica line. Alongside vehicle modernization, the tram network will be expanded to include new tram lines. Nedžarići Dorbrinja, Railway station- Šip, Stup-Rajlovac. In terms of soft measures, the project will involve



B-2.2: Individual action outlines		
		the establishment of a public-private partnership model, which will define the roles of all parties involved, with subsidies to support the acquisition of new vehicles and infrastructure. The spatial planning documents will need to be modified to incorporate new tram tracks and electric vehicle charging stations, aligning with urban development standards and reducing environmental impacts.
Reference to impact pathway	Field of action	Mobility & transport
	Systemic lever	Technology/Infrastructure Governance and policy Learning & capabilities Finance & Funding
	Outcome (according to module B-1.1)	Improved sustainability of public transport through the implementation of green transportation initiatives
Implementation	Responsible bodies/person for implementation	N/A
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton) Transport network, infrastructure (charging stations, tram stops, adaptation of roads and infrastructure), fleet modernization, environmental & technical infrastructure
	Involved stakeholders	N/A
	Targeted Groups	The project targets daily public transport users, environmentally conscious citizens, commuters from urban and peri-urban areas, and vulnerable groups relying on affordable mobility options.
	Comments on implementation – consider mentioning resources, timelines, milestones	2026 Feasibility studies, route planning completed, tram procurement launched 2027-2030 Construction of new lines 2030 Full system operational and integrated into FUA smart mobility network
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	43,876 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 49,965,039.80 EUR OPEX: 4,996,503.98 BAM Total costs by CO ₂ e unit: 1,253 EUR/tCO _{2eq}

B-2.2: Individual action outlines 3.4.-3.4.3

Action outline	Action name	3.4.-3.4.3 Digital mobility platform for integrated public transport
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B-2.2: Individual action outlines 3.4.-3.4.3		
	Action type	Technical interventions
	Action description	The project aims to develop and implement a unified digital mobility platform across FUA Sarajevo to support public transport coordination, increase accessibility, and reduce CO ₂ emissions. A comprehensive Digital Mobility Platform will offer real-time information on all public transport and shared mobility options (buses, trams, e-bikes, e-cars, etc.). Currently, public transport is underutilized due to outdated infrastructure and the absence of a user-friendly digital system. The new platform will enable route planning, real-time updates, and purchase of various ticket types (including multi-day and monthly) via a mobile application, while introducing contactless payment options. It will also support integration between transport services across entity lines, improving regional connectivity and contributing to reduced private car use and air pollution.
Reference to impact pathway	Field of action	Mobility & transport
	Systemic lever	Technology/Infrastructure Governance and Policy Learning & Capabilities
	Outcome (according to module B-1.1)	Improved public transport connectivity and efficiency through the implementation of a digital mobility platform
Implementation	Responsible bodies/person for implementation	Ministry of Transport of Sarajevo Canton, City of East Sarajevo, City Development Agency East Sarajevo
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Public transport
	Involved stakeholders	Public transport companies (GRAS, Centrotrans) Private mobility service providers (taxi services, ride-sharing platforms) Citizens and transport service users Non-governmental organizations focused on sustainable mobility Investors and technology companies interested in the development of digital solutions.
	Comments on implementation – consider mentioning resources, timelines, milestones	The implementation of the Digital Mobility Platform will involve the development of a centralized and modular system that integrates public transport and emerging mobility services. Core infrastructure measures include the design of a real-time tracking system, mobile and web applications, smart stops with digital displays, GPS-enabled vehicles, and a unified payment interface allowing for contactless transactions. Key soft measures focus on enabling regulatory frameworks for mobility service integration, standardizing data exchange protocols among providers, and ensuring data privacy and user transparency. Additionally, stakeholder engagement will be supported through public awareness campaigns, digital literacy initiatives for citizens, and capacity building for operational staff. Key milestones: <ul style="list-style-type: none"> • 2027 Project scoping completed; funding and partnerships secured • 2028 Platform design and stakeholder agreements in place



B-2.2: Individual action outlines 3.4.-3.4.3		
		<ul style="list-style-type: none"> 2029 Full system live with public app and city dashboard operational
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 4,081,632.65 EUR OPEX: 102,258.38 EUR/year

B-2.2: Individual action outlines 3.5		
Action outline	Action name	3.5. Electrification of taxis and public (institutional) vehicles
	Action type	Technical interventions Physical/spatial intervention Other interventions
	Action description	The project focuses on the electrification of taxis and publicly owned vehicles to reduce GHG emissions, improve air quality, and promote sustainable transport. Sarajevo Canton has already initiated a financial aid program for electric taxis, which significantly lowers operating costs and CO ₂ emissions compared to conventional diesel and petrol vehicles. This initiative will be extended to East Sarajevo, providing an opportunity to expand the electrification of both cars and motorcycles. The expected improvements include reduced CO ₂ emissions, enhanced air quality, noise reduction, and lower dependency on fossil fuels. Key components include the establishment of charging infrastructure and driver education programs. Additionally, financial incentives will make electric taxis more competitive by reducing fuel and maintenance costs.
Reference to impact pathway	Field of action	Mobility & transport
	Systemic lever	Technology/Infrastructure Finance & funding Learning & capabilities Governance and policy
	Outcome (according to module B-1.1)	Increased adoption of electric taxis and publicly owned institutional vehicles through subsidies, contributing to a greener and more sustainable transportation system
Implementation	Responsible bodies/person for implementation	N/A
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Taxi fleet, charging infrastructure, drivers, regulatory framework, public awareness



B-2.2: Individual action outlines 3.5		
	Involved stakeholders	N/A
	Targeted Groups	The project targets taxi drivers, taxi companies, public institutions with vehicle fleets, and environmentally conscious citizens
	Comments on implementation – consider mentioning resources, timelines, milestones	By subsidizing electric taxi and public vehicles and constructing the necessary charging infrastructure, the project will significantly reduce CO ₂ emissions, improve air quality, and contribute to the city's sustainable development goals. However, the project's soft measures are critical for successful implementation. Key measures include regulatory changes to support electric vehicle integration, amendments to spatial planning documents for the installation of charging stations, and public awareness campaigns to promote the environmental and health benefits of electric taxis. Financial incentives need to be provided for taxi operators to transition to electric vehicles, while price regulations need to ensure the competitiveness of electric taxis in the market. Additionally, specialized training for drivers on the specifics of driving electric vehicles, including proper charging, energy consumption management, and basic technical information, will contribute to sustainability of the action.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	1,426 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 3,942,980.00 EUR OPEX: 788,596 EUR Total costs by CO ₂ e unit: 3,319 EUR/tCO _{2eq}

B-2.2: Individual action outlines 3.6		
Action outline	Action name	3.6. Establishment of low-emission zones with restricted access for fossil fuel-powered vehicles
	Action type	Technical interventions Physical/spatial intervention Other interventions
	Action description	This project focuses on establishing a Low Emission Zone (LEZ) in Sarajevo to address the city's severe air quality issues, particularly during the winter months when air pollution peaks. With Sarajevo's AQI reaching "very unhealthy" levels in December 2024 and continued high pollution due to traffic congestion and outdated diesel vehicles, the implementation of the LEZ will be crucial in reducing harmful emissions like PM _{2.5} and NO ₂ , which are



B-2.2: Individual action outlines 3.6		
		significant contributors to respiratory diseases. The expected improvements include cleaner air, reduced traffic congestion, and a better urban environment. The LEZ will include designated pedestrian-only areas. The LEZ will encourage the use of public transport, non-motorized transport (such as walking and cycling), and electric vehicles, thus contributing to reduced carbon emissions and improving overall public health.
Reference to impact pathway	Field of action	Mobility & transport
	Systemic lever	Technology/Infrastructure Finance & funding Learning & capabilities Governance and policy
	Outcome (according to module B-1.1)	Designating LEZ inside the Sarajevo city centre restricts movement of vehicles, forcing citizens to use public transport rather than private vehicles in the city centre.
Implementation	Responsible bodies/person for implementation	N/A
	Action scale & addressed entities	FUA Sarajevo - Sarajevo Canton Regulatory framework, public awareness
	Involved stakeholders	N/A
	Targeted Groups	The project targets urban residents, daily commuters, commercial vehicle operators, and businesses operating within the city centre.
	Comments on implementation – consider mentioning resources, timelines, milestones	<p>The implementation of the LEZ in Sarajevo’s historic core involves multiple key infrastructure measures and legal prerequisites. The plan includes restricting access to high-emission vehicles through either a restriction model (limiting vehicles below EURO 4 standard) or a payment model, where vehicles pay a fee based on their emission level. This will be monitored via an Automated Vehicle Monitoring System using license plate recognition cameras.</p> <p>The project will also include the expansion of pedestrian and cycling infrastructure, improved signage, and real-time pollution and traffic information systems to further reduce vehicle reliance. The citizens at CA session suggested the following route as designated pedestrian route: Zelenih Beretki – Branilaca Sarajeva – Mis Irbina – Kotromanića – Skenderija – Vilsonovo promenade. The initiative includes piloting on selected streets.</p> <p>To support walking as a primary and accessible mode of transport, existing pedestrian pathways will be upgraded and expanded with inclusive infrastructure for people with disabilities and parents with strollers.</p> <p>Key legal and soft measures necessary for success include amendments to traffic laws, public awareness campaigns, a phased enforcement system, and incentives for businesses and residents. Coordination with public transport operators and the introduction of Park & Ride facilities will ensure a seamless transition while reducing congestion outside the LEZ. Incentives such as subsidies for businesses affected by the LEZ and the encouragement</p>



B-2.2: Individual action outlines 3.6		
		of alternative transport solutions are also integral to the smooth implementation and acceptance of the LEZ.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	58,726 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO _{2e} unit	CAPEX: 2,984,693.88 EUR OPEX: 268,622 EUR Total costs by CO _{2e} unit: 55 EUR/tCO _{2eq}

B-2.2: Individual action outlines 3.7-3.7.1		
Action outline	Action name	3.7.1.Decarbonisation of logistics - transport through better planning and positioning of logistics centres
	Action type	Technical interventions Physical/spatial intervention
	Action description	The project focuses on optimizing city logistics in Sarajevo to address challenges such as infrastructural limitations, regulatory hurdles, and environmental concerns. The city's current logistics system struggles with congestion, limited road capacity, and inadequate loading and unloading facilities, while freight traffic exacerbates air and noise pollution, particularly in the winter. The proposed solution involves optimizing freight traffic flow and improving the logistics network by consolidating Urban Logistics Hubs and implementing timed delivery windows to reduce vehicle kilometres travelled and congestion. This will also enhance the efficiency of deliveries by improving load factors and route density through smart routing systems. The project aims to reduce emissions and noise levels by transitioning to electric delivery vehicles and enforcing LEZ, leading to a decrease in urban freight emissions and significant noise reduction in residential areas. In addition, the project will improve urban space utilization by rationalizing logistics depots into peripheral hubs and introducing dedicated loading/unloading zones, thus reducing illegal parking and freeing up valuable urban space.
Reference to impact pathway	Field of action	Mobility & transport
	Systemic lever	Technology/Infrastructure Governance and policy Learning & capabilities Finance & Funding
	Outcome (according to module B-1.1)	Modernized, low-emission urban logistics system in Sarajevo that significantly improves delivery efficiency,



B-2.2: Individual action outlines 3.7-3.7.1		
		reduces environmental impact, and enhances the overall functionality of the city's transport infrastructure
Implementation	Responsible bodies/person for implementation	N/A
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton) Transport network, infrastructure (charging stations, tram stops, adaptation of roads and infrastructure), fleet modernization, environmental & technical infrastructure
	Involved stakeholders	N/A
	Targeted Groups	Urban freight and logistics operators Small and medium-sized enterprises Municipal authorities and urban planners Residents and visitors of Sarajevo Environmental and sustainability stakeholders Infrastructure and utility providers Transport and delivery associations Commercial property owners and managers Public policy and regulatory bodies
	Comments on implementation – consider mentioning resources, timelines, milestones	The consolidation of logistics depots into 2-3 urban logistics hubs located on the city's periphery will significantly increase efficiency by optimizing last-mile deliveries. In addition to the consolidation, the electrification of the last-mile delivery fleet is crucial to meet the LEZ requirements and contribute to the city's Net Zero goals. Further infrastructure improvements include the development of smart urban logistics, which will include dedicated delivery zones, micro-distribution points, and optimized access roads. Key legal and soft measures to support the implementation include regulating delivery time windows, enforcing the LEZ, promoting collaboration among logistics providers, and supporting the use of digital tools and coordination platforms.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	2,814 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 11,494,897.96 EUR OPEX: 574,744 EUR Total costs by CO ₂ e unit: 4,289 EUR/tCO ₂ e



B-2.2: Individual action outlines 3.7-3.7.2		
Action outline	Action name	3.7.2 Decarbonisation of logistics through deployment of electric delivery vehicles
	Action type	Technical interventions Physical/spatial intervention
	Action description	The electrification of delivery vans in Sarajevo aims to replace outdated, high-emission vehicles with electric models, significantly reducing urban air pollution and GHG emissions. According to the latest vehicle registration bulletin, only 10 out of 875 registered transport vehicles in Sarajevo are electric. Approximately 58.4% of the fleet consists of delivery vans. The transition of around 350 delivery vans will cut CO ₂ while also optimizing urban delivery logistics through a digital fleet management platform, reducing congestion and improving scheduling, particularly during off-peak hours.
Reference to impact pathway	Field of action	Mobility & transport
	Systemic lever	Technology/Infrastructure Governance and policy Learning & capabilities Finance & Funding
	Outcome (according to module B-1.1)	Modernized, low-emission urban logistics system in Sarajevo that significantly improves delivery efficiency, reduces environmental impact, and enhances the overall functionality of the city's transport infrastructure
Implementation	Responsible bodies/person for implementation	N/A
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton) Transport network, infrastructure (charging stations, tram stops, adaptation of roads and infrastructure), fleet modernization, environmental & technical infrastructure
	Involved stakeholders	N/A
	Targeted Groups	Urban freight and logistics operators Small and medium-sized enterprises Municipal authorities and urban planners Infrastructure and utility providers Transport and delivery associations Commercial property owners and managers
	Comments on implementation – consider mentioning resources, timelines, milestones	The successful implementation of this project will require ensuring the deployment of dedicated fast-charging infrastructure at key logistics hubs, industrial zones, and within LEZ zones to facilitate efficient operations for commercial fleets. It will be essential to retrofit existing depots with charging stations and integrate solar energy systems to support sustainability. Ensuring the establishment of electric access and priority lanes, along with digital fleet management systems, will be crucial for optimizing delivery routes and minimizing congestion. To support the transition, it will be necessary to provide purchase subsidies for electric vans, tax incentives, and ensure integration with the LEZ framework to make the electrification financially feasible for logistics companies.



B-2.2: Individual action outlines 3.7-3.7.2		
		Public-private partnerships will need to be fostered for the development and maintenance of charging infrastructure, and workforce training programs will be essential to ensure the availability of a skilled labour force capable of supporting the transition to electric delivery fleets.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	6,146 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 8,100,000 EUR OPEX: 891,000 EUR Total costs by CO ₂ e unit: 1,463 EUR/tCO _{2eq}

B-2.2: Individual action outlines 3.8		
Action outline	Action name	3.8 Smart traffic management systems
	Action type	Technical interventions
	Action description	The project aims to modernize traffic management by introducing artificial intelligence for real-time traffic flow optimization. Currently dominated by fixed-phase signals without adaptive control, the existing infrastructure contributes to inefficiencies, delays, and increased emissions. By implementing AI-powered systems, including adaptive traffic lights, real-time traffic monitoring, and public transport prioritization, the project will reduce congestion and environmental impact while improving road user experience.
Reference to impact pathway	Field of action	Mobility & transport
	Systemic lever	Technology/Infrastructure Governance and Policy Learning & Capabilities
	Outcome (according to module B-1.1)	Improved traffic efficiency, reduced congestion, and enhanced road safety
Implementation	Responsible bodies/person for implementation	Ministry of Transport of Sarajevo Canton, City of East Sarajevo, City Development Agency of East Sarajevo
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Adaptive traffic management systems
	Involved stakeholders	Local government units Public and private sector Citizens and non-governmental organizations
	Comments on implementation –	The project will be implemented through the establishment of a centralized Traffic Management and Mobility



B-2.2: Individual action outlines 3.8		
	consider mentioning resources, timelines, milestones	Operations Centre, integrating adaptive traffic signal systems, real-time monitoring, and public transport prioritization across FUA Sarajevo. Infrastructure measures include upgrading all intersections with AI-driven signals, IoT sensors, and energy-efficient equipment, alongside the development of a digital control platform and support services. Soft measures focus on adapting legal frameworks for AI deployment, ensuring data protection, and enabling institutional cooperation. Capacity building for operators and public awareness campaigns will ensure smooth implementation and promote sustainable mobility behaviours.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	CAPEX: 11,071,428.57 EUR OPEX: 204,000 EUR/year

3.2.4 Waste & Circular Economy

B-2.2: Individual action outlines – 4.1.		
Action outline	Action name	4.1 Zero-Waste Programme for FUA Sarajevo
	Action type	Technical interventions Physical/spatial intervention
	Action description	Current State: Waste prevention and reduction have never figured as priorities in strategic planning documents at any administrative tier in Bosnia and Herzegovina. No quantified targets exist at State or Federation level, and only Republika Srpska has adopted a Waste-Prevention Programme—none of those measures have yet been implemented. At local level the City of Sarajevo is the sole authority that has addressed the issue: it runs a food-waste-prevention programme and has co-financed several awareness-raising projects, but structural drivers (tariffs, procurement rules, incentives for reuse and repair) remain unchanged.
Reference to impact pathway	Field of action	Waste & circular economy Governance and Policy
	Systemic lever	Technology/Infrastructure
	Outcome (according to module B-1.1)	Achievement of measurable waste-prevention and reduction across households, commerce and public institutions.



B-2.2: Individual action outlines – 4.1.		
Implementation	Responsible bodies/person for implementation	The responsible entity for KS: Ministry of Communal Affairs, Infrastructure, Spatial Planning, Construction and Environmental Protection and City of Sarajevo The responsible entity for East Sarajevo: City Administration East Sarajevo
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo)
	Involved stakeholders	Interested parties: <ul style="list-style-type: none"> • Municipalities and cities • Public utility companies for waste management, green-area maintenance and water supply • IT departments / Institutes for Informatics • Business-support organisations (chambers, regional development agencies) • Educational institutions • Environmental funds • Service-sector and manufacturing representatives • Federal and State environmental ministries (for EPR alignment) • Social and volunteer associations, NGOs • IT companies (digital-platform development)
	Comments on implementation – consider mentioning resources, timelines, milestones	Project component descriptions: <ul style="list-style-type: none"> • Green Public Procurement (GPP). Revise the cantonal/municipal procurement rulebooks so that multi-use or recycled packaging scores extra points; introduce a minimum recycled-content requirement in promotional materials and office paper; oblige cleaning and catering contracts to deliver without single-use plastic etc. • Local Ban on Single-Use Plastics. City/Canton council decision prohibits distribution of plastic straws, cups and tableware at all publicly funded institutions and events. • Reuse and Repair Hub. Convert an existing municipal warehouse into a “Reuse Lab” for functional goods (furniture, appliances); hold weekly repair workshops (Saturday repair-café) and sell refurbished items at symbolic prices. • Free Drinking-Water Station Network. Restore existing fountains and install new water stations at high-footfall locations, supported by the “Bring-Your-Bottle” campaign; QR-codes record litres dispensed to estimate PET bottles avoided. • “Too Good To Waste Sarajevo”. Digital platform linking grocery stores and restaurants with food banks; utilities grant fee rebates to participating outlets. • “Sarajevo Circular Market”. B2B/B2C application for exchanging surplus materials, C&D off-cuts and equipment. • Zero-Waste Business Certification. Voluntary bronze-silver-gold scheme with waste-prevention criteria for companies, showcased at the events such as Sarajevo Trade Fair. <p>Key legal and other assumptions (soft measures):</p>



B-2.2: Individual action outlines – 4.1.		
		<ul style="list-style-type: none"> - Draft and adopt a Waste-Prevention and Reduction Programme with a five-year Action Plan for the FUA, including quantified KPIs, responsible entities and financing lines. - Sign cooperation agreements with retailers, food-service associations and ICT firms for platform maintenance and voucher co-funding. - Mandate public-event organisers to submit waste-prevention plans and disclose results in the WMIS. - Introduce a cantonal incentive package for zero-waste start-ups (micro-grants, access to municipal premises). <p>Capital costs 3,928,571 EUR</p> <p>Operational costs: 510,204 EUR</p> <p>Financing options:</p> <ul style="list-style-type: none"> • Environmental Protection Funds (hardware grants, campaign co-funding) • Retailer and service-sector sponsorship of voucher platform • IFI technical-cooperation and investment grants • Cantonal/city budget line for reuse-hub refurbishment • Donors via NGOs <p>Project start/end year by phases:</p> <ul style="list-style-type: none"> - Preparation – 2025 - Pilot & roll-out 2026-2027 - Full deployment & optimisation 2028-2030
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	3,928,571 EUR

B-2.2: Individual action outlines		
Action outline	Action name	4.2 Development of waste separation and recycling infrastructure
	Action type	Technical intervention Other intervention



B-2.2: Individual action outlines		
	Action description	Currently, the waste management system is heavily reliant on landfilling, with insufficient infrastructure for separate collection and material recovery. In Sarajevo Canton, although around 40% of the total municipal waste is composed of recyclable dry fractions, only a fraction is actually collected separately. The infrastructure is outdated and insufficient, especially for bio-waste, which is not collected at all. In East Sarajevo, there is currently no established system for separate waste collection, resulting in valuable recyclable and organic materials being landfilled. The absence of waste separation not only increases GHG emissions and operational costs but also undermines opportunities for resource recovery and circular economy development. The proposed project will address these issues through the deployment of standardized infrastructure for the separate collection of dry recyclables, bio-waste, and construction waste, supported by the modernization of recycling yards and the expansion of logistical and digital systems. In addition to environmental benefits, the project will generate significant social and economic co-benefits: improved hygiene and public health, better quality of secondary raw materials, new business opportunities in the recycling and recovery sectors, and the creation of green jobs.
Reference to impact pathway	Field of action	Waste & circular economy
	Systemic lever	Technology/Infrastructure Governance and Policy Learning & capabilities
	Outcome (according to module B-1.1)	Increased quantity and quality of separately collected recyclable waste, ensuring highly efficient sorting and alignment with strategic sustainability objectives.
Implementation	Responsible bodies/person for implementation	Ministry of Communal Affairs, Infrastructure, Spatial Planning, Construction, and Environmental Protection of Sarajevo Canton City of East Sarajevo and municipalities of East Sarajevo
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Infrastructure (containers and bins, recycling points and yards, vehicle collection, existing sorting centres, new waste sorting facilities, sanitary landfill, reuse and repair centres)
	Involved stakeholders	KJKP RAD Sarajevo Development Planning Institute of Sarajevo Canton Construction Institute of Sarajevo Canton Municipalities of Sarajevo Canton JKP "RAD" Istočno Novo Sarajevo JKP "Komunalno" Pale JKP "Trnovo" Trnovo JKP "Komil" Istočna Ilidža JKP "Glog" Istočni Stari Grad JKP "Sokolac" Sokolac Institute for Planning of Republika Srpska Municipalities of East Sarajevo Private sector representatives (construction waste generators - contractors/construction companies, investors, private waste collectors, start-ups) Non-governmental organizations engaged in environmental initiatives



B-2.2: Individual action outlines		
		Chambers of commerce and business associations
	Comments on implementation – consider mentioning resources, timelines, milestones	The project's key legal and soft measures focus on enhancing waste management through public awareness campaigns, educational initiatives, and the creation of a GIS database for waste collection points. It proposes changes to the current tariff policy to incentivize recycling and the introduction of regulations for construction and textile waste. The project also emphasizes the creation of a composting utility, the development of circular economy initiatives, and financial mechanisms to support waste treatment. Measures include promoting the use of recycled materials in public infrastructure, improving legal frameworks, and fostering sustainable practices at public events. Additionally, it aims to address illegal waste disposal by strengthening regulations, improving inspections, and expanding waste container access in rural areas
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	74,458 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 33,010,204 BAM OPEX: 1,377,551 BAM Total costs by CO ₂ e unit: 462 BAM/tCO ₂ eq

B-2.2: Individual action outlines – 4.3.		
Action outline	Action name	4.3. Local EPR schemes for special waste categories in FUA Sarajevo
	Action type	Technical interventions Physical/spatial intervention Learning & capabilities
	Action description	Current State: <ul style="list-style-type: none"> Extended Producer Responsibility (EPR) schemes are in place at the Federation of BiH level and Producer Responsibility Organisations (PROs) exist for packaging (Ekopak Sarajevo, Ekoživot Tuzla) and WEEE (Kim Tec Eko Vitez, ZEOS ekosistem Sarajevo). The Federal Environmental Fund redistributes fees collected for waste tyres,



B-2.2: Individual action outlines – 4.3.		
		<p>accumulators, end-of-life vehicles and oils to authorised collectors and treatment facilities. Textile waste is still not regulated by any law and therefore has no EPR scheme. The situation in Republika Srpska is similar; the only difference is that WEEE is not managed through a PRO, while a packaging PRO (Eurobeta) does operate.</p> <ul style="list-style-type: none"> • Domestic treatment facilities are available for waste tyres (Negro Crown Sarajevo, SGI Tešanj), plastic and paper packaging (Omorika Doboj, Janjina Goražde) and WEEE (mechanical recycling at Lucius Vitez). Infrastructure for textile waste is limited: two social/volunteer enterprises (Eco-Bosnia Sarajevo and Vuprom Čitluk) currently produce cleaning cloths from organic textile waste. • PROs have invested in collection bins for packaging and WEEE; however, collection points for waste tyres are limited to vulcanising workshops and a few municipal recycling yards. In addition, a reuse and repair centre for WEEE, operated by ZEOS Eko, has recently opened in Sarajevo. Ten smart textile-waste bins have been installed at KJKP RAD recycling yards, but the downstream management of the collected textile fraction is still undefined. <p>According to data from the GHG emissions register:</p> <ul style="list-style-type: none"> • Total CO₂eq emissions (FUA Sarajevo): 204,992 t/year (municipal solid waste) + 48.036 (sewage sludge) + 52,800 t/year¹³ (construction waste) = 305,828 t/year <p>Expected Improvement:</p> <ol style="list-style-type: none"> I. Reduction of CO₂eq emissions (total FUA Sarajevo): Already accounted for in Action: Waste Separation and Recycling Infrastructure Development in Sarajevo Canton and East Sarajevo <p>Additional Benefits:</p> <ul style="list-style-type: none"> • Landfill diversion of special waste categories • Local recycled-PET feedstock for SMEs and beverage producers; new jobs in tyre- and textile-processing; verified chain-of-custody data for municipal planning
Reference to impact pathway	Field of action	Waste & circular economy Governance and Policy
	Systemic lever	Technology/Infrastructure
	Outcome (according to module B-1.1)	Improving local EPR schemes for special waste categories to divert waste from landfilled and make them circulate as new products with added value

¹³ The life-cycle modelling in this study shows that shifting concrete--and--brick rich C&D waste from landfill to advanced recycling avoids about 264 kg CO₂-eq per tonne of waste. The value already includes transport, processing and the substitution of virgin aggregates, and is presented as the representative EU average for mixed C&D streams: <https://publications.jrc.ec.europa.eu/repository/handle/JRC134500> Therefore, 200.000 tonnes of waste being landfilled annually contributes to 52.000 tonnes of CO₂ emissions.



B-2.2: Individual action outlines – 4.3.		
Implementation	Responsible bodies/person for implementation	The responsible entity for KS: Ministry of Communal Affairs, Infrastructure, Spatial Planning, Construction and Environmental Protection The responsible entity for East Sarajevo: City Administration East Sarajevo
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo)
	Involved stakeholders	Interested parties: <ul style="list-style-type: none"> • PROs for special waste categories • Municipal companies and private waste collectors • Waste treatment facilities • Environmental Funds, • SMEs and green entrepreneurs • NGOs, • Chamber of commerce • Cities/municipalities • Donors • Ministries and department for economic development
	Comments on implementation – consider mentioning resources, timelines, milestones	Project component descriptions: <ul style="list-style-type: none"> - Component 1 – Tyre EPR (“ReTyre FUA Sarajevo”): Municipal utilities will conclude a long-term service agreement with Negro Crown Sarajevo, assigning the company exclusive responsibility for shredding and granulating all waste tyres collected within the FUA. In line with the Federation’s by-laws, the Environmental Protection Fund will disburse performance-based incentives for both collection and processing; payment is triggered through a digital batch-tracking system that records the transfer from point of capture to the treatment plant. The collection network will be strengthened by installing certified storage cages at every registered vulcaniser and by expanding capacity at existing municipal recycling yards. To drive citizen participation, a two-track communication campaign is planned: first, a “Return-Your-Tyres” media burst during the seasonal tyre-change periods (radio, social media and service-station displays); second, a continuous reward scheme that issues QR-coded vouchers—redeemable for public-transport tickets or discounts on new tyres—whenever households deliver end-of-life tyres to an authorised point. The combined contractual, financial and outreach measures are expected to raise the collection rate to at least 75% by 2030 while ensuring full compliance with environmental standards. - Component 2 – WEEE EPR: “e-Cycle FUA Sarajevo”: The WEEE scheme will be implemented through a producer-financed service agreement between ZEOS and the municipal utilities. A permanent network of small-appliance drop-off cages will be installed so that every neighbourhood (>5 000 residents) has a nearby collection point, while a mobile recycling yard will



B-2.2: Individual action outlines – 4.3.		
		<p>schedule quarterly pick-up campaigns for large devices. All handovers are registered electronically and linked to the cantonal EPR database. Public outreach comprises a targeted school programme, neighbourhood briefings and quarterly repair-cafés hosted by the existing ZEOS refurbishment centre. Equipment that can be restored is channelled to a social-reuse pool; non-repairable fractions are routed to authorised mechanical recycling (Lucius Vitez). Producer fees cover collection logistics, educational materials and spare parts.</p> <ul style="list-style-type: none"> - Component 3 – Textile Stewardship Pilot (“Circular Loop Sarajevo”): Major clothing retailers and local brands sign a five-year memorandum with the Sarajevo Canton/East Sarajevo, committing to finance collection and sorting in proportion to the weight of textiles they place on the market. Contributions are booked as corporate-social-responsibility expenses and offset through public recognition—participants receive an annual “Circular Partner” label that is promoted in media and promotional events. Retailers, business support organisations and donors fund the placement and servicing of dedicated textile containers at shopping centres, residential hotspots and recycling yards. Collected material is consolidated at a central sorting hub operated by public utility companies, where it is triaged into three streams: direct reuse, cotton suitable for conversion into industrial wipers, and mixed-fibre residues for mechanical recycling. Revenue from the sale of wipers to Eco Bosnia and from fibre bales to recyclers is reinvested in running costs, while any shortfall is covered by the stewardship contributions. Public engagement is driven by retailer-led incentives rather than statutory fees: each kilogram returned to an authorised point earns shoppers a digital coupon redeemable as a discount on second-hand goods or public-transport tickets. Seasonal “repair-and-restyle” weeks—in store and at the municipal repair hub—reinforce waste-prevention behaviour. - Component 4 – Packaging Stewardship “Smart Pack Sarajevo”: The packaging stream will be strengthened through a deposit-return model built around reverse-vending machines (RVMs) operated by the private firm Eko Grad Sarajevo. Grants from the Environmental Protection Funds and donor programmes finance the acquisition and siting of the RVMs at supermarkets, public-transport hubs and municipal recycling yards. Each unit accepts PET bottles and aluminium cans, refunds a small cash deposit or a digital coupon, and transmits weight and material data to the cantonal waste-monitoring platform. The high-quality PET from the machines supplies two distinct user groups: Local design and manufacturing start-



B-2.2: Individual action outlines – 4.3.		
		<p>ups, which mould the flakes into new consumer products (planters, building components, household items), and regional beverage producers, which re-process the resin into bottles containing a certified share of recycled PET. The arrangement closes the material loop without new fiscal instruments. Producer-responsibility organisations continue to finance back-haul logistics, while the public contribution is limited to capital grants for equipment.</p> <p>Key legal and other assumptions (soft measures):</p> <ul style="list-style-type: none"> - Development and adoption of textile waste regulation at entity level - Voluntary stewardship MoUs for textiles; service annexes with existing PROs for WEEE & packaging - FUA Sarajevo EPR strategy and action plan for special waste categories - Environmental Funds' public calls aligned to finance RVMs and tyre cages - Communication and stakeholder engagement strategy for local EPR to function <p>Capital costs 11,122,449 EUR</p> <p>Operational costs 1,275,510 - covered by PROs, Fund incentives and material revenues.</p> <p>Financing options:</p> <ul style="list-style-type: none"> - PRO / stewardship contributions – 60% - Environmental Protection Funds (FBiH & RS) – 15% - Donor / IFI grants & concessional loans (EBRD, EIB, WB) – 15% - Cantonal & city/municipal budgets – 10% <p>Project start/end year by phases:</p> <ul style="list-style-type: none"> - Preparation (2025): MoUs, digital registry, grant awards. - Roll-out (2026-27): infrastructure installation, public campaigns. - Scale-up (2028-30): performance optimisation, KPI audit
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	Already accounted for in Action: Waste Separation and Recycling Infrastructure Development in Sarajevo Canton and East Sarajevo
	GHG emissions compensated	N/A



B-2.2: Individual action outlines – 4.3.		
	(natural or technological sinks)	
	Total costs and costs by CO2e unit	CAPEX: 11,122,449 EUR OPEX: 1,275,510 EUR

B-2.2: Individual action outlines – 4.4		
Action outline	Action name	4.4. Circular Construction- and-Demolition-Waste Programme for FUA Sarajevo
	Action type	Technical interventions Physical/spatial intervention Learning & capabilities
	Action description	<p>Current State: Construction activity in the Sarajevo FUA is expanding, and with it the volume of construction-and-demolition (C&D) waste. Apart from a single recycling yard that accepts mixed rubble, there is no dedicated infrastructure for source-separated collection. When the yard's container is full, material is transferred directly to the inert-waste cell at the Smiljevići Regional Waste Management Centre. C&D waste is therefore one of the largest but least quantified waste streams in the FUA Sarajevo, with estimations cca 200.000 t per year. Economic incentives for sorting or recycling are absent; selective demolition is not required by regulation; digital tracking of material flows is non-existent; and secondary materials have no certified market outlet. Only one contractor, Bosman Sarajevo, operates a mobile crusher, but the un-certified aggregates it produces are used irregularly and command no stable demand. According to data from the GHG emissions register:</p> <ul style="list-style-type: none"> Total CO2eq emissions (FUA Sarajevo): 204,992 t/year (municipal solid waste) + 48.036 (sewage sludge) + 52,800 t/year¹⁴ (construction waste) = 305,828 t/year <p>Expected Improvement: II. Reduction of CO2eq emissions (total FUA Sarajevo): 36,960 t/year¹⁵</p> <p>Additional Benefits:</p> <ul style="list-style-type: none"> Construction waste diverted from landfills New skilled jobs in recycling operations; stable supply of certified secondary aggregates for local construction SMEs; launchpad for design-for-disassembly practices in new builds.
Reference to impact pathway	Field of action	Waste & circular economy Governance and Policy
	Systemic lever	Technology/Infrastructure
	Outcome (according to module B-1.1)	By 2030 at least 70% of C&D waste reused or recycled.

¹⁴ The life-cycle modelling in this study shows that shifting concrete--and--brick rich C&D waste from landfill to advanced recycling avoids about 264 kg CO₂-eq per tonne of waste. The value already includes transport, processing and the substitution of virgin aggregates, and is presented as the representative EU average for mixed C&D streams: <https://publications.jrc.ec.europa.eu/repository/handle/JRC134500> Therefore, 200.000 tonnes of waste being landfilled annually contributes to 52.000 tonnes of CO₂ emissions.

¹⁵ 70% out of 200,000 tonnes of construction waste will be diverted from landfill, thus avoiding (140,000*0.264 Tco2EQ=36,960)



B-2.2: Individual action outlines – 4.4		
Implementation	Responsible bodies/person for implementation	The responsible entity for KS: Ministry of Communal Affairs, Infrastructure, Spatial Planning, Construction and Environmental Protection The responsible entity for East Sarajevo: City Administration East Sarajevo
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo)
	Involved stakeholders	Interested parties: <ul style="list-style-type: none"> • Chambers of Economy • Construction companies • Ministry of Spatial planning at entity level • start-ups • universities (Civil Engineering & Architecture) • Environmental Funds (FBIH & RS) • IFIs (EBRD, EIB, KfW) • NGOs promoting circular construction.
	Comments on implementation – consider mentioning resources, timelines, milestones	Project component descriptions: <ul style="list-style-type: none"> • Selective-demolition protocol & training: Mandatory pre-demolition audit and on-site separation checklist issued by the Canton/East Sarajevo competent entities; training courses for contractors co-financed through an industry levy. • Digital Building Material Passport and C&D Material Bank: Web/app platform where investors upload material inventories before demolition and contractors bid for salvaged elements; PPP with local IT firm for development and hosting. • “Sarajevo Circular Hub” (stationary): Fixed facility for sorting, crushing, screening and quality-testing of recycled aggregates, wood and metals. Hub is built and operated via a 15-year PPP: canton/city provides land and planning permit, private consortium finances plant and earns gate fees plus aggregate sales. • Mobile treatment fleet expansion: Leasing programme for three additional mobile crushers/screeners; equipment procured by a leasing company and rented to SMEs at subsidised rates. • Quality lab & product certification: Accreditation of recycled aggregate to construction standards; co-located with Circular Hub. Certification cost shared 50:50 between hub operator and private laboratories. • GPP & fiscal incentives: Green public procurement rule—all municipal infrastructure must use ≥ 20 % certified recycled aggregate; Landfill gate fee surcharge on mixed C&D waste, with a discount if pre-sorted. • Demonstration projects: Two pilot roads (rubberised asphalt + recycled concrete), one public building with reclaimed bricks; co-funded by IFIs to de-risk first movers. • Financing window for start-ups: Revolving fund (2 M BAM seed) to issue low-interest loans to SMEs producing reclaimed building components



B-2.2: Individual action outlines – 4.4		
		<p>(e.g. timber panels, insulation from mineral wool off-cuts).</p> <p>Key legal and other assumptions (soft measures):</p> <ul style="list-style-type: none"> - Selective-demolition by-law – requires a pre-demolition audit, separation plan and on-site segregation checklist - Revised construction-waste regulation – introduces: Incentive rebates on permit fees for projects that demonstrate reuse of ≥ 20 % materials; Mandatory recycling targets for all licensed contractors (progressive: 30 % in 2027, 50 % in 2030); - Pay-as-you-throw surcharge on unsorted C&D waste delivered to landfill, fully aligned with the polluter-pays principle. - Upgraded Waste-Management Information System (WMIS) – contractors must report quantities generated, sorted, reused and dispatched; reports are cross-checked by inspectorates and the Environmental Fund before refunds or incentives are released. - Digital Building-Material Passport ordinance – investors upload material inventories to the WMIS at the design stage and update them before demolition; data feed the online Material Bank. - Green Public Procurement decree – all cantonal and city/municipal infrastructure contracts must specify ≥ 20 % certified recycled aggregate and give preference to products listed on the Material Bank. - Quality-standard adoption – the Ministry of Spatial Planning recognises EN 12620 and EN 13242 for recycled aggregates; the cantonal laboratory is authorised to issue conformity certificates. - PPP framework agreement – clarifies land-use rights, gate-fee structure and revenue-sharing for the Circular Hub, securing investor confidence. - Fiscal support package – VAT exemption on secondary aggregates sold for public works and accelerated depreciation for mobile recycling equipment. - Capacity-building scheme – mandatory certification course on selective demolition and recycling for site managers, co-financed by the Chamber of Commerce and the Environmental Fund. - Communication & compliance plan – joint campaign “Build Circular Sarajevo”, regular industry round-tables, and annual public performance reports summarising WMIS data, inspection findings and recycling rates. <p>Capital costs 8,265,306 EUR</p> <p>Operational costs 1,377,551 EUR</p>



B-2.2: Individual action outlines – 4.4		
		<p>OPEX is recovered through gate fees (hub), leasing charges, and aggregate sales; public subsidy limited to training, digital platform maintenance and initial PPP viability-gap grant.</p> <p>Financing options:</p> <ul style="list-style-type: none"> - Private-sector equity & commercial debt via PPP (≈ 50 %) - Environmental Funds (infrastructure grants, training subsidies) - IFI concessional loans / green bonds (EBRD, EIB) - Cantonal & city budgets for digital platform and demonstration projects - Revolving start-up fund capitalised by SERDA and donor grants. <p>Project start/end year by phases:</p> <ul style="list-style-type: none"> - Regulatory & PPP preparation: 2025 - Infrastructure roll-out (hub, fleet, platform): 2026-27 - Scale-up, GPP enforcement, demos: 2028-30
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	36,960 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO _{2e} unit	CAPEX: 8,265,306 EUR OPEX: 1,377,551 EUR/year Total costs by CO _{2e} unit: 261 EUR/tCO _{2eq}

B-2.2: Individual action outlines- 4.5		
Action outline	Action name	4.5. Biogas production and waste sludge treatment in Sarajevo Canton
	Action type	Technical interventions Physical/spatial intervention
	Action description	The project aims to improve waste management and environmental sustainability in Sarajevo Canton by addressing the disposal and treatment of organic waste and waste sludge. Currently, organic waste is landfilled, while sewage sludge from the city's Butile wastewater treatment plant is dewatered before being stored in a temporary landfill. The biogas produced during the sludge treatment process is used for thermal energy and electricity generation, but there is no permanent solution for the final disposal of the dewatered sludge. The expected improvements include a reduction in CO _{2eq} emissions, generation of energy, contribution to public health



B-2.2: Individual action outlines- 4.5		
		improvement, and reduction in the environmental impact of landfilling. The project will also provide a permanent solution for waste sludge disposal and promote collaboration between public and private enterprises.
Reference to impact pathway	Field of action	Waste & circular economy Governance and Policy
	Systemic lever	Technology/Infrastructure
	Outcome (according to module B-1.1)	Reduced amount of organic waste sent to landfills through the implementation of energy recovery from waste processes
Implementation	Responsible bodies/person for implementation	Ministry of Communal Affairs, Infrastructure, Spatial Planning, Construction, and Environmental Protection of Sarajevo Canton
	Action scale & addressed entities	Sarajevo Canton Biogas production plant and cogeneration plant, solar drying facility, upgrading of existing anaerobic digestion and cogeneration facilities, logistics for organic waste collection
	Involved stakeholders	KJKP RAD KJKP ViK Sarajevo Institute for Development Planning of Sarajevo Canton Institute for Construction of Sarajevo Canton Municipalities of Sarajevo Canton
	Comments on implementation – consider mentioning resources, timelines, milestones	The project consists of two main components: the construction of a biogas production and cogeneration plant for electricity and thermal energy generation from organic municipal waste in Sarajevo Canton, and the solar drying of waste sludge from the Butila WWTP, which will be used as an alternative fuel in the cement industry. An alternative to a standalone biogas plant could involve upgrading the existing anaerobic digestion and cogeneration facilities at the Butila WWTP to process both the organic waste collected by KJKP Rad and the waste sludge, with potential inclusion of animal waste from food processing industries. Key legal and soft measures include defining treatment plant locations through the Spatial Plan of Sarajevo Canton, conducting strategic impact assessments, and developing a register and feasibility study for animal waste management scenarios, potentially for a multi-feedstock facility.
Impact & cost	Generated renewable energy (if applicable)	18.3 GWh/year
	Removed/substituted energy, volume, or fuel type	18.3 GWh/year of electricity produced from fossil fuel
	GHG emissions reduction estimate (total) per emission source sector	92,352 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	CAPEX: 40,816,327 EUR OPEX: 1,581,633 EUR/year



B-2.2: Individual action outlines- 4.5		
		Total costs by CO ₂ e unit: 459 EUR/tCO ₂ eq

B-2.2: Individual action outlines 4.6		
Action outline	Action name	4.6. Optimization of waste collection through smart route planning and navigation system
	Action type	Technical interventions Other interventions
	Action description	The project aims to reduce CO ₂ emissions and operational inefficiencies in Sarajevo Canton and East Sarajevo by introducing a smart waste collection system. Through the use of GPS, sensors, and real-time data, waste collection routes will be optimized based on container fill levels, traffic, and weather conditions. This will lower fuel consumption, improve service quality, and reduce environmental impact.
Reference to impact pathway	Field of action	Waste & circular economy
	Systemic lever	Technology/Infrastructure Governance and Policy Learning & Capabilities
	Outcome (according to module B-1.1)	Optimized waste collection and reduced operational costs through the implementation of a smart route planning and navigation system
Implementation	Responsible bodies/person for implementation	KJKP Rad Sarajevo City of East Sarajevo
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Route planning and navigation system for waste management
	Involved stakeholders	Local government units Private sector Citizens and non-governmental organizations
	Comments on implementation – consider mentioning resources, timelines, milestones	The project will be implemented through the development of an integrated software platform for dynamic route planning, supported by mobile applications for field teams and IoT-based monitoring of container fill levels. Infrastructure components include GPS-based tracking, weather and traffic data integration, and real-time optimization tools, all interoperable with existing GIS and waste management systems. Soft measures include the development of a supporting legal framework for digital waste management, institutional cooperation with local governments for the implementation of software solutions, staff training programs.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated	N/A



B-2.2: Individual action outlines 4.6		
	(natural or technological sinks)	
	Total costs and costs by CO2e unit	CAPEX: 1,122,449 EUR OPEX: 51,129 EUR/year



3.2.5 Agriculture, forestry and other land use

The AFOLU green infrastructure and nature-based solutions under the **residual emission strategy** focus on leveraging ecological approaches to reduce carbon emissions and enhance climate resilience in Sarajevo's Functional Urban Area (FUA). Urban greening initiatives begin with the maintenance and restoration of public green spaces by removing unwanted vegetation, repairing terrain damage, improving soil quality, and replanting native, non-allergenic tree species alongside pollinator-friendly plants to boost biodiversity and microclimate regulation. Efforts include removing pavement from select urban areas to enable ecological rehabilitation and sustained green space upkeep. These early actions, guided by the Sarajevo FUA Urban Nature Plan—a five-year strategic framework integrated into urban planning policies—are expected to improve air quality, increase rainwater infiltration, reduce flood risks, and enhance overall urban liveability. It is envisaged to adopt urban rules on green spaces that establish legally binding requirements, aligned with the set of guidance documents on green infrastructure developed under the Urban Transformation Project Sarajevo.

To ensure effective maintenance of green spaces, it is essential to strengthen the capacity of public utility companies by increasing budgets, hiring forestry engineers, providing staff training, and upgrading equipment. When needed, qualified private companies should be engaged to support cleaning and upkeep activities, facilitating knowledge transfer and maintaining high-quality standards. Community learning and stewardship can be fostered through seasonal volunteer programs involving students and citizens, which promote hands-on experience and environmental awareness. Additionally, targeted training should be provided to improve planting techniques, ensure proper site preparation, and enhance oversight by forestry authorities, all aimed at increasing the survival rates of tree seedlings.

Forest land restoration complements urban efforts through the rehabilitation of degraded forests, supported by advanced digital forestry management systems such as GIS and remote sensing for real-time monitoring. The adoption of a Federal Forestry Law and formation of private forest owner associations aim to standardize governance and promote stakeholder collaboration. This program will enhance water security, mitigate urban heat island effects, regenerate soils, create green jobs, and strengthen rural community resilience. Agroforestry initiatives further improve soil health and climate adaptation by identifying suitable lands and implementing pilot projects alongside annual action plans. These efforts also diversify farmers' incomes and bolster the sustainability of vulnerable rural areas.

Urban agriculture and rooftop beekeeping projects introduce green roof systems to support local food production and pollinator populations, backed by clear regulatory standards and simplified permitting to encourage adoption. The campaign "A Fruit Tree in Every Yard" empowers residents to plant and care for fruit trees by providing saplings, gardening materials, and a digital platform for registration, fostering community engagement while contributing to microclimate regulation and stormwater management. These measures also help reduce emissions associated with food transport.

Transforming neglected urban spaces into community gardens with composting infrastructure enhances soil carbon storage, reduces degradation, and mitigates methane emissions from organic waste. These gardens are integrated into urban planning with regulatory and financial support, accompanied by training programs on permaculture and pest management, involving schools and youth groups to foster community stewardship.

To support these greening activities, the production of high-quality planting materials through climate-resilient nurseries and decentralized micro-nurseries is prioritized, reducing



transportation emissions and generating local green economy opportunities. Governance measures include creating a nursery registry and promoting public-private partnerships to scale production, while training and collaboration ensure technical expertise and sustainability.

Finally, establishing a digital Green Space Cadastre and Management System utilizing GIS technology allows comprehensive mapping, monitoring, and citizen engagement for urban green infrastructure. This system facilitates data-driven planning and supports biodiversity conservation, backed by regulatory frameworks mandating data updates and integrated into climate adaptation and land-use policies. Training for municipal staff and community science initiatives enhance the use and impact of this tool.

Together, these systematic levers—spanning technology, governance, finance, and learning, and centred around the Sarajevo FUA Urban Nature Plan—will deliver broad environmental and social benefits, including improved air and water quality, enhanced biodiversity, increased urban liveability, and socio-economic development, advancing Sarajevo’s long-term climate resilience goals. The green infrastructure and nature-based solutions will also enrich the city’s natural beauty and public spaces, boosting eco-tourism and outdoor activities. These efforts will attract visitors seeking sustainable, healthy, and authentic experiences, ultimately strengthening Sarajevo’s reputation as a vibrant and environmentally responsible destination.

By implementing these actions, Sarajevo FUA is expected to achieve up to 20% of its carbon sink targets, significantly contributing to the city’s overall climate goals.

In terms of decarbonization of the AFOLU sector, measures are focused on reducing greenhouse gas emissions by effectively utilizing manure from the two largest cattle farms. Utilizing manure from the two largest cattle farms contributes to the energy sector of Sarajevo FUA by enabling the production of biogas through anaerobic digestion. This biogas can be used as a renewable energy source for electricity generation, heating, or as a substitute for fossil fuels, thereby reducing reliance on non-renewable energy. This not only lowers greenhouse gas emissions from both waste and conventional energy use but also supports local energy security and creates opportunities for sustainable, decentralized energy production within the region.

A. Decarbonization of agriculture

B-2.2: Individual action outlines – Decarbonization of agriculture - 5.1		
Action outline	Action name	5.1. Production of renewable energy from livestock manure from cattle farms
	Action type	Nature based solution Other interventions
	Action description	This project focuses on transforming livestock manure from two farms: KJP Poljoprivredno dobro Butmir and Mujanovic into renewable energy through anaerobic digestion. With around 1,950 dairy cows producing 35 tons of manure daily, the current storage method results in significant uncontrolled methane emissions. By introducing a biogas plant, the farm could generate approximately 13,650 m ³ of biogas daily, which could be used for electricity and heat generation. This is expected to cut annual GHG emissions, reduce reliance on fossil fuels, and create additional value through heat recovery and the use of digestate as organic fertilizer.



B-2.2: Individual action outlines – Decarbonization of agriculture - 5.1		
Reference to impact pathway	Field of action	Green infrastructure & nature-based solutions
	Systemic lever	Finance & Fundings Governance & Policy
	Outcome (according to module B-1.1)	Established an anaerobic digestion plant that processes manure into biogas, which will be used in a combined heat and power (CHP) unit to generate electricity and heat
Implementation	Responsible bodies/person for implementation	Provincial public enterprise Agricultural Estate Butmir (Kantonalno javno preduzeće (KJP) Poljoprivredno dobro Butmir)
	Action scale & addressed entities	FUA Sarajevo Provincial public enterprise Agricultural Estate Butmir (Kantonalno javno preduzeće Poljoprivredno dobro Butmir) Mujanovic
	Involved stakeholders	Ministry of Economy of Sarajevo Canton
	Comments on implementation – consider mentioning resources, timelines, milestones	The project implementation involves constructing an anaerobic digestion plant and installing a combined CHP unit to convert livestock manure into renewable energy. Supporting infrastructure includes a digester, manure transport systems, gas storage, purification units, and digestate handling. Key soft measures include establishing an incentive framework for renewable energy (such as feed-in tariffs or power purchase agreements), ensuring an organizational structure with qualified personnel for plant operations and maintenance, and securing financial support through grants, loans, or budgetary incentives. These preconditions are essential to ensure the technical and economic sustainability of the project.
Impact & cost	Generated renewable energy (if applicable)	8.9 GWh/year
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	44,786 t/year
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 4,081,633 EUR OPEX: 408,163 EUR/year Total costs by CO ₂ e unit: 100 EUR/ tCO _{2eq}

B. Residual emission strategy

B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy –5.2.1		
Action outline	Action name	5.2.1. Urban Greening - Afforestation of riverbank protective zones for climate resilience and ecosystem restoration
	Action type	Nature based solution



B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy –5.2.1		
		Other interventions
	Action description	The project focuses on restoring and protecting degraded riverbank zones across the FUA Sarajevo through the establishment of protective forests. About 110 km of suitable riverbanks will be afforested with native deciduous species like alder, poplar, willow, and birch. This nature-based solution will reduce CO ₂ emissions, enhance biodiversity, stabilize riverbanks against erosion, and mitigate flood risks in vulnerable areas. Hence, the project plays a key role in adapting to climate change, improving water quality, and reclaiming neglected natural corridors within an increasingly urbanized landscape.
Reference to impact pathway	Field of action	Green infrastructure & nature-based solutions
	Systemic lever	Governance and Policy Learning&Capabilities
	Outcome (according to module B-1.1)	Expanded forested areas that enhance CO ₂ absorption, prevent further degradation of river ecosystems, and improve ecosystem health. The project also strengthens the resilience of urban areas, particularly flood-prone regions.
Implementation	Responsible bodies/person for implementation	Sarajevo Canton City of East Sarajevo
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) River protective zones
	Involved stakeholders	Sava River Watershed Agency, Public Enterprises for Forest Management
	Comments on implementation – consider mentioning resources, timelines, milestones	<p>The project aims to protect and expand urban green spaces and riverbank ecosystems in FUA Sarajevo by resolving legal and property issues, particularly illegal structures along riverbanks. Restoration of degraded parks and open spaces by planting native trees, shrubs, and groundcover to improve biodiversity and ecological function. Priority should be given to the planting of non-allergenic, native tall tree species, as well as the integration of medicinal plants and pollinator-friendly flower beds, to enhance urban biodiversity, support ecosystem services, and improve microclimatic conditions. In addition, pavement removal and urban greening Interventions- removal of asphalt and concrete from selected squares, sidewalks, and other paved public areas, as well as industrial areas, followed by ecological rehabilitation through planned planting and landscaping.</p> <p>According to the CA members priority locations for pavement removal and immediate greening include:</p> <ul style="list-style-type: none"> • Skenderija Plateau • Trg na Ilidži / Parking area across from the Town Hall (<i>including restoration of the existing fountain</i>) • Tree-lined corridor between Stup and Ilidža • Hastahana Park • University Campus Parking Area • Park near the International University of Sarajevo (IUS) in Ilidža



B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy –5.2.1

		<ul style="list-style-type: none"> • Plateau in front of the Sarajevo Railway Station (<i>including restoration of the existing fountain</i>) • Avenue from the Eternal Flame to Marijin Dvor (tree-lined expansion) <p>Establishment and activation of a Citizen Stewardship Group to support the long-term success of urban greening and afforestation efforts will be initiated. The group will engage in site selection, tree planting, and species monitoring, contribute to the health assessment and reporting of green spaces using digital tools, assist with basic maintenance tasks, and lead community outreach to promote awareness and care for urban greenery.</p> <p>It includes developing and adopting a five-year Urban Nature Plan, integrating it into the urban spatial plan, this plan will be fully integrated into the overarching urban/spatial plan of the FUA Sarajevo to ensure institutional coherence and long-term implementation. It is recommended that the Sarajevo Functional Urban Area (FUA) apply the Urban Nature Plan Guidance as a framework for developing and implementing ambitious nature-based solutions. This guidance, developed in collaboration with Eurocities and ICLEI, provides practical tools for creating biodiverse urban spaces such as parks, urban forests, green roofs, and other green infrastructure. The Citizen Assembly proposed introducing legal regulations such as a Green Area Protection Regulation (urban rules for green spaces), Establishing legally binding targets for green space allocation—at least 30% in total built-up areas and 5–10% per individual building plot. In critical urban ventilation corridors, the regulation will limit building heights to 20 meters and set a maximum building density coefficient (Ki) of 3. The citizen Assembly proposed that any proposed land-use changes affecting green or undeveloped areas will require a public referendum, preceded by structured public consultations.</p> <p>This is in line with key expert documents produced under the Sarajevo Urban Transformation Project - UTPS:</p> <ul style="list-style-type: none"> • Greening Sarajevo: Action Plan for the Development of Urban Green Areas • Concept of the Urban Plan for the Canton – Regulatory Recommendations for the Protection, Improvement, and Furnishing of Open Spaces • Nature in the City: Good Practices for Resilient and Healthy Urban Greenery • Spatial Typologies: Strategic Directions for Sustainable Open Spaces in Sarajevo Canton <p>Those recommendations need to be incorporated in draft urban plan along with urban rules for green spaces and construction. This could be further explored through Commit2Green project.</p> <p>The project also seeks to define and regulate river protection zones, regulate green roofs, and promote public</p>
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B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy –5.2.1		
		awareness to support ecological restoration and climate resilience.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	1,196 t/year
	Total costs and costs by CO ₂ e unit	CAPEX: 765,306 EUR OPEX: 7,669 EUR/year Total costs by CO ₂ e unit: 646 EUR/tCO ₂ eq

B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy – 5.2.2		
Action outline	Action name	5.2.2 Forest Land Restoration Program - Large-scale afforestation of degraded forest lands and shrubland
	Action type	Nature based solution
	Action description	The aim is to restore degraded land in FUA Sarajevo through large-scale afforestation, contributing significantly to carbon sequestration, ecosystem resilience, and soil stabilization. Project targets barren land, degraded forests, and shrubland, with an emphasis on conifer-dominant planting and enhanced seedling survival. It aligns with forestry strategies and local plans, leveraging existing forest management plans and legal frameworks to ensure feasibility and long-term sustainability. Sarajevo Canton and the City of East Sarajevo collectively manage over 165,000 hectares of forest land, yet afforestation remains underutilized due to institutional and technical gaps. This program addresses those challenges by reinforcing legal frameworks, improving planting and maintenance practices, and expanding efforts to private forest areas. A total of 1,000,000 seedlings will be planted. Complementary measures include technical improvements in degraded forest stands, transformation of shrublands into mixed forests, and implementation of contour planting to reduce erosion by 40%. The project also contributes to biodiversity preservation, microclimate stabilization, and long-term ecological sustainability.
Reference to impact pathway	Field of action	Green infrastructure & nature-based solutions
	Systemic lever	Governance and Policy Learning & Capabilities Finance & Fundings



B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy – 5.2.2		
	Outcome (according to module B-1.1)	Expanded forested areas through the regeneration of barren land, degraded forests, and shrubland, enhancing ecological resilience, carbon sinks, stabilizing erosion-affected soils, and improving microclimatic stability.
Implementation	Responsible bodies/person for implementation	<p>Sarajevo Canton</p> <p>Cantonal Public Forestry Company – KJP "Sarajevo – šume" d.o.o.</p> <p>City of East Sarajevo</p> <p>Government of Republika Srpska through the Ministry of Agriculture, Forestry, and Water Management</p>
	Action scale & addressed entities	<p>FUA Sarajevo</p> <p>State- and private-owned forests</p>
	Involved stakeholders	<p>Ministry of Economy of Sarajevo Canton</p> <p>Public Enterprise for State Forest Management – JPŠ "Šume Republike Srpske" a.d. Sokolac</p> <p>Forestry Departments (private forests) and private forest owners</p> <p>Inspection Authorities – Forestry Inspection Departments</p> <p>The Parliament of the Federation of BiH / The Federal Ministry of Agriculture, Water Management and Forestry</p> <p>Institute for Development Planning of the Sarajevo Canton</p> <p>Local municipalities – municipal administrations</p>
	Comments on implementation – consider mentioning resources, timelines, milestones	<p>Key measures include soil preparation, seedling procurement and transport, and the possible installation of protective structures such as fencing in areas vulnerable to erosion or animal damage.</p> <p>Strengthening the legal and policy framework will enable transparent financing mechanisms and reinforce afforestation as a priority - adopt a Federal Forestry Law to standardize forest governance, establish transparent funding mechanisms, and enforce sustainable forest practices. The establishment of private forest owners' associations will facilitate the mobilization of private land, improve technical capacity, and provide access to funding and coordinated forest management. Furthermore, enhancing digital information systems in forestry and advancing the implementation of forest management plans will support data-driven monitoring and adaptive management. To ensure long-term effectiveness, the project will include targeted training for volunteers, public awareness campaigns, and improved planting and maintenance techniques to boost seedling survival.</p>
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated	62,573 t



B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy – 5.2.2		
	(natural or technological sinks)	
	Total costs and costs by CO ₂ e unit	CAPEX: 3,316,327 EUR OPEX: 33,234 EUR/year Total costs by CO ₂ e unit: 54 EUR/tCO ₂ eq

B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy – 5.2.3		
Action outline	Action name	5.2.3 Agroforestry for carbon sequestration
	Action type	Nature based solution Other interventions
	Action description	This project focuses on the development of agroforestry practices, aimed at enhancing soil health, increasing biodiversity, and significantly reducing CO ₂ emissions. Despite favourable conditions, agroforestry practices are currently absent in BiH. The project will implement sustainable farming methods by integrating tree planting with agricultural production, emphasizing soil conservation, erosion control, and protection from extreme weather events. Key activities include educational workshops for farmers on agroforestry techniques and sustainable practices, such as no-till farming and the use of organic fertilizers, alongside the potential use of renewable energy technologies. By planting 100,000 trees by 2030, the project will sequester CO ₂ , enhance water retention in the soil, and improve resilience against climate change.
Reference to impact pathway	Field of action	Green infrastructure & nature-based solutions
	Systemic lever	Finance & Funding Learning & Capabilities
	Outcome (according to module B-1.1)	Reduced GHG emissions and improved soil health through the promotion and implementation of sustainable agricultural and forestry production systems. Enhanced citizen engagement with nature and citizen involvement in urban greening activities.
Implementation	Responsible bodies/person for implementation	Ministry of Agriculture, Water Management, and Forestry of Federation of BiH Ministry of Agriculture, Forestry, and Water Management of Republika Srpska
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Agricultural organizations
	Involved stakeholders	Farmers and landowners Agricultural organizations CSO and professional organizations focused on environmental protection, sustainable development, and rural development Local government units Ministry of Economy of Sarajevo Canton EU and international donors
	Comments on implementation – consider mentioning resources, timelines, milestones	The implementation of the agroforestry development program requires a phased and participatory approach, beginning with the identification of suitable areas for agroforestation and develop a database of interested farmers through public calls. Infrastructure measures include GIS-based mapping, pilot demonstration projects to



B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy – 5.2.3		
		test and showcase agroforestry models adapted to regional conditions, targeted training in sustainable farming practices, and the staged introduction of indigenous tree species combined with no-till soil management. Soft measures focus on creating a legal framework for agroforestry (recognizing agroforestry as a specific production method), building institutional support systems, and securing access to financial mechanisms.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	621 t/year
	Total costs and costs by CO2e unit	CAPEX: 298,469 EUR OPEX: 33,745 EUR Total costs by CO2e unit: 535 EUR/ tCO _{2eq}

B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy – 5.2.4		
Action outline	Action name	5.2.4 Urban Agriculture and Rooftop Beekeeping
	Action type	Nature based solution Physical/spatial intervention Technical interventions Other interventions
	Action description	The project is aimed at establishing a climate-smart model of urban agriculture across FUA Sarajevo. While urban gardening remains underdeveloped in the region, this project builds on recent pilot efforts and strategic planning to promote local food production, reduce environmental impacts, and improve urban liveability. The project includes mapping existing and potential green spaces (an appropriate green roof system for piloting , prepare comprehensive project documentation, and secure all necessary permits and approvals for implementation), providing public training in sustainable urban farming methods (e.g., vertical gardening, composting), beekeeping training sessions covering hive management, pollination benefits, and honey harvesting, and integrating modern irrigation systems. By empowering residents, municipalities, and organizations to convert small plots, rooftops, and community spaces into productive green areas, the project strengthens community resilience, fosters environmental awareness, and supports decarbonization through localized food systems, organic waste recycling, and soil carbon storage. Though small in



B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy – 5.2.4		
		emissions impact, the project has strong educational and social value and supports Sarajevo's climate neutrality targets through citizen-driven sustainability actions.
Reference to impact pathway	Field of action	Green infrastructure & nature-based solutions
	Systemic lever	Technology/Infrastructure Governance and Policy Learning & Capabilities Finance & Funding
	Outcome (according to module B-1.1)	Sustainable urban agriculture promoted in the FUA Sarajevo through the integration of ecological farming practices like permaculture and agroecology, reduced reliance on chemical inputs, and institutional support via strategies and guidelines for green spaces dedicated to urban agriculture.
Implementation	Responsible bodies/person for implementation	Local self-government units
	Action scale & addressed entities	Sarajevo Canton - City of Sarajevo Companies from the agriculture and sustainable technologies sector
	Involved stakeholders	City Administration of the City of Sarajevo Ministry of Economy of the Sarajevo Canton Institute for Development Planning of the Sarajevo Canton Primary and secondary schools Faculties of Agriculture and Architecture Non-governmental organizations and citizen associations Companies from the agriculture and sustainable technologies sector International and development organizations Media
	Comments on implementation – consider mentioning resources, timelines, milestones	The project will be implemented in three phases. The first focuses on assessing potential urban spaces and preparing strategic and legal frameworks to enable the transformation of neglected areas into productive gardens. It will be necessary to develop and enforce clear regulatory standards for green roof design, installation, and maintenance, including safety, structural integrity, and environmental criteria, while simplifying the permitting process to encourage adoption and ensure long-term project success. Strong collaboration with local authorities and stakeholders will be established, and funding sources secured. The second phase includes the physical setup of urban gardens, composting infrastructure, and vertical gardens, along with the rollout of broad educational programs targeting citizens and schools. In the final phase, the project emphasizes sustainability through community engagement, feedback-based improvements, and creating systems for long-term maintenance. Institutional support, legal clarity, and financial incentives are key enablers of successful implementation, while partnerships and awareness campaigns will foster widespread participation.
Impact & cost	Generated renewable energy (if applicable)	N/A



B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy – 5.2.4		
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	CAPEX: 28,061 EUR/location OPEX: 12,245 EUR

B-2.2: Individual action outlines – 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy - 5.2.5		
Action outline	Action name	5.2.5 A Fruit Tree in Every Yard- Campaign
	Action type	Nature based solution Other interventions
	Action description	This project promotes the greening of densely built hillside neighbourhoods in the FUA Sarajevo by encouraging the planting of fruit trees in private residential yards. Given the spatial constraints and limited opportunities for traditional afforestation in these areas, this initiative taps into the potential of underutilized private green spaces. Through GIS-based mapping, community outreach, and provision of high-quality indigenous fruit tree seedlings, the project aims to plant at least 20,000 new trees. Beyond enhancing visual appeal, these trees will provide ecosystem services such as improved air quality, increased biodiversity, soil stabilization, and reduced heat island effects. The integration of small-scale sustainable agriculture and smart irrigation technologies contributes to climate adaptation and long-term environmental resilience. Although carbon sequestration from individual trees is relatively modest, the collective impact will support the broader goals of climate neutrality and liveability across the FUA Sarajevo.
Reference to impact pathway	Field of action	Green infrastructure & nature-based solutions
	Systemic lever	Finance & Funding Governance & Policy
	Outcome (according to module B-1.1)	Improved ecological and aesthetic value of hillside areas in FUA Sarajevo through the planting of fruit trees in yards, leading to enhanced air quality, reduced soil erosion, increased CO ₂ sequestration, and mitigation of the urban heat island effect
Implementation	Responsible bodies/person for implementation	Local government units
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Hillside settlements - the final beneficiaries of the project
	Involved stakeholders	Households in hillside settlements – end users of the project, who will receive seedlings and benefit from the cultivation of fruit trees CSO focused on environmental conservation



B-2.2: Individual action outlines – 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy - 5.2.5		
		Ministry of Economy of Sarajevo Canton Ministry of Agriculture, Forestry, and Water Management of Republika Srpska International organizations such as UNDP, EU funds, or GIZ, which support sustainable development projects
	Comments on implementation – consider mentioning resources, timelines, milestones	The implementation of this project requires a phased and participatory approach that integrates both infrastructural measures and key soft policy instruments. Infrastructure measures focus on mapping available land in hillside neighbourhoods, selecting tree species adapted to local microclimates, and organizing the logistics of planting and maintenance (provide high-quality fruit tree saplings suited to the local climate and soil conditions and distribute essential gardening tools and materials (mulch, compost, drip irrigation kits)). Special attention is given to planting high-quality indigenous fruit trees suited for urban and peri-urban residential yards. Workshops and training programs are essential to equip citizens with knowledge on proper tree care, ensuring high survival rates and maximizing ecological benefits. On the soft measures side, the initiative must be aligned with local spatial and urban plans to avoid regulatory conflicts. Municipalities and relevant cantonal institutions should provide financial support through public calls or incentive schemes, while international partners may assist through grants or donations. A coordinated public awareness campaign and the establishment of educational platforms and community mentorship programs will help foster long-term community engagement and ownership.
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	97.39 t/year
	Total costs and costs by CO ₂ e unit	CAPEX: 184,949 EUR OPEX: 27,610 EUR Total costs by CO ₂ e unit: 2,183 EUR/ tCO ₂ eq

B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy – 5.2.6		
Action outline	Action name	5.2.6. Urban Gardens – Sustainable Urban Agriculture Solutions
	Action type	Nature based solution Physical/spatial intervention Technical interventions Other interventions



B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy – 5.2.6		
	Action description	The project is aimed at establishing a climate-smart model of urban agriculture across FUA Sarajevo. While urban gardening remains underdeveloped in the region, this project builds on recent pilot efforts and strategic planning to promote local food production, reduce environmental impacts, and improve urban liveability. The project includes mapping existing and potential green spaces, providing public training in sustainable urban farming methods (e.g., vertical gardening, composting), and integrating modern irrigation systems. By empowering residents, municipalities, and organizations to convert small plots, rooftops, and community spaces into productive green areas, the project strengthens community resilience, fosters environmental awareness, and supports decarbonization through localized food systems, organic waste recycling, and soil carbon storage. Though small in emissions impact, the project has strong educational and social value and supports Sarajevo's climate neutrality targets through citizen-driven sustainability actions.
Reference to impact pathway	Field of action	Green infrastructure & nature-based solutions
	Systemic lever	Technology/Infrastructure Governance and Policy Learning & Capabilities Finance & Funding
	Outcome (according to module B-1.1)	Sustainable urban agriculture promoted in the FUA Sarajevo through the integration of ecological farming practices like permaculture and agroecology, reduced reliance on chemical inputs, and institutional support via strategies and guidelines for green spaces dedicated to urban agriculture.
Implementation	Responsible bodies/person for implementation	Local self-government units
	Action scale & addressed entities	Sarajevo Canton - City of Sarajevo Companies from the agriculture and sustainable technologies sector
	Involved stakeholders	City Administration of the City of Sarajevo Ministry of Economy of the Sarajevo Canton Institute for Development Planning of the Sarajevo Canton Primary and secondary schools Faculties of Agriculture and Architecture Non-governmental organizations and citizen associations Companies from the agriculture and sustainable technologies sector International and development organizations Media
	Comments on implementation – consider mentioning resources, timelines, milestones	The project will be implemented in three phases. The first focuses on assessing potential urban spaces and preparing strategic and legal frameworks to enable the transformation of neglected areas into productive gardens. Strong collaboration with local authorities and stakeholders will be established, and funding sources secured. The second phase includes the physical setup of urban gardens, composting infrastructure, and vertical gardens, along with the rollout of broad educational programs targeting citizens and schools. In the final phase, the project emphasizes



B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy – 5.2.6		
		<p>sustainability through community engagement, feedback-based improvements, and creating systems for long-term maintenance. Institutional support, legal clarity (integrate urban agriculture into urban planning and land use policies, allowing temporary or permanent use of public land for gardens), and financial incentives are key enablers of successful implementation, while partnerships and awareness campaigns will foster widespread participation. In addition, integrate urban agriculture into urban planning and land use policies, allowing temporary or permanent use of public land for gardens.</p> <p>The project aims to establish mechanisms for community co-management or land stewardship agreements with local authorities.</p>
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	CAPEX: 28,061 EUR/location OPEX: 12,245 EUR

B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy – 5.2.7		
Action outline	Action name	5.2.7. Production of planting material for AFOLU projects
	Action type	Other interventions
	Action description	This project addresses the critical gap in the availability of high-quality, climate-adapted planting material for afforestation, reforestation, and urban greening initiatives in FUA Sarajevo. Currently, the region faces low seedling survival rates, averaging only 50% for forestry species, due to unsuitable or low-quality planting stock and a lack of species adapted to changing climate conditions. The situation is further constrained by insufficient production capacities of local nurseries, particularly for horticultural varieties suitable for urban environments. By revitalizing and expanding local nursery operations, this project aims to support the long-term implementation of AFOLU projects.
Reference to impact pathway	Field of action	Green infrastructure & nature-based solutions
	Systemic lever	Technology/Infrastructure Finance & Funding Learning & Capabilities



B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy – 5.2.7		
	Outcome (according to module B-1.1)	Improved availability of high-quality, indigenous, and climate-adapted planting material, enhancing the effectiveness of afforestation and AFOLU projects in the short term, while supporting long-term greening initiatives in the FUA Sarajevo.
Implementation	Responsible bodies/person for implementation	Ministry of Economy of Sarajevo Canton Ministry of Communal Economy, Infrastructure, Spatial Planning, Construction, and Environmental Protection of Sarajevo Canton City of East Sarajevo Beneficiaries: KJKP Park d.o.o. Sarajevo (horticultural species) KJP Sarajevo-šume d.o.o. Sarajevo (forestry species) Public Utility Company “Komunalno” Pale in cooperation with the “Jahorina” Pale Forest Management Company (both horticultural and forestry species)
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Planting material
	Involved stakeholders	Associations (e.g., Association of Landscape Architects, Association of Forestry Engineers and Technicians - UŠIT) Universities (e.g. Faculty of Forestry, Faculty of Agriculture) Municipalities Other business entities operating in the horticulture sector
	Comments on implementation – consider mentioning resources, timelines, milestones	The project will involve conducting a nursery potential mapping study, which will assess existing resources and identify investment needs for infrastructure and equipment upgrades. Additionally, a planting material production plan will be developed to outline species requirements and ensure quality control for all AFOLU projects in the region. The project includes establishment of climate-resilient nurseries equipped with controlled environments (greenhouses, shade nets, misting systems) to produce high-quality seedlings year-round and investment in decentralized community-based micro-nurseries to increase local access and reduce transport emissions. Also, it aims to allocate the public funds or green bonds to support initial infrastructure development of nurseries. Engagement of NGOs focused on local business development to support entrepreneurship in this sector and encourage their target groups—particularly youth, women, and rural communities—to establish sustainable enterprises in planting material production. Capacity-building initiatives will provide technical training for nursery operators, enabling them to apply best practices in plant production. Partnerships with universities, research institutions, and local associations will facilitate knowledge exchange and support the implementation process.
	Impact & cost	Generated renewable energy (if applicable)
	Removed/substituted energy, volume, or fuel type	N/A



B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy – 5.2.7		
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO2e unit	CAPEX: 714,286 EUR OPEX: 97,145 EUR

B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy – 5.2.8		
Action outline	Action name	5.2.8. Green Space Cadastre and Management System
	Action type	Physical/spatial intervention Nature based solution Other interventions
	Action description	<p>The project aims to create a digitized, publicly accessible system for mapping and managing urban green spaces in FUA Sarajevo. Currently, green spaces are fragmented and lack precise data, hindering effective planning and maintenance. This project focuses on the establishment of a comprehensive GIS-based digital cadastre of green spaces within FUA Sarajevo to support strategic urban planning, climate adaptation, and biodiversity conservation. Institutional responsibilities will be clearly defined among local government units, utility services, and environmental agencies to ensure coordinated management. The cadastre will be integrated into key urban development strategies, including the Climate Neutral Action Plan (CNAP) and land-use regulations.</p> <p>Initial funding will be secured through cantonal and entity environmental funds, with additional allocations from municipal budgets for data collection, system maintenance, and public awareness activities. The project will include capacity-building programs for municipal staff, planners, and NGOs, alongside the creation of user manuals and knowledge-sharing platforms. The project will also promote community engagement through citizen science initiatives, empowering residents to contribute to green space monitoring and stewardship.</p>
Reference to impact pathway	Field of action	Green infrastructure & nature-based solutions
	Systemic lever	Technology/Infrastructure Governance and Policy Learning & Capabilities
	Outcome (according to module B-1.1)	Enhanced management and expansion of green spaces through the establishment of a green space cadastre
Implementation	Responsible bodies/person for implementation	KJKP Park Institute for Informatics and Statistics of Sarajevo Canton City of East Sarajevo
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Green Space Cadastre and Management
	Involved stakeholders	Municipal authorities Public utilities for maintenance



B-2.2: Individual action outlines- 5.2. Green Infrastructure & Nature-Based Solution- Residual emission strategy residual emission strategy – 5.2.8		
		Non-governmental organizations and citizens Universities and research institutions
	Comments on implementation – consider mentioning resources, timelines, milestones	The platform will include software for mapping, species inventory, and an interactive user portal, as well as a mobile app for real-time information and public participation. Soft measures include improving the legal framework for green space protection, ensuring local government responsibility for cadastre maintenance, promoting public education and involvement, fostering cooperation with NGOs and academic institutions, and adapting legislation to support digital technologies and GIS systems, ensuring the sustainability and transparency of the initiative.
Impact & cost	Generated renewable energy (if applicable)	NA
	Removed/substituted energy, volume, or fuel type	NA
	GHG emissions reduction estimate (total) per emission source sector	NA
	GHG emissions compensated (natural or technological sinks)	NA
	Total costs and costs by CO2e unit	CAPEX: 663,265 EUR OPEX: 25,565 EUR/year



3.2.6 Digital Transformation/Social Innovation

B-2.2: Individual action outlines 6.1		
Action outline	Action name	6.1. Digital platform for citizen engagement in environmental and sustainable development decision-making
	Action type	Other interventions
	Action description	Currently, in FUA Sarajevo there is a lack of citizen participation, no centralized platform, limited transparency in decision-making, and insufficient data connection between institutions and the public. The platform will enhance citizen involvement in local policies and projects, improve transparency and access to information, and enable more efficient communication between citizens and authorities. It will also facilitate faster implementation of citizens' proposals, fostering more direct and effective participation in decision-making processes.
Reference to impact pathway	Field of action	Digital Transformation/Social Innovation
	Systemic lever	Technology/Infrastructure Governance and Policy Learning & Capabilities
	Outcome (according to module B-1.1)	Enhanced citizen engagement in environmental decision-making through the establishment of a digital platform for active participation in sustainability initiatives.
Implementation	Responsible bodies/person for implementation	Institute for Informatics and Statistics of Sarajevo Canton City of East Sarajevo
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Digital Platform for Citizen Engagement
	Involved stakeholders	Ministry of Communal Economy, Infrastructure, Spatial Planning, Construction, and Environmental Protection of Sarajevo Canton Municipalities and Cantonal institutions within Sarajevo Canton, Municipalities and other institutions within East Sarajevo, Local communities and citizens of Sarajevo, Private sector, including IT companies and investors, Academic institutions and research centres, Investors and technology companies interested in developing digital solutions.
	Comments on implementation – consider mentioning resources, timelines, milestones	The digital platform will centralize citizen proposals, feedback, and issues, fostering transparent communication between citizens and authorities. Key components include the customization of the Go Vocal platform for Sarajevo Canton and East Sarajevo, integrating features such as interactive maps, participatory modules, and a mobile app for real-time issue reporting. The platform will also include data analytics for tracking engagement and providing transparency on project implementation. Educational efforts, such as workshops, online tutorials, and media campaigns, will promote citizen involvement. Soft measures necessary for success include the development of a legal framework for digital participation, cooperation with authorities, ensuring data privacy, and compliance with transparency laws. Guidelines for effective citizen participation in urban planning processes will further support the platform's success.



B-2.2: Individual action outlines 6.1		
Impact & cost	Generated renewable energy (if applicable)	N/A
	Removed/substituted energy, volume, or fuel type	N/A
	GHG emissions reduction estimate (total) per emission source sector	N/A
	GHG emissions compensated (natural or technological sinks)	N/A
	Total costs and costs by CO ₂ e unit	CAPEX: 433,673 EUR OPEX: 25,565 EUR/year

B-2.2: Individual action outlines 6.2.		
Action outline	Action name	6.2. Smart Sarajevo Digital Twin for Climate Neutrality
	Action type	Technical interventions Other interventions
	Action description	The Smart Sarajevo Digital Twin for Climate Neutrality project aims to develop a comprehensive Digital Twin platform for Sarajevo's Functional Urban Area (FUA) to support the city's transition toward climate neutrality. Aligned with the Climate Neutral Action Plan (CNAP), the project will enable data-driven urban planning, real-time simulation, and effective monitoring of emissions-reduction strategies across sectors such as energy, transport, buildings, waste, and land use. The Digital Twin will act as a dynamic virtual model integrating data from infrastructure, energy systems, mobility, and environmental conditions to optimize decision-making, enhance transparency, and foster public engagement. Key components include upgrading Sarajevo's GIS platform, designing a robust data centre, integrating climate and emission data, simulating sustainable energy and mobility solutions, supporting circular economy initiatives, and modelling green infrastructure. Interactive dashboards will empower stakeholders with tools for participatory planning and real-time feedback, while automated monitoring systems will track progress toward EU-aligned climate goals. The project, led by Sarajevo's urban planning departments and supported by local institutions and potential international funders, will unfold over three phases—initial design and data collection, full model deployment, and continuous monitoring and scaling—with the goal of creating a replicable model for other cities in the region.
Reference to impact pathway	Field of action	Digital Transformation/Social Innovation
	Systemic lever	Technology/Infrastructure Governance and Policy Learning & Capabilities



B-2.2: Individual action outlines 6.2.		
	Outcome (according to module B-1.1)	6.2 Enhanced spatial planning and disaster risk management through the development of integrated Smart GIS platform
Implementation	Responsible bodies/person for implementation	Institute for Informatics and Statistics of Sarajevo Canton, Institute for Planning and Development of Sarajevo Canton, City of East Sarajevo
	Action scale & addressed entities	FUA Sarajevo (Sarajevo Canton and East Sarajevo) Integrated Smart GIS platform
	Involved stakeholders	Ministry of Communal Economy, Infrastructure, Spatial Planning, Construction, and Environmental Protection of Sarajevo Canton, Municipalities and Cantonal institutions within Sarajevo Canton, Municipalities and other institutions of the East Sarajevo, City of East Sarajevo, Local communities and citizens of FUA Sarajevo, Private sector, including IT companies and investors, Academic institutions and research centres Investors and technology companies interested in developing digital solutions.
	Comments on implementation – consider mentioning resources, timelines, milestones	<p>The success of this project heavily depends on robust technical infrastructure. Upgrading the existing GIS platform and establishing a new data centre require advanced servers, storage systems, and secure networking. Procuring high-performance computing resources and ensuring system interoperability will be crucial early steps.</p> <p>A multidisciplinary team is essential, including GIS specialists, data scientists, urban planners, climate experts, software developers, and systems engineers. Close collaboration with local universities and ICT firms will be vital to address skill gaps and build capacity.</p> <p>The project will require substantial funding, particularly for the data centre setup, software development, and stakeholder engagement activities. Engagement with potential funders like the Horizon Europe, SECO, SIDA, and others will be necessary early in the timeline to ensure long-term financial sustainability.</p> <p>Key milestones include:</p> <p>2026-2027: Platform design, data collection, and stakeholder workshops 2027-2029: Model development, sectoral integration, pilot applications 2029-2030: Monitoring, optimization, and scaling</p>
Impact & cost	Generated renewable energy (if applicable)	NA
	Removed/substituted energy, volume, or fuel type	NA
	GHG emissions reduction estimate	NA



B-2.2: Individual action outlines 6.2.		
	(total) per emission source sector	
	GHG emissions compensated (natural or technological sinks)	NA
	Total costs and costs by CO2e unit	CAPEX: 2,500,00 EUR OPEX: 200,000 EUR/year



3.2.7 Strategy for Residual Emissions

While the implementation of the Project Portfolio will lead to a substantial reduction in GHG emissions, achieving the net-zero target will also require FUA Sarajevo to enhance its carbon sinks. Hence, efforts will focus on the implementation of targeted nature-based solutions, as outlined in [Section 3.2.5](#). These initiatives include the following projects:

Strategy for Residual Emissions	
Action	CO ₂ eq sinks (t/year)
Afforestation of riverbank protective zones for climate resilience and ecosystem restoration	1,196
Greening and raising the standards of public green space management	808.5
Promoting CO ₂ absorption by planting fruit trees in hillside settlements	97.39
Agroforestry development for carbon sequestration	621
Large-scale afforestation of degraded forest lands and shrubland	62,573
Advancing sustainable urban agriculture	NA
Production of planting material for AFOLU projects	NA
Green space cadastre and management for sustainable urban development	NA
TOTAL	65,296

As a result of these actions, the capacity of carbon sinks is expected to increase from 383,950 tCO₂eq/year in 2018 to 449,246 tCO₂eq/year by 2030. This enhancement will enable FUA Sarajevo to offset residual emissions and reach its goal of climate neutrality.

In addition, Sarajevo is a partner in the **Commit2Green** project that has received joint funding through the Cities Mission and the Adaptation Mission. Sarajevo has the ambition to develop greening and renaturing strategies that (a) are cross-scalar and participatory (b) inform existing development agendas and policies, and (c) are implemented through demonstrators that create tangible impact on the ground for the local communities and broader ecosystem.

At the heart of the Commit2Green (C2G) project are nature-based solutions (NbS) that address pressing urban climate challenges - such as heat, flooding, and biodiversity loss - while enhancing the liveability and resilience of cities. Urban Nature Plans are a central tool for planning and implementing these solutions in a systematic and impactful way.

Urban Nature Plans help local governments integrate NbS into their broader climate and nature strategies. By restoring ecosystems and embedding nature into urban design, these plans contribute directly to achieving climate neutrality, improving urban biodiversity, and fulfilling the goals of the EU Nature Restoration Regulation.

C2G will co-develop Urban Nature Plan guidance with Sarajevo, ensuring tailored, context-specific support for local authorities. The Urban Nature Plan process consists of 10 structured steps across three main phases – **Preparation**, **Action Planning**, and **Implementation & Monitoring** – designed to embed long-term ecological thinking into city planning.



As recommended by the European Union, Urban Nature Plans are not only key to restoring nature in cities but also offer vital tools for Mission cities like Sarajevo to meet their ambitious climate and nature commitments.

In **Commit2Green**, Sarajevo will develop urban greening guidelines through the Urban Nature Plan and urban greening strategy self-assessment processes. The Urban Nature Self-Assessment will critically evaluate the scope and quality of existing greening actions, identify weakness and opportunities and enhance integration with other policies and strategies. The Action Portfolio will be analysed further and opportunities for urban greening and net biodiversity gain will be explored. This will further enhance the potential for carbon sequestration in FUA Sarajevo while simultaneously unlocking several climate resilience and adaptation co-benefits.



3.3 Module B-3 Indicators for Monitoring, Evaluation and Learning

Module B-3 “Indicators for Monitoring, Evaluation and Learning” contains a selection of indicators to monitor and evaluate progress along the selected impacts pathways and fields of action described in Module B-1. as well as a monitoring and evaluation plan, i.e., metadata on each indicator selected, in addition to milestones and timeline.

To date, the monitoring and reporting of indicators relevant to the Net Zero Cities framework in FUA Sarajevo have been fragmented and limited in scope. Current data collection practices are not yet fully aligned with the integrated, cross-sectoral approach necessary for effectively tracking progress toward climate neutrality. Moreover, existing reporting mechanisms are primarily oriented toward regulatory compliance, rather than serving as tools for performance assessment or strategic planning within the Net Zero Cities framework.

In FUA Sarajevo, certain indicators - particularly those related to air quality (e.g., PM_{2.5}, PM₁₀, NO₂) and energy consumption, are regularly monitored through the Federal Hydrometeorological Institute and the Republic Hydrometeorological Institute.

The Institute for Informatics and Statistics of Sarajevo Canton publishes annual statistical yearbooks that report across various sectors aligned with the Net Zero sectors. While primarily designed for general statistical reporting, the sectoral data contained within these yearbooks correspond with key areas of the Net Zero Cities framework. As such, these publications represent a valuable resource that can be utilized to supplement and expand the set of indicators reported through the Net Zero platform, facilitating more comprehensive monitoring and evaluation of progress toward climate neutrality goals.



Figure 11: Statistical yearbook of Sarajevo Canton ¹⁶

As previously noted, in parallel with the development of the CNAP and the GHG inventory for the FUA Sarajevo, Sarajevo Canton has taken significant steps to improve long-term air pollution monitoring and transparency. As part of its ongoing efforts to enhance air quality planning, **a comprehensive Air Emissions Register and Pollutant Information System was completed in April 2025**. While the system is primarily designed for tracking air pollutants, it also includes a module for CO₂ emissions, supporting alignment with climate targets. Although its datasets cannot be retroactively applied to the 2018 baseline used in the CNAP, the system will significantly facilitate monitoring the impact of implemented measures

¹⁶ Source: Statistical yearbook of Sarajevo Canton, 2022, Institute for Informatics and Statistics of Sarajevo Canton



over time and contribute to more transparent evaluation of progress. It can also serve as a tool for reporting specific indicators within the framework of Net Zero Cities. Hence, there is a growing institutional capacity to implement CNAP, strengthening the link between air quality planning and climate neutrality efforts.

B-3.1: Impact Pathways							
Outcomes/ impacts addressed	Action/ project	Indica tor No. (uniqu e identif ied)	Indicator name	Unit	Target values		
					2025	2027	2030
Reduction of CO ₂ eq emissions from stationary energy sources (compared to the 2018 baseline year)	All actions from Energy systems sector (subsector: built environment/buildings and heating)	E1	GHG emission from stationary energy	tCO ₂ equivalent and (%)	38,081 (reduction of 3% compared to baseline)	38,081 (reduction of 3% compared to baseline)	1,145,151 (reduction of 91% compared to baseline)
Reduction of CO ₂ eq emissions from transport (compared to the 2018 baseline year)	All actions from Mobility & Transport sector	M1	GHG emission from transport	tCO ₂ equivalent and (%)	74,975 (reduction of 15% compared to baseline)	74,975 (reduction of 15% compared to baseline)	397,752 (reduction of 81% compared to baseline)
Reduction of CO ₂ eq emissions from waste (compared to the 2018 baseline year)	All actions from Waste & Circular Economy sector	W1	GHG emission from waste	tCO ₂ equivalent and (%)	-	-	203,770 (reduction of 67% compared to baseline)
Reduction of CO ₂ eq emissions from IPPU (compared to the 2018 baseline year)	All actions from IPPU sector and subsector electricity, from Energy systems	I1	GHG emission from IPPU	tCO ₂ equivalent and (%)	1,500 (reduction of 0.4% compared to baseline)	1,500 (reduction of 0.4% compared to baseline)	318,721 (reduction of 81% compared to baseline)
Reduction of CO ₂ eq emissions from AFOLU (compared to the 2018 baseline year)	All actions from AFOLU sector	A1	GHG emission from AFOLU	tCO ₂ equivalent and (%)	-	-	44,786 (reduction of 42% compared to baseline)



B-3.1: Impact Pathways							
Outcomes/ impacts addressed	Action/ project	Indica tor No. (uniqu e identif ied)	Indicator name	Unit	Target values		
					2025	2027	2030
baseline year)							
Reduction of CO ₂ eq emissions from grid supplied energy (compared to the 2018 baseline year)	All actions from Energy systems (subsector: electricity)	E2	GHG emission from grid supplied energy	tCO ₂ equivalent and (%)	23,136 (reductio n of 3% compare d to baseline)	23,136 (reductio n of 3% compare d to baseline)	682,126 (reduction of 78% compared to baseline)
Climate change mitigation, by enhancing the natural carbon absorption capacity of ecosystems Improved air quality, biodiversity conservatio n, and urban resilience.	All actions from AFOLU sector (excluding those related to cattle farming)	A3	Negative emission s through natural sinks	tCO ₂ equivalent and (%)	383,950	383,950	449,246 (increase of 17% compared to the 2018 baseline year)
Improved air quality.	All actions, either directly or indirectly, contribute to improving air quality..	AQ1	PM2.5 concentr ation levels	µg/m ³	14,8	7	5
Improved air quality.	All actions, either directly or indirectly, contribute to improving air quality.	AQ2	PM10 concentr ation levels	# of days	80	40	35
Improved air quality.	All actions, either directly or indirectly, contribute to improving air quality.	AQ3	NO ₂ concentr ation levels	µg/m ³	28	20	10



B-3.2: Indicator Metadata	
Indicator Name	GHG emission from stationary energy
Indicator Unit	tCO2 equivalent
Definition	Greenhouse gas emissions (mainly CO2 emissions) from the operations of buildings.
Calculation	Base emission information can be derived through "Amount of fuel consumption per fuel type x GHG emission per fuel type". Calculation methodology has been described in detail in GHG Protocol for Cities (GPC) pages 60 – 73.
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Fields of action according to GHG inventory format – Module A-1 – Energy Systems – subsector – Built Environment/Buildings & Heating
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improved air quality and public health due to reduced fossil fuel combustion, lower household and business energy costs through energy efficiency, enhanced energy security and resilience by diversifying energy sources.
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[no]
Data requirements	
Expected data source	Centre for Air Quality Management of Sarajevo Canton: Air Emissions Register and Pollutant Information System of Sarajevo Canton City of East Sarajevo
Is the data source local or regional/national?	Local
Expected availability	Available from 2026/2027
Suggested collection interval	Annually
References	
Deliverables describing the indicator	N/A
Other indicator systems using this indicator	N/A



B-3.2: Indicator Metadata	
Indicator Name	GHG emission from transport
Indicator Unit	tCO2 equivalent
Definition	Greenhouse gas emissions from the operations of vehicles.
Calculation	Calculation formula for Transport indicators can be found in the GHG Protocol for Cities (2020).
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Fields of action according to GHG inventory format – Module A-1- Mobility & Transport sector
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improved air quality and reduced respiratory illnesses, reduced noise pollution in urban areas, less traffic congestion and more reliable travel times and increased physical activity through walking and cycling.
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[no]
Data requirements	
Expected data source	Centre for Air Quality Management of Sarajevo Canton: Air Emissions Register and Pollutant Information System of Sarajevo Canton City of East Sarajevo
Is the data source local or regional/national?	Local
Expected availability	Available from 2026/2027
Suggested collection interval	Annually
References	
Deliverables describing the indicator	N/A
Other indicator systems using this indicator	N/A

B-3.2: Indicator Metadata	
Indicator Name	GHG emission from waste



Indicator Unit	tCO2 equivalent
Definition	Greenhouse gas emissions from waste treatment, waste incineration and landfills
Calculation	Quantity of waste per End-of-life (EoL) treatment type x emission factors per EoL treatment. Detailed methods for different waste types are defined under GPC, pages 89 - 107
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Fields of action according to GHG inventory format – Module A-1 – Waste & Circular Economy sector
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Reduced land and water contamination from waste disposal, resource efficiency through recycling and material recovery, job creation in recycling and circular economy sectors and energy generation from biogas and waste-to-energy systems.
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[no]
Data requirements	
Expected data source	Centre for Air Quality Management of Sarajevo Canton: Air Emissions Register and Pollutant Information System of Sarajevo Canton City of East Sarajevo
Is the data source local or regional/national?	Local
Expected availability	Available from 2026/2027
Suggested collection interval	Annually
References	
Deliverables describing the indicator	N/A
Other indicator systems using this indicator	N/A

B-3.2: Indicator Metadata

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B-3.2: Indicator Metadata	
Indicator Name	GHG emission from IPPU
Indicator Unit	tCO2 equivalent
Definition	Greenhouse gas emissions from industrial processes and product use within city boundary.
Calculation	GHG emission calculation methodology for the IPPU sector is described in detail in the 2014 IPCC Mitigation of Climate Change, chapter 10, page 746. City-level calculation and scoping methodology described in GPC, pages 109 onward.
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Fields of action according to GHG inventory format – Module A-1 – IPPU sector
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improved industrial efficiency and competitiveness, reduced use of harmful chemicals and pollutants (e.g., F-gases), encouragement of innovation and cleaner technologies and enhanced worker health and safety in industrial environments.
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[no]
Data requirements	
Expected data source	Centre for Air Quality Management of Sarajevo Canton: Air Emissions Register and Pollutant Information System of Sarajevo Canton City of East Sarajevo
Is the data source local or regional/national?	Local
Expected availability	Available from 2026/2027
Suggested collection interval	Annually
References	
Deliverables describing the indicator	N/A
Other indicator systems using this indicator	N/A



B-3.2: Indicator Metadata	
Indicator Name	GHG emission from AFOLU
Indicator Unit	tCO2 equivalent
Definition	IPCC guidelines divides AFOLU emission activities into three categories: Livestock, Land, Aggregate sources and non-CO2 emissions sources on land. The cumulative of these emissions forms the sectoral emissions. It requires identifying which categories of the AFOLU sector are relevant for reporting purposes.
Calculation	Detailed calculation and scoping methodology described in GPC pages 121- 137
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Fields of action according to GHG inventory format – Module A-1 - AFOLU sector
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improved soil health, increased agricultural productivity, enhanced food security, preservation of biodiversity, and better water retention and quality.
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[no]
Data requirements	
Expected data source	Centre for Air Quality Management of Sarajevo Canton: Air Emissions Register and Pollutant Information System of Sarajevo Canton City of East Sarajevo
Is the data source local or regional/national?	Local
Expected availability	Available from 2026/2027
Suggested collection interval	Annually
References	
Deliverables describing the indicator	N/A



Other indicator systems using this indicator	N/A
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B-3.2: Indicator Metadata	
Indicator Name	GHG emission from grid supplied energy
Indicator Unit	tCO2 equivalent
Definition	GHG emissions occurring as a consequence of the use of grid-supplied electricity, heat, steam and/or cooling within the city boundary.
Calculation	Detailed calculation and scoping methodology described in GPC pages 56 – 75.
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Fields of action according to GHG inventory format – Module A-1 – Electricity subsector
Does the indicator measure indirect impacts (i.e., co- benefits)?	[yes]
If yes, which co-benefit does it measure?	Specify co-benefit
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[no]
Data requirements	
Expected data source	Centre for Air Quality Management of Sarajevo Canton: Air Emissions Register and Pollutant Information System of Sarajevo Canton City of East Sarajevo
Is the data source local or regional/national?	Local
Expected availability	Available from 2026/2027
Suggested collection interval	Annually
References	
Deliverables describing the indicator	N/A
Other indicator systems using this indicator	N/A

B-3.2: Indicator Metadata	
Indicator Name	Negative emissions through natural sinks
Indicator Unit	tCO2 equivalent



Definition	“Natural sinks” refer to the planting of trees or other conversion of land use. Cities are allowed to account for negative emissions through the enlargement or enhancement of natural sinks within the territory to address residual emissions (accounting for all changes in the carbon stock). Carbon sinks should be accounted for as part of the ‘AFOLU’ sector of the GHG inventory and can be independently monitored as a progress indicator to show negative emissions.
Calculation	Refer to AFOLU indicators section.
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Fields of action according to GHG inventory format – Module A-1
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improves biodiversity, enhances ecosystem services, supports climate adaptation, improves urban aesthetics, and provides health and recreational benefits for local communities.
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[no]
Data requirements	
Expected data source	Institute for Informatics and Statistics of Sarajevo Canton and Republic Institute of Statistics/City of East Sarajevo
Is the data source local or regional/national?	Local/National
Expected availability	Available from 2026/2027
Suggested collection interval	Annually
References	
Deliverables describing the indicator	N/A
Other indicator systems using this indicator	N/A

B-3.2: Indicator Metadata



Indicator Name	PM2.5 concentration levels
Indicator Unit	µg/ m ³
Definition	This indicator corresponds to the highest annual mean of PM2.5 concentration recorded in a particular year at stations in urban and suburban background locations.
Calculation	Data can be obtained: 1) From air quality monitoring reports in different stations on a municipal or regional level and 2) Based on measurements made in urban and suburban background locations established for this purpose.
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[no]
If yes, which emission source sectors does it measure?	Fields of action according to GHG inventory format – Module A-1
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	<ul style="list-style-type: none"> • Lower PM2.5 levels reduce respiratory and cardiovascular diseases, lowering healthcare costs and mortality rates. • Cleaner air leads to better overall well-being, increased outdoor activity, and greater urban liveability.
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[no]
Data requirements	
Expected data source	Centre for Air Quality Management of Sarajevo Canton: Air Emissions Register and Pollutant Information System of Sarajevo Canton and Federal Hydrometeorological Institute City of East Sarajevo and Republic Hydrometeorological Institute
Is the data source local or regional/national?	Local
Expected availability	Available
Suggested collection interval	Annually
References	



Deliverables describing the indicator	N/A
Other indicator systems using this indicator	N/A

B-3.2: Indicator Metadata	
Indicator Name	PM10 concentration levels
Indicator Unit	# of days
Definition	This air quality management indicator corresponds to the highest number of days in a year where the PM10 concentration level recorded at stations in urban and suburban background locations has exceeded the WHO recommendation of 45 µg/ m ³ . It refers to the number of days on the monitoring station that measured the most days in exceedance of the WHO recommendation of 45 µg/m ³ .
Calculation	Data can be obtained: 1) From air quality monitoring reports in different stations on a municipal or regional level and 2) Based on measurements made in urban and suburban background locations established for this purpose.
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[no]
If yes, which emission source sectors does it measure?	Fields of action according to GHG inventory format – Module A-1
Does the indicator measure indirect impacts (i.e., co- benefits)?	[yes]
If yes, which co-benefit does it measure?	Reduces asthma, bronchitis, and other lung-related illnesses.
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[no]
Data requirements	
Expected data source	Centre for Air Quality Management of Sarajevo Canton: Air Emissions Register and Pollutant Information System of Sarajevo Canton and Federal Hydrometeorological Institute



	City of East Sarajevo and Republic Hydrometeorological Institute
Is the data source local or regional/national?	Local
Expected availability	Available
Suggested collection interval	Annually
References	
Deliverables describing the indicator	N/A
Other indicator systems using this indicator	N/A

B-3.2: Indicator Metadata	
Indicator Name	NO ₂ concentration levels
Indicator Unit	µg/ m ³
Definition	This indicator corresponds to the highest value of the annual mean of nitrogen dioxide (NO ₂) concentrations recorded in a particular year at stations with the highest traffic locations.
Calculation	Data can be obtained: 1) From air quality monitoring reports in different stations on a municipal or regional level and 2) Based on measurements made in urban and suburban background locations established for this purpose.
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[no]
If yes, which emission source sectors does it measure?	Fields of action according to GHG inventory format – Module A-1
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Lower NO ₂ levels significantly reduce risks of heart disease, asthma, and other chronic conditions. Improves air quality in traffic-heavy areas.
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Impact Pathways according to Module B-1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[no]



Data requirements	
Expected data source	Centre for Air Quality Management of Sarajevo Canton: Air Emissions Register and Pollutant Information System of Sarajevo Canton and Federal Hydrometeorological Institute City of East Sarajevo and Republic Hydrometeorological Institute
Is the data source local or regional/national?	Local
Expected availability	Available
Suggested collection interval	Annually
References	
Deliverables describing the indicator	N/A
Other indicator systems using this indicator	N/A



4 Part C – Enabling Climate Neutrality by 2030

4.1 Module C-1 Governance Innovation Interventions

C-1.1: Description or visualisation of the participatory governance model for climate neutrality

At the heart of FUA Sarajevo’s climate action lies a vibrant, collaborative structure, with the “**Transition Hub**” leading the charge. More than just a coordinating body, the Hub acts as a catalyst for change, uniting a diverse network of stakeholders and organizations to ensure a seamless and inclusive transition. It brings together expertise from local governments, businesses, civil society, and international financial institutions (IFIs), all working toward the shared goal of a decarbonized and sustainable FUA Sarajevo. This approach fosters inclusivity and transparency, ensuring a well-coordinated transition to climate neutrality across relevant sectors.

The FUA Sarajevo Transition Hub’s approach is multifaceted, drawing on a range of partnerships that collectively create an ecosystem for meaningful change. The **FUA Sarajevo Governing Body** plays a central role in steering and coordinating the transition to climate neutrality across the Sarajevo Functional Urban Area. Comprising high-level decision-makers—including the **Prime Minister of Sarajevo Canton, the Mayor of the City of Sarajevo, and the Mayor of the City of East Sarajevo**—this body ensures effective, unified leadership and inter-institutional collaboration. Beyond facilitating timely and coherent decision-making, the Governing Body generates key co-benefits for Climate City Contract implementation, including strengthened political ownership, accelerated resolution of cross-jurisdictional challenges, streamlined allocation of resources, and enhanced credibility and accountability in the eyes of international partners and local stakeholders.

This high-level coordination fosters a stable environment for long-term climate investments and systemic urban transformation. To ensure effective coordination and implementation of the Climate City Contract (CCC), the **FUA Sarajevo Operational Team** is formally established as the central entity responsible for orchestrating the transition to climate neutrality within the Sarajevo Functional Urban Area. The team consists of three designated representatives—one each from Sarajevo Canton, the City of Sarajevo, and the City of East Sarajevo. The Operational Team is tasked with preparing and analyzing operative plans and proposals for submission to the FUA Governing Body, ensuring that decisions are informed by technical evidence, stakeholder input, and alignment with the CCC’s strategic objectives. It play a key role in fostering synergy among institutions, partners, and sectors involved in the development and delivery of climate actions, thus enabling coherent, inclusive, and efficient implementation across the FUA. By coordinating technical planning, aligning stakeholders, and ensuring consistency across sectors, the FUA Sarajevo Operational Team plays a vital role in unlocking the co-benefits of climate neutrality. Their efforts in fostering cross-sectoral collaboration and stakeholder engagement promote social inclusion



and innovation, while their coordination role ensures that resources are efficiently allocated to actions with the highest potential for impact. In doing so, the Operational Team helps embed climate action into the broader socioeconomic development of the Sarajevo FUA.

We have envisaged a several Key Functions of a Transition Hub:

1. **Strategic Coordination:** aligns efforts among multiple stakeholders including governments, private sector, civil society, and citizens, to ensure a unified approach toward net-zero goals.
2. **Governance and Oversight:** working under a governing board, to ensure that planning and implementation follow agreed policies and maintain legitimacy.
3. **Capacity Building and Support:** provides technical support, training, and tools to local actors, helping them take effective action in their areas of responsibility.
4. **Monitoring and Evaluation:** tracks progress, collects data, and reports on the impact of various initiatives to support continuous improvement throughout implementation.
5. **Resource Mobilization:** helps attract, align, and leverage funding and investments for climate actions and projects.
6. **Stakeholder Engagement:** ensures inclusive participation across different sectors and levels of governance, including the public, to build ownership and social acceptance.

Given the complexity of the Hub's responsibilities, we envision the Transition Hub as a dynamic network of local institutions including municipalities, public utilities, private sector, academic institutions, and civil society organizations. These actors will collaborate through **Sarajevo Economic Region Development Agency (SERDA)** to drive the climate transition. SERDA is designated as the key administrative and technical support institution for the implementation of the Climate City Contract (CCC) in the Sarajevo Functional Urban Area - As a neutral and professional intermediary, SERDA is responsible for the day-to-day coordination, facilitation of stakeholder consultations, organization of meetings, and technical support across climate action initiatives. It also manages progress monitoring and reporting systems to ensure timely and accurate tracking of results in line with CNAP objectives. SERDA will coordinate data collection from various institutions in order to produce report on progress. Through its full-time, dedicated staff, SERDA acts as a backbone institution that supports the functioning of the Operational and Transition Teams and ensures continuity, transparency, and accountability in implementation processes.

While we remain firmly committed to leveraging local expertise in developing partnerships and implementing projects, we recognize that sustained engagement with external experts providing technical assistance will be crucial to driving the transition process forward and achieving the transformative change required. Therefore, this core network should be supported by a dedicated **Transition Team** designed to operationalize the Climate City Contract (CCC) for the Sarajevo FUA. The **Transition Team** (TT) will serve as the central body responsible for translating strategic climate objectives into practical, implementable actions. It will provide expert guidance across key thematic areas such as policy, finance, technical project design, and stakeholder engagement. A key function of the TT is to support



the implementation of the Climate Neutrality Investment Plan, ensuring project bankability and access to blended financing sources.

SERDA and the Transition Team (TT) will jointly create a **spin-out transition team** dedicated to overseeing and coordinating the implementation of the Climate City Contract.

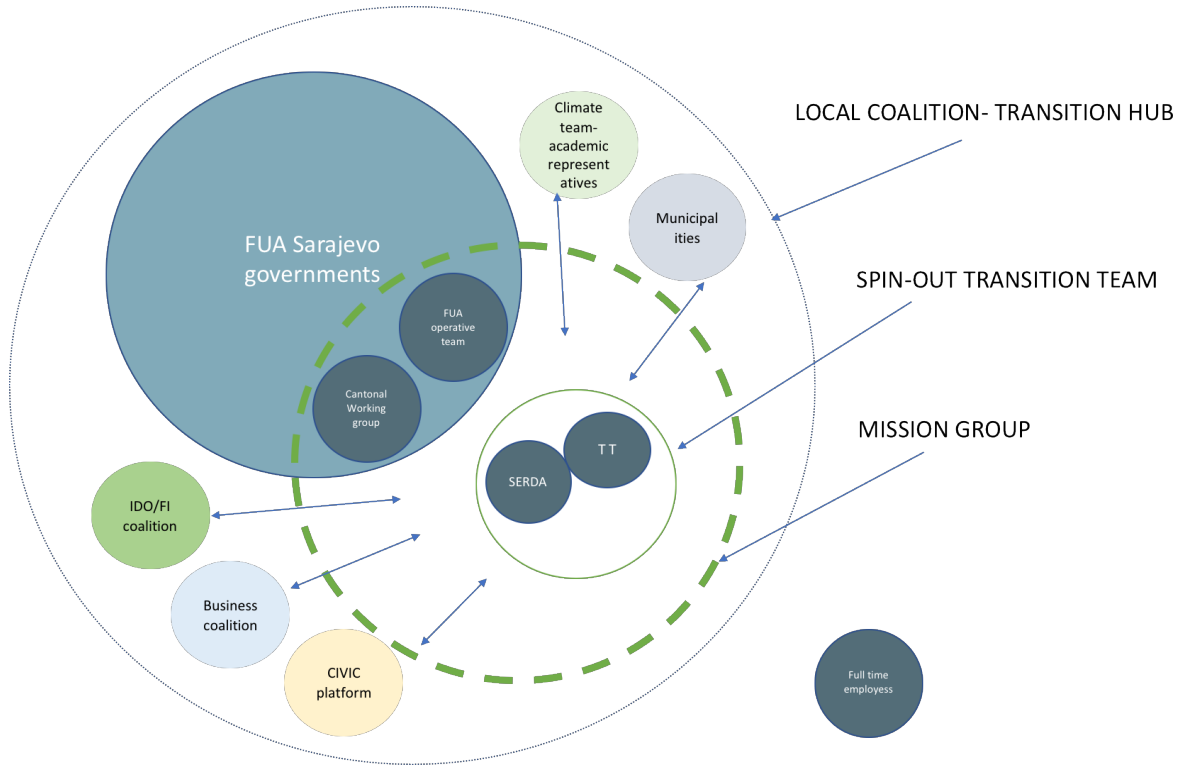


Figure 12: FUA Sarajevo Transition Hub

The **Sarajevo Canton Working Group** is a multidisciplinary body composed of key representatives from multiple ministries and institutions. Its primary role is to strategically prioritize and mainstream climate action within the Sarajevo Functional Urban Area’s development agenda. By facilitating cross-sectoral coordination, policy integration, and resource mobilization, the Working Group ensures that climate initiatives are effectively implemented and aligned with broader economic, social, and environmental goals. Through their efforts, the group enables the realization of significant co-benefits such as improved public health, job creation, enhanced urban resilience, and sustainable economic growth, driving a just and inclusive transition toward a climate-neutral future.

The **Climate Team** is primarily composed of esteemed university professors and academic experts specializing in CNAP-related fields. Their critical role involves rigorously reviewing and validating climate initiatives to ensure they meet the highest sustainability standards and incorporate the latest scientific research. Beyond this verification process, the team proactively identifies opportunities for improvement and refinement, offering evidence-based recommendations that strengthen the effectiveness and impact of every climate action.



The **IFI coalition** of international financial institutions plays a crucial role in supporting the implementation of Sarajevo FUA's Climate City Contract by providing both financial resources and technical expertise. Their involvement enables access to a diverse range of funding mechanisms, including credit financing and grants, which are essential for advancing decarbonization projects and energy transition initiatives. Beyond financing, these institutions offer valuable know-how and support in deploying innovative technologies, enhancing energy efficiency, and facilitating integrated planning. Through coordinated consultations led by the FUA Operational Team and the Transition Team, their varied programs and expertise are aligned to maximize impact, not only to achieve climate neutrality but also to contribute to sustainable economic development.

The established **Business Alliance** brings together a vibrant mix of local, regional and international businesses, all of whom have demonstrated an inspiring commitment to decarbonizing their operations and supporting broader sustainability efforts. With a shared passion for a greener future, this alliance is ready to spark a wave of private sector investment in clean energy solutions and sustainable practices. Coordinated by the Transition Team in partnership with the Chamber of Commerce of RS and the Employer's Association of FBiH, this dynamic group will offer valuable insights and leading the charge on initiatives that will drive the Net Zero Mission forward.

The **Civil Society (Civic) Platform** goes beyond merely informing civil society organizations—it actively engages them in shaping decisions that impact the entire community. By embracing a broad range of voices, the platform helps build a path forward that genuinely reflects the concerns and interests of all citizens. Through regular consultations, open discussions, and meaningful dialogue, it ensures that citizen perspectives are not only heard but integrated into the Climate City Contract, fostering a shared vision for a sustainable and inclusive future. Moreover, the platform plays a vital role in the ongoing implementation of the Climate City Contract by monitoring progress, providing feedback, and holding stakeholders accountable, ensuring transparency and responsiveness throughout the process.

The IFI Coalition, the Business Alliance, and the Civic Platform have been actively engaged in shaping the Climate City Contract (CCC) throughout the extensive stakeholder consultation process. From June 2024 to June 2025, the CNAP/CNIP evolved through a series of participatory steps—beginning with the identification of strategic priorities, followed by the co-development of draft objectives and measures, and culminating in the finalization of an integrated and actionable plan. Throughout this process, the IFI Coalition, the Business Alliance, and the Civic Platform not only contributed valuable insights but also expressed strong commitment and readiness to support the implementation of the CNAP/CNIP across all its dimensions—technical, financial, institutional, and social.



C-1.2: Sample Table: Relations between governance innovations, systems, and impact pathways					
Intervention name	Description	Systemic barriers / opportunities addressed	Leadership and stakeholders involved	Enabling impact	Co-benefits
FUA Sarajevo Governing Body	Steering and coordinating the transition to climate neutrality within Sarajevo FUA	Lack of cross-entity and inter-institutional collaboration	3 members (Prime Minister of Sarajevo Canton, Mayor of City of Sarajevo and Mayor of City of East Sarajevo).	Effective decision-making	Strengthened political ownership, accelerated resolution of cross-jurisdictional challenges, streamlined allocation of resources, and enhanced credibility and accountability in the eyes of international partners and local stakeholders
FUA Sarajevo Operational team	Entity established to orchestrate the transition to climate neutrality. – operative planning and coordination level	Lack of cross-entity and inter-institutional collaboration	3 members (Representatives of Sarajevo Canton, City of Sarajevo and City of East Sarajevo).	Enhanced public trust and participation, through stakeholder engagement,	Improved local governance by enhancing coordination, transparency, and institutional capacity. Social inclusion and innovation, socioeconomic development
Transition Team	External expertise through national and international consultants, technical and financial advisors, and climate specialists, delivering targeted knowledge and strategic guidance to	Limited institutional capacity to coordinate complex, cross-sectoral climate action. Insufficient technical knowledge and financial expertise at the local level.	A team of experts with specialized knowledge and skills to support the execution of net-zero mission.	Streamlined development and execution of this plan	Increased investment in climate solutions, thanks to better project bankability and financial structuring. Creation of green jobs and skills, by fostering public-private collaboration



C-1.2: Sample Table: Relations between governance innovations, systems, and impact pathways					
	ensure effective implementation.	Challenges in accessing and managing climate finance. Lack of trust from private investors			and investment in the green economy.
SERDA	Administrative and technical support for FUA Sarajevo to drive climate neutrality efforts. Responsible for progress monitoring and reporting and technical organisation and coordination of activities and stakeholder consultations	Lack of institutional capacities	A neutral intermediary with a team of full-time employees	Strengthens coordination across the Sarajevo FUA, mobilizes funding, facilitates innovation and multi-stakeholder engagement	Bridges the public sector with businesses and universities, fostering public-private-academic partnerships for climate innovation. Social inclusion and innovation, socio-economic development
Sarajevo Canton Working Group	Prioritize and mainstream climate action, facilitate cross-sectoral coordination, policy integration, and resource mobilization,	Lack of inter-sectoral coordination Fragmented climate policy and planning	Representatives of cantonal ministries and public institutions.	Provides structured and institutionalized input into the development and implementation of the CNAP. Enhances policy coherence by integrating climate considerations into sectoral planning. Strengthens accountability and ownership of climate actions across ministries.	Improved Policy Coherence and Integration Stronger Political Support and Legitimacy Cross-Sectoral Innovation and Synergies



C-1.2: Sample Table: Relations between governance innovations, systems, and impact pathways					
				Facilitates data sharing and coordinated decision-making.	
Climate Team	decentralized expert support group to be established to provide independent, science-based guidance on climate-related initiatives.	Limited integration of academic research into policymaking Lack of capacities of local institutions	University professors and esteemed experts from five designated priority areas.	Verification of climate-related initiatives.	Enables CNAP to remain responsive to emerging trends and scientific findings, ensuring long-term relevance and resilience.
IFI Coalition	Established to support FUA Sarajevo decarbonization efforts.	Lack of financial resources	EBRD, EIB, WB, KfW and other IFIs.	<p>Ensures sustained engagement of IFIs in Sarajevo's decarbonization journey</p> <p>Enhances strategic alignment between CCC objectives and IFI investment pipelines</p> <p>Facilitates joint programming, co-financing, and technical assistance for priority climate actions</p> <p>Strengthens Sarajevo's capacity to implement large-scale, bankable projects aligned with the Climate City Contract</p>	<p>Provides access to a stable and diversified pool of climate financing instruments (grants, loans, guarantees, technical assistance).</p> <p>Enables co-financing models that leverage both public and private capital for CNAP-aligned projects.</p> <p>Aligns CNAP measures with international financial standards and climate investment criteria, increasing their viability and funding potential.</p>



C-1.2: Sample Table: Relations between governance innovations, systems, and impact pathways					
					Supports the development of robust, investment-ready project pipelines.
Business Alliance	fosters collaboration among businesses to promote green investments, share best practices, and align corporate strategies with national climate priorities.	Limited private sector capital mobilization for climate-neutral actions.	More than 100 companies and their associations	Facilitates coordination and collective action among businesses, increasing the scale and effectiveness of private climate investments. Promotes knowledge exchange and dissemination of best practices in sustainability. Strengthens the voice of the private sector in national climate policymaking and implementation.	Mobilizes additional private capital and resources to support CNAP goals. Enhances innovation and market development for low-carbon products and services. Builds capacity and raises awareness within the business community on climate risks and opportunities. Improves multi-sectoral coordination between private sector and government climate initiatives. Support creating green jobs and economic development
Civic platform	Citizen engagement in shaping decisions and monitoring of implementation of CCC	Lack of meaningful citizen engagement and representation in climate decision-making.	Wide network of civil society organizations (CSOs), community groups, and citizen representatives.	Facilitates inclusive, participatory decision-making processes that reflect diverse	Promotes social inclusion and equity by ensuring marginalized voices are heard.



C-1.2: Sample Table: Relations between governance innovations, systems, and impact pathways					
				<p>community needs.</p> <p>Enhances transparency and accountability by monitoring and providing feedback on CCC progress.</p> <p>Builds trust and social ownership of climate initiatives among citizens.</p> <p>Strengthens the democratic legitimacy of climate policies through continuous civic oversight.</p>	<p>Increases the effectiveness and sustainability of climate actions through community buy-in.</p> <p>Fosters resilience by building local capacity to engage with and adapt to climate challenges.</p> <p>Encourages behavioral change and local innovation driven by community engagement.</p>

4.2 Module C-2 Social Innovation Interventions

C-2.1 Sample Table: Relations between social innovations, systems, and impact pathways					
Intervention name	Description	Systemic barriers / opportunities addressed	Leadership and stakeholders involved	Enabling impact	Co-benefits
Citizens' Assemblies	Citizen engagement in decision-making processes regarding climate initiatives	<p>Cultivating an inclusive and engaged environment – Limited direct participation of the general public in policy formulation.</p> <p>Risk of decisions lacking legitimacy and</p>	<p>Diverse groups of ordinary citizens selected to represent the community.</p> <p>Facilitators and experts who provide information and guide discussions.</p>	<p>Enables meaningful public participation and ownership of climate initiatives.</p> <p>Promotes informed, balanced, and reflective input through deliberation.</p>	<p>Strengthens democratic legitimacy and social acceptance of climate policies.</p> <p>Enhances policy quality by incorporating diverse perspectives and local knowledge.</p>



C-2.1 Sample Table: Relations between social innovations, systems, and impact pathways					
Intervention name	Description	Systemic barriers / opportunities addressed	Leadership and stakeholders involved	Enabling impact	Co-benefits
		public support.	Government entities responsible for integrating CA recommendations into policies.	Builds trust in decision-making by enhancing transparency and inclusiveness. Helps align policies with citizen values, needs, and priorities.	Encourages civic education and empowerment around climate issues. Facilitates social cohesion and collective responsibility for climate action.
The integrated digital mobility platform	The digital mobility platform refers to the integration of various transport services from two cities and Canton into one accessible and user-friendly digital platform.	Optimization of traffic flow and improvement of user satisfaction	Ministry of transport of Canton Sarajevo, city of East Sarajevo, SERDA, citizens	Facilitates coordination and integration of transport services across multiple jurisdictions (two cities and Canton), enabling a seamless user experience. Improves data-driven decision-making by collecting and analyzing real-time mobility data to optimize traffic management and service delivery. Supports modal shift from private fossil-fuel vehicles to public and shared transport	Reduced traffic congestion through optimized traffic flow, leading to lower emissions and improved air quality. Improved public health due to reduced air pollution and potential increase in active transport use. Economic benefits from time savings, reduced fuel costs, and more efficient transport systems.



C-2.1 Sample Table: Relations between social innovations, systems, and impact pathways					
Intervention name	Description	Systemic barriers / opportunities addressed	Leadership and stakeholders involved	Enabling impact	Co-benefits
				options through increased accessibility and convenience.	
Citizen participation in the decision making through digital platform	Establishment of a digital platform that enables the citizens of the Sarajevo Canton to actively participate in environmental and sustainable development decision-making processes	Limited citizen involvement and engagement in local environmental and development decisions. Lack of transparency and accessible information regarding sustainable development policies.	Ministry of justice, Agency for Statistics of Canton Sarajevo Municipalities, Institute for Spatial Planning Citizens as active participants	Increased citizen engagement in local policies and project. Enhanced transparency and access to information about sustainable development. More efficient communication between citizens and authorities.	Builds trust between citizens and government institutions. Promotes informed decision-making based on community needs and priorities. Encourages social cohesion through collective involvement in sustainability goals. Improves policy outcomes by integrating diverse perspectives and local knowledge.
Digital Twin	A dynamic digital replica of Sarajevo, incorporating real-time data for climate planning, scenario modelling and impact assessment.	The systematic gathering and analysis of climate data to inform evidence-based decision-making.	Departments for urban planning in FUA Sarajevo	Enhance transparency, accountability and efficiency in the implementation of CNAP measures	Improved Climate Resilience- Enables accurate modeling of climate impacts and risks, helping to design targeted adaptation measures that reduce vulnerabilities. Data-Driven Decision Making-



C-2.1 Sample Table: Relations between social innovations, systems, and impact pathways					
Intervention name	Description	Systemic barriers / opportunities addressed	Leadership and stakeholders involved	Enabling impact	Co-benefits
					<p>Provides reliable, real-time data that supports evidence-based policy and investment decisions, enhancing the effectiveness of CNAP actions.</p> <p>Enhanced Transparency and Public Engagement- Makes climate data and progress visible to stakeholders and the public, fostering trust and inclusive participation.</p> <p>Cross-Sectoral Coordination- Facilitates integration of climate considerations across urban planning, infrastructure, environment, and other sectors, supporting holistic adaptation.</p> <p>Resource Optimization- Helps prioritize actions and allocate resources efficiently by simulating different scenarios and outcomes.</p>



C-2.1 Sample Table: Relations between social innovations, systems, and impact pathways					
Intervention name	Description	Systemic barriers / opportunities addressed	Leadership and stakeholders involved	Enabling impact	Co-benefits
					<p>Innovation and Capacity Building- Promotes the use of cutting-edge technologies and builds local expertise in climate data management and urban planning.</p> <p>Monitoring and Evaluation- Supports continuous tracking of CNAP implementation progress and impact, enabling adaptive management and timely adjustments.</p>
Digital platforms for circular economy	Digital platforms supporting product and by-product sharing, material reuse, waste recycling and tracking	Lack of infrastructure for reuse and circularity, absence of secondary material markets, data and tracking limitations	SERDA; business associations/ chambers of economy, business community, waste management actors NGOs, citizens,	Resource efficiency, citizen engagement, green jobs	Facilitates circular practices and material recovery
Zero-Waste business certification	Voluntary scheme awarding businesses for reducing waste	No incentives for circular transition	SERDA, Chambers of economy, business community	Promotes responsible business models	Support socio-economic development Increase visibility for SMEs, facilitate public-private cooperation
Reuse and repair hub	Public hub for furniture/appliance reuse and	Absence of reuse infrastructure; throw-away culture	Municipalities citizens, waste management actors	Social cohesion, job opportunities in repair sector	Reduces waste, promotes reuse



C-2.1 Sample Table: Relations between social innovations, systems, and impact pathways					
Intervention name	Description	Systemic barriers / opportunities addressed	Leadership and stakeholders involved	Enabling impact	Co-benefits
	community repair events				

C-2.2: Description of social innovation interventions

Citizens’ Assemblies (CA) is a cornerstone of the stakeholder engagement process, ensuring that the perspectives of ordinary citizens are heard and incorporated into the decision-making process. The CA empowers citizens to engage deeply with key issues, fostering informed discussions and ensuring that their input shapes initiatives.

Prior to commencement of the CA processes, citizens representing their communities from the City of Sarajevo, Sarajevo Canton and the City of East Sarajevo were randomly selected. A total of 4,000 invitations letters were distributed to randomly chosen addresses within the Sarajevo FUA. From 218 applicants, 75 assembly members were randomly selected based on various demographic criteria, along with five reserve participants.

The CA process was conducted over **three weekends in May 2025**, focusing on the three thematic areas of this plan:

- Agriculture, Forestry, and Other Land Use (AFOLU)
- Energy systems
- Mobility



Figure 13 : Launch of the Citizen Assembly

The number of participants across all CA sessions ranged from 59 to 72. The Assemblies were facilitated by a team of ten facilitators, including two lead facilitators. During the first CA, citizens had the opportunity to familiarize themselves with the topics through expert presentations while in the second CA, citizens developed recommendations for each thematic area. The final CA concluded with voting on these recommendations to produce the final outcomes. The final recommendations and voting results are presented as Annex 1.



Final adopted recommendations of the CA for the Green Infrastructure & Nature-Based Solutions are:

I. Technology/infrastructure:

- **Implement greening and afforestation initiatives** in public areas along riverbanks at the municipal level. Organize seasonal clean-up and maintenance campaigns—during spring, summer, and autumn—for riverbeds and water protection zones along all rivers and streams
- **Establish a comprehensive digital GIS database of green spaces** within the Functional Urban Area (FUA) of Sarajevo to support planning, monitoring, and management of green infrastructure. In terms of **Monitoring & Evaluation** the GIS-based platform should allow tracking implementation of greening measures, climate impact, and biodiversity indicators.
- **Pavement removal and Urban Greening Interventions in the FUA Sarajevo** The Urban Greening Plan Sarajevo FUA should prioritize the removal of asphalt and concrete from selected squares, sidewalks, and other paved public areas, followed by ecological rehabilitation through planned planting and landscaping. Priority locations for pavement removal and immediate greening include:
 - Skenderija Plateau
 - Trg na Ilidži / Parking area across from the Municipal Hall (*including restoration of the existing fountain*)
 - Tree-lined corridor between Stup and Ilidža
 - Hastahana Park
 - University Campus Parking Area
 - Park near the International University of Sarajevo (IUS) in Ilidža
 - Plateau in front of the Sarajevo Railway Station (*including restoration of the existing fountain*)
 - Avenue from the Eternal Flame to Marijin Dvor (tree-lined expansion)

As part of these interventions, priority should be given to the planting of non-allergenic, native tall tree species, **as well as the integration of** medicinal plants and pollinator-friendly flower beds, **to** enhance urban biodiversity, support ecosystem services, and improve microclimatic conditions.

- **Urban Agriculture and Rooftop Beekeeping:** Implement pilot projects on green roofs to promote urban agriculture and beekeeping in collaboration with local residents. These initiatives will demonstrate the potential of productive green roofs for local food production, biodiversity enhancement, and community engagement. Native, non-invasive, and pollinator-friendly plant species will be prioritized to support ecosystem health and climate resilience.

II. Governance and Policy

Adopt a Law on the Protection of Green Areas within the Functional Urban Area (FUA) of Sarajevo: This law should establish a legal framework for the preservation and sustainable management of green spaces across the FUA Sarajevo. Key provisions should include:

- **Mandatory Green Space Ratios:** Require that a minimum of 30% of the total built-up area (including buildings, roads, and other impervious surfaces) be dedicated to



green spaces. For individual construction plots, mandate a minimum of 5% to 10% green coverage, ensuring consistent integration of green infrastructure in all new developments.

- **Regulation of Building Height and Density in Critical Zones:** In designated wind corridors and areas essential for urban ventilation, limit the height of buildings to a maximum of 20 meters. Additionally, enforce a building density coefficient (K_i) of less than or equal to 3 to maintain air flow, reduce the urban heat island effect, and safeguard environmental quality.
- **Democratic Oversight of Land Use Changes:** Any proposed change in the designated use of green or undeveloped areas—relative to the existing urban plan—within a municipality must be subject to approval by public referendum held in that municipality. Such referendums must be preceded by structured public consultations and discussions to ensure transparency and community engagement.

III. Learning capabilities

- **Enhancing Learning Capacities for Urban Green Infrastructure :** Strengthen the capacity of public utility companies through increased budgets, staff training, and upgraded equipment to ensure effective green space maintenance. When necessary, engage qualified private companies to support cleaning and upkeep, ensuring knowledge transfer and quality control. Foster community learning and stewardship by organizing seasonal volunteer activities involving students and citizens, promoting hands-on experience and environmental awareness.
- **Implement Continuous Public Education on AFOLU:** Establish ongoing public education initiatives focused on Agriculture, Forestry, and Other Land Use (AFOLU), with active collaboration between local government authorities, NGOs, and media outlets to raise awareness and promote sustainable practices.
- **Deliver Targeted Educational Workshops on Disaster Risk Reduction:** Organize and deliver workshops for communities at high risk of climate-related disasters, with a focus on prevention strategies, preparedness, and minimizing damage from future events.
- **Integrate AFOLU Education into School Programs:** Introduce AFOLU-related content as part of extracurricular programs in primary and secondary schools, aiming to equip younger generations with knowledge and skills related to sustainable land use and environmental stewardship.

Final adopted recommendations of the CA for the energy sector Buildings/Heating and Cooling are:

I. Technology/Infrastructure

- Pilot project at two locations (Sarajevo Canton and East Sarajevo): **Installation of individual heat meters (calorimeters), thermostatic valves, or heat cost allocators** in energy-renovated multi-apartment residential buildings.
- **Construction of Waste-to-Energy Plants for District Heating:** To provide a sustainable alternative energy source and simultaneously address the issue of waste disposal, it is proposed to construct energy recovery facilities (waste-to-energy plants) for use in district heating networks in Sarajevo FUA—drawing inspiration from successful models such as Stockholm and Uppsala.
 - Establish an expert task force comprising national and international specialists.
 - Conduct a feasibility study within one year.



- Secure financing through EU and international funds.
- Plan construction of the waste-to-energy plants and related infrastructure within three years upon project approval (potential sites include Buća Potok or Butila).
- **Expand Infrastructure to Connect 50% of Households to District Heating Networks:** To reduce air pollution and enhance energy supply reliability, it is crucial to connect a greater number of old buildings and individual users to the district heating system across the entire Sarajevo FUA.
 - Prepare a feasibility study within one year.
 - Launch a public awareness campaign to highlight project benefits.
 - Assess citizens' interest and readiness to join the system.
 - Construct necessary network infrastructure within three years.
 - Provide subsidies of up to 70% for individual household connections.
- **Finalize and Initiate New Geothermal Heat Pump Projects:** to accelerate the transition to clean and cost-effective heating systems, Sarajevo FUA aims to complete ongoing heat pump initiatives and launch new ones, including in areas such as Ilidža, Vogošća, and Mojmilo.
 - Expedite the completion of Phase 3 of the "Butila 1" heat pump project.
 - Secure funding from authorities for the implementation of new projects over the next three years.
 - Implement new geothermal heat pump projects across identified locations over the next five years.

II. Governance and Policy

- **Establish a dedicated energy efficiency fund** to provide subsidies for the thermal insulation of buildings and the switch to environmentally friendly heating systems, applicable even to buildings without complete documentation. A differentiated subsidy structure should be introduced based on the legal status of buildings, accompanied by a fast-track legalization process to enable broader participation in energy efficiency programs.
 - Simplify existing regulations to streamline implementation.
 - Develop a dedicated energy efficiency strategy and formally establish the subsidy fund.
 - Eliminate the requirement for a building permit when applying for subsidies.
 - Define a tiered subsidy model: 70% support for legal buildings (collective and individual) and 50% for those without complete legal documentation.
 - Introduce legal provisions to accelerate and incentivize the legalization of informal housing, enabling access to efficiency programs and reinvesting legalization fees into these programs.
- **Amend regulations for multi-apartment buildings to lower the threshold for decision-making on energy retrofitting investments** from unanimous consent to 60%. This will empower homeowner associations to initiate efficiency upgrades more easily, while introducing flexible payment options for low-income residents.
 - Allow majority vote ($\geq 60\%$) to commit all residents to energy efficiency upgrades.
 - Introduce special payment models (e.g., instalment plans, credits, subsidies) for vulnerable or low-income residents.
- **Enact legal provisions for solar energy use** in residential buildings, enabling autonomous production, use, and sale of electricity through solar panels without mandatory contracts with power utilities. The legal framework should also ensure grid readiness and quality standards for solar equipment.



- Allow full self-consumption of electricity produced via solar panels without the requirement to sign a supply contract with power utilities.
- Strengthen the power grid to enable the purchase of excess electricity from households.
- Require contracts with utilities only when excess energy is sold.
- Set minimum quality standards for solar power equipment.
- **Strengthen Enforcement of Environmental and Air Protection Laws:** Ensure effective implementation of the Law on Environmental Protection and Law on Air Protection by increasing inspection capacity and human resources.
 - Increase inspection of household heating systems.
 - Improve conditions for environmental inspectors to conduct effective monitoring and enforcement.
- **Mandate heat suppliers to install individual heat meters** (calorimeters), thermostatic valves, or heat cost allocators in energy-renovated collective housing buildings.

III. Finance and Funding

- **Enable financial participation of local self-governments (JLS) in the cost of construction materials** for insulating individual residential buildings through invoicing.
- Provide **material subsidies directly to individuals for private homes**, with installation costs covered by the beneficiaries.
- Define clear eligibility criteria for support, prioritizing low-income households.
- Set a 12-month deadline for the installation of donated materials and completion of insulation works and ensure strict monitoring of installation procedures and quality of materials used.

IV. Learning & Capabilities

- **Conduct a comprehensive citizen survey across** local communities to gather data on heating methods and raise awareness about the environmental and health impacts of polluting fuels. The campaign should utilize QR-code posters, social media, TV/radio promotions, and hard-copy flyers.
- **Launch a daily media campaign** via public broadcasters, including short educational segments before or after the evening news, involving experts and public figures to raise awareness of clean heating technologies and air pollution.
- **Integrate ecological and energy literacy into the formal education system**, introducing relevant content in primary and secondary curricula and organizing creative school activities such as workshops and competitions.
- Collaborate with NGOs to deliver community-based energy education and awareness initiatives. This includes setting up a free advisory service for citizens, publishing informative materials, organizing workshops and public forums, and engaging volunteers through seasonal campaigns.

Final adopted recommendations of the CA for the mobility are:

I. Technology/Infrastructure

- **Adaptive Traffic Signal Modernization:** To reduce congestion, air pollution, and energy consumption while improving connectivity between Sarajevo and East Sarajevo, adaptive traffic signalling systems will be introduced—prioritizing critical corridors in East Sarajevo. Citizens will be engaged through public consultations to ensure local ownership and transparency. Dedicated funding mechanisms will be identified for system implementation and maintenance.



- **Dedicated Public Transport Lanes:** To increase safety and efficiency, physically separated lanes for public transport (including trams, buses, taxis, and emergency vehicles) will be developed. The lanes will be supported by digital enforcement (cameras, sensors), with stricter penalties for misuse. The model leverages tramway tracks as shared corridors and aims to incentivize modal shift from private vehicles to public transport.
- **Pedestrianization of the City Core:** A phased approach will be used to restrict motor vehicle access to the central urban zone, connecting it with the existing pedestrian and cycling network (e.g., Vilsonovo promenade). Identify the exact locations for closure; proposed area: Zelenih Beretki – Branilaca Sarajeva – Mis Irbina – Kotromanića – Skenderija – Vilsonovo promenade (which should be completely closed to traffic). The initiative includes piloting on selected streets, developing peripheral parking facilities, and introducing Park & Ride systems, as well as incentives like free first-hour use of public e-bikes or scooters. Local residents will receive designated parking permits to maintain accessibility.
- **Enhancement of Pedestrian Zones and Amenities:** To support walking as a primary and accessible mode of transport, existing pedestrian pathways will be upgraded and expanded. This includes installing urban furniture (benches, bins, fountains), tartan walking tracks, and inclusive infrastructure for people with disabilities and parents with strollers.
- **Extension of Public Transport Operations to 24 Hours within Sarajevo FUA :** To improve accessibility, road safety, and reduce private vehicle use, public transport services across the Sarajevo Functional Urban Area (FUA) should be extended to operate 24/7, particularly on lines currently lacking night service. This would also support tourism development and night-time economic activity.
 - Increase the number of public transport vehicles and hire additional drivers.
 - Consult with local tourist boards in Sarajevo Canton and East Sarajevo to assess specific mobility needs of tourists.
 - Adjust night-time timetables (22:00–06:00) based on citizen needs and professional guidance through a pilot phase.
- **Establishing Eco-Friendly Public Transport Links Between Sarajevo and East Sarajevo:** Due to the absence of inter-city public transport between Sarajevo and East Sarajevo, residents rely heavily on private cars, creating congestion and pollution. The recommendation calls for introducing electric buses and, in the long-term, tram or trolleybus lines to improve connectivity, reduce traffic, and promote environmental sustainability.
 - Build or upgrade infrastructure for electric and green transport modes.
 - Revive pre-war plans for transport corridors such as Hrasnica–Grlica–Vojkovići–Kotorac–Lukavica–Vraca–Grbavica, and Grlica–Dobrinja–Lukavica.
 - Conduct public consultations to inform planning and ensure community buy-in.
- **Dedicated Public Transport and Emergency Lane from Ilidža to City Hall:** To ensure uninterrupted and prioritized movement of public transport and emergency services, one traffic lane from Ilidža to Vijećnica (City Hall) should be designated exclusively for these vehicles. This would reduce congestion and increase traffic safety.
 - Adapt traffic flow to accommodate turn lanes and dedicated bus lanes.
 - Install surveillance systems to monitor use and enforce rules.
 - Equip public transport vehicles with cameras to record traffic violations.
 - Enforce strict penalties and fines for unauthorized use of the dedicated lanes.



- **Increase Service Frequency during Peak Hours:** Public transport frequency should be increased during morning and evening peak periods, particularly for tram lines between Čengić Vila and Baščaršija, trolleybus lines from Otoka, and eco-minibus lines in hillside neighbourhoods. This would relieve congestion, reduce commuter stress, and improve punctuality.
 - Procure additional tram, trolleybus, and eco-minibus vehicles.
 - Optimize existing routes, including suggestions such as relocating Line 15's turnaround station from Otoka to Buća Potok.

II. Governance and Policy

- **Amendments to the Traffic Law to Regulate Alternative Transport Modes :** To ensure the safe and regulated operation of alternative transport modes such as electric scooters and bicycles, the existing Traffic Law should be amended to introduce categorization, safety standards, and enforcement mechanisms. This will enhance traffic flow, reduce risks, and support the orderly development of micromobility.
 - Define dedicated traffic lanes for alternative transport.
 - Increase penalties for violations that hinder the flow or safety of alternative mobility.
 - Set a maximum speed limit for micromobility at 30 km/h.
 - Define a minimum age requirement (14 years) for operating electric scooters and e-bikes.
 - Install surveillance cameras at pedestrian crossings.
 - Regulate proper parking to prevent obstruction of pedestrians or traffic.
 - Establish a registration system for alternative vehicles, requiring visible ID plates.
 - Mandate use of safety equipment (helmets, protective gear).

IV. Learning & Capabilities

- **Awareness campaigns and public events (e.g., Car-Free Week)** will reinforce sustainable mobility behaviours, while new green areas and public toilets will enhance user experience and urban aesthetics.
- **Introduce educational content** on alternative transport in the "My Environment" curriculum in primary schools.

The majority of suggestions provided by the Citizens' Assembly (CA) have been accepted and integrated into the decarbonisation and residual emissions strategy outlined in the CNAP. However, the proposal advocating for waste incineration as the sole treatment option was not accepted, as this method ranks lowest on the waste management hierarchy. Instead, the waste and circular economy portfolio prioritises waste prevention and the 5R approach (Refuse, Reduce, Reuse, Repurpose, Recycle), with limited use of waste-to-energy solutions, such as biogas production, in cases where other recovery options are not feasible. The proposal to revive pre-war plans for transport corridors such as Hrasnica–Grica–Vojkovići–Kotorac–Lukavica–Vraca–Grbavica, and Grica–Dobrinja–Lukavica has been evaluated but not included in the CCC. This is because the proposal primarily supports private car use, which is not aligned with the overarching strategy of the Sarajevo Functional Urban Area (FUA) to reduce car dependency.



While the construction of these corridors may alleviate traffic congestion in the short term, it would not lead to a meaningful reduction in the number of cars on the streets, nor would it contribute to the long-term goals of promoting sustainable and multimodal transport solutions.

The **integrated digital mobility platform** closely aligns with Sarajevo's Net Zero Mission by fostering more sustainable and efficient urban mobility. By centralizing transport options, the platform promotes the use of cleaner and more sustainable transportation modes, reducing reliance on private cars and thereby cutting down on carbon emissions.

A **digital platform enabling citizens active participation** in environmental and sustainable development decisions presents a substantial opportunity for increased civic engagement. To ensure transparent and inclusive decision-making, this platform allows citizens to provide input and feedback on key environmental initiatives. This innovation promotes community empowerment and ensures that sustainability efforts are aligned with citizen priorities, leading to more effective and broadly supported sustainable policies.

The **Digital Twin** was developed as part of the Urban Transformation Project Sarajevo (UTPS), with support from the Swiss Secretariat for Economic Affairs (SECO). The UTPS aimed to modernize the integrated urban planning system in Sarajevo Canton and create better conditions for sustainable, climate resilient and socio-economic development.

The Digital Twin functions as a dynamic, real-time virtual replica of Sarajevo enabling continuous monitoring, simulation and analysis of critical urban systems such as traffic, energy, infrastructure, water resources and the environment. Sarajevo's Digital Twin not only captures the physical and natural environment but also integrates layers of socio-scientific data. These include demographic insights, cultural and other key social indicators, making it a powerful tool for data-informed urban planning and decision-making.

While the technology provides a comprehensive and dynamic platform for planners, policymakers and citizens in shaping resilient and inclusive solutions for city's future development, it is important to emphasize that further upgrades are necessary. As outlined in previous chapters, the Digital Twin must evolve in response to emerging needs and feedback to fully realize its potential as a strategic tool for Sarajevo's FUA future: integration of geospatial, environmental and infrastructure data to simulate CNAP interventions.



Figure 14: AI-supported 4D Digital Twin of Sarajevo

Digital platforms for circular economy encompass multiple digital tools such as “Too Good To Waste Sarajevo”, “Sarajevo Circular Market” and the “Digital Building Material Passport”. Each platform addresses a distinct challenge in the circular economy landscape. Collectively, they promote the sharing of surplus food and materials, incentivize recycling, and enable data-informed reuse of construction materials. By connecting businesses, citizens and institutions, these platforms create digital infrastructure that supports resource efficiency and material recovery. Their widespread implementation demonstrates Sarajevo FUA's commitment to scaling up data-driven, user-friendly circular economy solutions.

Zero-Waste business certification is a voluntary, tiered certification programme (bronze, silver, gold) aimed at incentivizing businesses to prevent and reduce waste generation. This initiative not only raises awareness of sustainable practices among the business community but also fosters innovation in product and packaging design, resource use and waste logistics. Certified businesses are promoted at local events and through dedicated communications, helping improve their visibility and brand value. By rewarding businesses that align with circular principles, the certification drives behaviour change and supports the FUA's transition toward climate neutrality.

Reuse and repair hub repurpose an existing municipal facility to become a local centre for reuse and repair. It hosts regular workshops (e.g., Saturday repair cafés), collects functional goods (e.g., appliances, furniture), and resells them at symbolic prices. As a community-driven initiative, the Hub strengthens social ties, promotes intergenerational knowledge sharing, and empowers citizens to extend product life cycles. Its contribution to reducing waste and supporting job creation in repair services marks it as a key enabler of social and environmental resilience in the Sarajevo FUA.



5 Outlook and next steps

Plans for next CCC and CCC Action Plan iteration

Once the CCC is adopted and approved, the FUA Sarajevo is entering a critical phase in translating its climate neutrality vision into coordinated action. The focus in the coming months will be on institutionalising the framework for implementation, ensuring cross-sectoral alignment, and securing the financial and technical preconditions for effective delivery.

A priority will be to **strengthen the governance structure** for climate action. This includes signing a formal memorandum of understanding among key institutions across Sarajevo Canton, East Sarajevo, and relevant ministries. The aim is to clearly define roles, coordination mechanisms, and joint responsibilities. This plan sets forth ambitious goals, and the FUA Sarajevo will require the support of an external expert team to assist with strategic guidance, conceptual development, coordination, specialized advice, and the identification of financing opportunities. Thus, a dedicated **Transition Team (TT)** is vital for the successful implementation of the CCC FUA Sarajevo's ambitious climate goals. The TT team provides expert guidance to translate strategic objectives into practical actions, builds local capacity with specialized knowledge, and facilitates coordination among diverse stakeholders. It also supports accessing and managing climate finance, ensures robust monitoring and adaptive management, and helps institutionalize climate resilience within local governance. Overall, the TT team should act as a crucial enabler for effective, well-coordinated, and sustainable climate action in Sarajevo. The FUA Sarajevo will actively explore opportunities to secure funding for the establishment of the Transition Team. A diverse funding sources will be identified and mobilised, including public budgets, international climate finance (e.g. IFIs, EU funds, GCF), and private investments. A comprehensive finance strategy will be developed to ensure the bankability of priority measures in the CNIP. To successfully establish and operate a Transition Team for CNAP implementation in FUA Sarajevo, a multidisciplinary group of professionals will be needed, combining expertise in climate policy, finance, technical project delivery, and stakeholder engagement. In addition to experts with international experience, the team must also include professionals with deep knowledge of local conditions—particularly within the private sector—whose credibility and recognition in the local context can help build trust among private investors in the projects proposed under the CNAP.

Strategic planning in Sarajevo will progress through the development of the Urban Nature Plan, which will be fully **integrated into the Urban Plan currently under preparation**. To ensure a holistic and climate-resilient approach to urban development, the Urban Plan must also address the spatial and infrastructural needs of key sectors such as sustainable mobility, the circular economy and waste management, energy efficiency, and renewable energy. Additional efforts are required to ensure alignment between the strategic orientations and climate neutrality scenarios outlined in Sarajevo's Climate City Contract (CCC) and the provisions of the Urban Plan. This coordination is essential to establish a coherent framework for achieving climate neutrality by 2030.

Regulatory reform is essential for the effective implementation of CCC measures, as existing legal and policy frameworks contain structural, procedural, and sectoral barriers that hinder coordinated climate action. To address this, the FUA Sarajevo will undertake actions to amend existing legislation and adopt new laws that establish favourable conditions for the implementation of climate mitigation and adaptation measures. These reforms will support



integrated planning, cross-sectoral alignment, and the removal of regulatory obstacles that currently limit progress toward climate resilience and neutrality.

Following the adoption of the Climate City Contract, the government will initiate targeted **capacity-building measures** to strengthen the knowledge, skills, and operational readiness of municipal departments, public utilities, and other key stakeholders. These efforts will be supported through tailored training programs, peer-learning opportunities, and institutional partnerships, aimed at enhancing both technical competencies and organizational effectiveness necessary for the successful implementation of climate neutrality measures.

To test and showcase the feasibility of proposed solutions, **pilot projects** will be initiated in areas such as urban agriculture, green roofs, district heating decarbonisation, and circular economy interventions. These pilots will provide practical insights and inform the scaling of successful actions across the FUA Sarajevo.

Government authorities will designate the institutions responsible for data collection and indicator calculation necessary for progress reporting. Additionally, a formal decision will be made to appoint the Sarajevo Development Agency (SERDA) to provide technical coordination and assistance in the reporting process. A robust **monitoring and evaluation** system will be established, incorporating a clear set of indicators aligned with the CNAP impact pathways. This system will support adaptive management and facilitate informed, evidence-based decision-making.

In addition, Sarajevo FUA is committed to a formal review of the CNAP every two years throughout the implementation period. This iterative approach will enable evidence-based adjustments to the Plan, ensuring it remains responsive to evolving climate challenges and reflective of progress made. The review process will be jointly supported by all members of the Transition Hub—including Transition Team, municipalities, the IFIs coalition, Business Alliance, Civic Platform, Climate Team, Cantonal Working Group, and other key stakeholders—ensuring continuous engagement, shared ownership, and institutional legitimacy. By establishing this regular review as a core component of the Plan, the FUA signals its long-term commitment to an adaptive, transparent, and resilient climate transition pathway.



6 Annex 1: Recommendations from the Citizens Assembly

SUBJECT MATTER:	AFOLU strategy (agriculture, forestry and land use, green areas and biodiversity)
TOPIC:	GREEN AREAS
<p>RECOMMENDATION 1:</p> <p>Seasonally (spring, summer and autumn) clean and maintain the riverbeds and water protection areas of all rivers and streams, conduct greening/afforestation of public areas along river flows.</p> <p>The recommendation was adopted with 100% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - Increasingly frequent flooding and the need to expand green areas and create conditions for greening and afforestation - The need for more oxygen and cleaner air - The negative impact of climate change (higher amount of precipitation) - High temperature differences - Impact on the psychophysical state of citizens (green therapy) 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Regularly clean and deepen the riverbeds of the rivers Miljacka, Mošćanica, Koševski potok, Željeznica, Bosna (and the Bosna river spring), Tilava, Dobrinjski potok, etc. - Arrange and remediate all existing water protection areas with a focus on those with a tendency of frequent flooding. - Regularly monitor the carrying out of regular cleaning actions. - Avoid highly allergenic plants (linden, birch, oak, ash) when greening and afforestation and focus on suppressing invasive species, while planting coniferous trees (black and white pine, Lebanese cedar, etc.). - It is imperative to preserve the already existing water protection areas in FUA Sarajevo without reducing them in relation to the area approved by experts (SFRJ). - Install filters on sewage drains in riverbeds (Miljacka, Dobrinja, Koševski potok, Željeznica). - Improve the resources of public utilities (budget, equipment, staff). - If necessary, hire private cleaning and maintenance companies.



	<ul style="list-style-type: none"> - Organize seasonal volunteering activities (students, citizens...). - Perform internal control and review of the efficiency of employees in public utility companies. - Motivate employees in public utility companies.
<p>RECOMMENDATION 2: Planned greening of de-asphalted areas in the wider urban area of Sarajevo (FUA Sarajevo). The recommendation was adopted with 97% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - Necessary for a healthy life for the citizens and quality of life - Reducing pollution and global warming - Reducing the risk of urban flooding 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Draft and adopt a five-year strategic plan for the greening of de-asphalted areas in the area of FUA Sarajevo. - Convert the Skenderija plateau into a green square. - Convert the square in Ilidža into a green square. - Renovate the fountain in Ilidža. - Partially convert the plateau/parking lot across the City Hall into a green park. - Plant a tree line between Stup and Ilidža. - Green Hastahana Park and return it to its former purpose. - Arrange the parking lot in the Campus so that it is partly also a green park. - Green the park next to IUS in Ilidža. - Green the plateau around the fountain in front of the Railway Station and renovate the fountain. - Systematically plant medicinal plants on de-asphalted surfaces. - Systematically install street furniture on de-asphalted surfaces.

	<ul style="list-style-type: none"> - Plant a tree line from the Eternal Fire to Marijin Dvor. - Draft strategic plans for the greening of de-asphalted areas within the framework of a detailed urban plan in the area of FUA Sarajevo.
<p>RECOMMENDATION 3: Draft and adopt a five-year strategic plan for the greening of de-asphalted areas in the wider urban area of Sarajevo. The recommendation was adopted with 89% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - Decrease in heating - Beautifying the city - The need to decorate an unused area - Reducing the risk of urban flooding 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Include greening and maintenance of roofs in development plans in the area of FUA Sarajevo. - Implement a strategic plan for the greening and maintenance of roofs in the area of FUA Sarajevo. - Green flat roofs of apartment buildings built after 2015 in central municipalities of the city, with a feasibility assessment. - Introduce incentives/subsidies for the future construction of facilities with green roofs (individual private facilities). - Develop a green roof maintenance system in accordance with the developed strategic plan. - Plan an adequate public budget for the construction and maintenance of green roofs without burdening tenants. - Propose securing funding from EU funds and other international and domestic donors. - Realise the pilot project of urban beekeeping on green roofs. - Provide a mechanism for the participation of tenants in the planning of planting on green roofs (vegetable gardening, herbs).

SUBJECT MATTER:	AFOLU strategy (agriculture, forestry and land use, green areas and biodiversity)
TOPIC:	LEGISLATIVE ON GREEN AREAS IN URBAN ENVIRONMENTS
<p>RECOMMENDATION 1:</p> <p>Legislate the mandatory percentage of green areas (minimum 30%) in relation to the entire constructed area (buildings, roads, concrete surfaces, etc.) in the wider area of Sarajevo, and a minimum of 5% to 10% on construction plots.</p> <p>The recommendation was adopted with 100% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - Because of the large difference in the ratio of green areas and "concrete" areas (a smaller percentage of green areas), which affects the quality of life of citizens (air quality, high temperatures, amenities for citizens, etc.) - This recommendation is important because it will prevent soil erosion (landslides, etc.) - Because of the preservation of the existing percentage of green areas 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Introduce a law or supplement it in relation to the creation of urban plans at the cantonal/city/municipal level. - Obligate local authorities to draft strategic documents with which 30% of green public areas will be reached. - Increase monitoring of the implementation of the adopted laws in such a way as to increase the transparency of the adoption of urban plans and compliance with them (citizen involvement). - For existing municipalities that currently have less than 30% of green areas – prohibit further construction, i.e. reduction of the percentage of green areas. Seek to increase the percentage in the coming years. <p>*Determine the level of the annual percentage increase until the minimum is achieved with the possible use of alternatives such as green roofs, green facades, etc.</p> <p>*Require municipalities that have less than 30% of green public areas to increase the percentage of green areas by at least 1% each year.</p>

<p>RECOMMENDATION 2:</p> <p>Establish a digital record/database of green areas for the wider urban area of Sarajevo with updated data by municipality.</p> <p>The recommendation was adopted with 100% of the votes.</p>	
<p>EXPLANATION</p> <ul style="list-style-type: none"> - The base is necessary so that we can have an insight into the current state of green areas, and so that we can plan activities directed at the reparation and prevention of future activities related to green areas (environmental protection). 	<p>POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Conduct a study that will provide insight into: the number of different types of trees, the square footage of green (non-concrete) parts/areas of FUA Sarajevo (by municipality), cartographic representation with infographics. - Each municipality will have to keep a database, and give access to citizens through their official websites. - Draft an annual report that will be available to citizens. - Draft an eco-programme related to the increases in the percentage of green areas. - Enable anonymous citizen reports within the framework of the website if they notice a discrepancy between the database and the actual on-site situation (annual report of anonymous reports). - Establish cooperation between the governmental and non-governmental sectors and other relevant actors during the creation and maintenance of the green base/records.
<p>RECOMMENDATION 3:</p> <p>Adopt a law on the protection of green areas in the wider urban area of Sarajevo.</p> <p>The recommendation was adopted with 100% of the votes.</p>	
<p>EXPLANATION</p>	<p>POSSIBLE ACTION</p>



<ul style="list-style-type: none">- Crucial for the prevention of devastation of green spaces- The term "green spaces" is not legally defined/specified- Preventing fraud through land use change- Conservation of biodiversity in the wider urban area of Sarajevo- It is necessary to adopt a law on green areas, and not to deal with this topic through a regulation	<ul style="list-style-type: none">- Adopt a law on the protection of green areas at all levels of government.- Define the term "green areas" in the wider urban area of Sarajevo (green parks, forests, tree rows, lawns, riverbeds, orchards, etc.).- Any change of land use of green/free areas in the territory of a particular municipality/local community must be approved by a referendum in the territory of that municipality/local community. Public discussions must precede the referendum. <p>*Introduce an online referendum</p> <p>*A minimum of 50% of residents must participate in a referendum for it to be valid Comment: (*Determine a threshold of 50% turnout for urban municipalities).</p> <p>*Other suburban municipalities do not have a referendum) ! Alternative: adopt a law that will determine the parameters/ratio of the percentage of green and non-green areas in FUA Sarajevo so as to avoid the organization of a referendum.</p> <p>*Of the total number of persons who took part in the referendum, 50% + 1 person/vote must support the referendum in order for it to be adopted/approved.</p> <p>*The method of informing citizens about the referendum should be of a hybrid nature (through the media, social networks, bulletin boards in local communities, brochures, etc.).</p> <p>*Creating a strategic plan for the implementation of the referendum (the period before the referendum, i.e. preparation and informing citizens, conducting the referendum, informing about the results, and implementing the activities voted on by the citizens).</p>
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SUBJECT MATTER:	AFOLU strategy (agriculture, forestry and land use, green areas and biodiversity)	
TOPIC:	PLANNED CONSTRUCTION	
<p>RECOMMENDATION 1:</p> <p>From the foundation to the roof: establish an independent, non-partisan body (commission) to control the competent institutions during the planning, adopting and construction of facilities in order to ensure compliance with regulations, planning documentation and construction standards.</p> <p>The recommendation was adopted with 91% of the votes.</p>		
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - During construction, legal regulations, planning documents, project documentation, as well as existing standards, in particular defining public and green areas (coefficient 1:3), are intentionally being disregarded, and it is necessary to regulate penal policy, construction monitoring and increase the coefficient of green areas. By controlling construction, we prevent negative phenomena such as pollution and overbuilding. 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Arrange the process of adopting plans in such a way that citizens are informed and involved by the municipal urban planning department and planning institute from the beginning throughout the planning, adoption and implementation process. - Adopt a regulative by which the ordered demolition of illegal construction will be monitored (Adopt a regulative by which the costs of demolition of illegal construction are paid by the investor). - Establish an independent monitoring commission that will, among others, include citizen representatives. Elaborate the methodology for the selection of commission members. <i>Issue of funding the commission members/volunteer work?</i> - Introduce supervision of inspectors, but the position must not be partisan. - Strengthen inspection capacities by 30%, and on-site inspection during the construction of buildings, off-hours on work days and on the weekends. - Obligate the investor to draft an environmental impact study for each new public building and condominium building with the definition of minimum standards by experts. 	

	<ul style="list-style-type: none"> - Clearly define by when the competent service must complete the case and specify the deadlines for obtaining permits (urban planning permit, building permit). - Legalize buildings that have been retained by the regulatory plan and meet the requirements for legalization. - Commit to the construction of public infrastructure (kindergartens, schools, clinics, parking lots, etc.) in accordance with the number of residents. - Tighten existing penal provisions, criminal and misdemeanour liability through: <ul style="list-style-type: none"> *Determining of individual liability with high fines (definition of serious and minor violations; prohibition of work for repeated violators in FUA). *Stopping the legalization of buildings that do not meet the standards (in FUA) and clearly marking such buildings.
<p>RECOMMENDATION 2: Limit the height of construction (on defined wind corridors) to 20 meters, with a construction coefficient ≤ 3. The recommendation was adopted with 89% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - Because of the blocking of air/wind corridors, smog is retained in the basin, there is a negative impact on the air flow through the city. (<i>Construction of tall buildings increases the population concentration</i>) 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Draft a study of the impact of the construction of buildings, which will be carried out by independent experts in accordance with EU standards, and define sites suitable for high-rise construction - Identify air corridors in legislation. - Follow the principle of sustainability in the development of the city (do not stop construction but arrange it in accordance with geographical, spatial and other influences).



	<ul style="list-style-type: none"> - Adjust the height and position of buildings to the directions of air flow (prohibit the construction of buildings that fall outside the scope of the results of the above study). - Through the construction coefficient Cc must be 3 or less, so that an apartment building may not be too large in relation to the plot. - Inform citizens about the concept and function of air corridors. - Provide publicly available data on the official website of the competent authority and their social networks from the study on air corridors (adapt the data to citizens, use visualizations, infographics).
<p>RECOMMENDATION 3: Expand the surface of protected areas within the wider urban area of Sarajevo and strengthen the control of the construction of infrastructure and residential buildings in forest areas and recreational sites (in the area of the Olympic mountains – Bjelašnica, Jahorina, Igman, Trebević..., as well as at the recreational sites Barice, Stojčevac, etc.). The recommendation was adopted with 98% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - By preserving these landscapes, we leave space for gatherings, family and socialization, preserve greenery and fresh air, drinking water, prevent soil erosion and consequent negative impacts. We are obliged to the EU to protect a significantly larger space than the approx. 3% up until now. 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Prepare a special set of measures for issuing building permits. - Perform rigorous control in these areas by increasing the number of foresters/rangers/forest technicians, inspectors. - Draft a study by experts for each (potentially) protected area (the study should contain data on soil structure, plant species, method of planting...). - Control traffic and transport in these areas because of the negative impact of sound pollution on the ecosystem. - Define these areas as protected areas so that they cannot be built on. - Maintain and preserve greenery in these areas. - Arrange the aforementioned areas for sports and recreational purposes and holidays in nature.



	<ul style="list-style-type: none">- Organize afforestation actions in areas stripped by clear cutting or other activities, according to the criteria and recommendations by experts (experts determine the quality of the soil, the type of seedlings/trees, the height of the plants...).
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SUBJECT MATTER:	AFOLU strategy (agriculture, forestry and land use, green areas and biodiversity)	
TOPIC:	GREEN CITY	
<p>RECOMMENDATION 1:</p> <p>De-asphalt and green the space in urban city centres in an amount of 30%.</p> <p>The recommendation was adopted with 92% of the votes.</p>		
EXPLANATION	POSSIBLE ACTION	
<ul style="list-style-type: none"> - De-asphalting and greening of urban space in urban city centres will enable: temperature reduction, carbon footprint reduction, a healthier and more comfortable environment, cleaner air, more green areas, greater accessibility for pedestrians and cyclists, the reduction of car presence, the reduction of hazards and risks of landslides and floods 	<ul style="list-style-type: none"> - Carry out afforestation of coastal areas, increase the number of green parks in the urban part, plant flowers, connect schools and local communities in the context of implementing these measures, more benches, increase biodiversity, educate citizens about the benefits of de-asphalting, install natural water management systems (rainwater exploitation and regulation – rain gardens), remove old dilapidated buildings and green those areas, draft a study on asphalted zones. 	
<p>RECOMMENDATION 2:</p> <p>Build a large city park (such as the At Mejdan Park), and build new city parks in all local self-government units in the area of Sarajevo Canton and the City of East Sarajevo.</p> <p>The recommendation was adopted with 94% of the votes.</p>		
EXPLANATION	POSSIBLE ACTION	
<ul style="list-style-type: none"> - A large city park should be built because of the improvement of the citizens' quality of life, contribution to the aesthetics of the city and contribution to the reduction of city pollution, contribution to tourism, increase of biodiversity 	<ul style="list-style-type: none"> - Conduct a public opinion poll on the adequate location, the amount of greenery as well as the amenities for the construction of the park. - Involve non-government organisations - Draft a construction study – Potential locations: parallel to the Put Famosa road (From Hrasnica to Grlica), Marin Dvor/Quadrant C and Remiza, etc. 	



	<ul style="list-style-type: none"> - Involvement of various social actors in the construction and maintenance of the park (e.g. primary school students, pensioners, etc.).
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RECOMMENDATION 3:

Improve/reform the waste management system with an emphasis on medical, pharmaceutical and electronic waste of citizens.

The recommendation was adopted with 98% of the votes.

EXPLANATION	POSSIBLE ACTION
<ul style="list-style-type: none"> - Modification of the existing systems in Sarajevo Canton and East Sarajevo and improvement of waste management will contribute to a cleaner city, cleaner air, energy generation, solving landfill problems. - Citizens often dispose of medications that they do not use in municipal waste, although there are procedures for returning them to pharmacies and their proper destruction 	<ul style="list-style-type: none"> - Educate on the proper sorting and recycling of different types of waste. - Increase the number of rubbish and recycling bins. - Regularly dispose rubbish. - Build an incinerator for non-recyclable waste. - Eliminate illegal landfills. - Penalise dumping in illegal landfills. - Strengthen monitoring of illegal landfills. - Determine the day of the week for the disposal of bulky waste. - Organize recyclable waste redeeming actions with a monetary equivalent. - Digitize the utility company. - Establish an independent commission for the purpose of auditing the work of the utility company.

SUBJECT MATTER:	AFOLU strategy (agriculture, forestry and land use, green areas and biodiversity)	
TOPIC:	EDUCATION OF CITIZENS	
<p>RECOMMENDATION 1:</p> <p>Organize continuous and mass education of citizens on AFOLU topics (agriculture, forestry and land use, green areas and biodiversity) with the participation of the administration of local self-government units from the wider urban area of Sarajevo, as well as non-governmental organizations and the media.</p> <p>The recommendation was adopted with 100% of the votes.</p>		
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - By raising awareness, interest increases and there is a greater possibility of participation and action at the collective level - Increasing social responsibility 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Establish a budget for the education of the population, ensure an amount of at least 0.1% of the Canton budget and the FUA budget for education. - Establish cooperation between government bodies and NGOs dealing with AFOLU topics. - Hold quarterly education in nature with a work action (afforestation, cleaning, planting flowers). - Motivate citizens' participation in the work of NGOs working in the field of AFOLU through projects. - Create educational material by experts. - Collaborate with the media and social networks: the "Month of Raising AFOL Awareness" campaign. - Introduce a TV show and repertoire about AFOLU 2 times per month and about the rights and possibilities of citizens' participation in the process of planning and deciding on development plans. - Educate citizens on the importance of preserving the eco-system service and on the method of separating recyclable waste that – by 	

	<p>experts in the field, financed by the City, Canton, Environmental Protection Fund (educational workshops, twice per year in transitional seasons).</p> <ul style="list-style-type: none"> - Hold an annual Citizens' Assembly/Forum with financial compensation. - Create a single web platform at the FUA level where citizens will have access to all information related to FUA activities such as: education, public invitations, discussions, plans, actions...
<p>RECOMMENDATION 2: Introduce educational workshops for citizens on the risks of disasters (natural and those caused by human activity) with an emphasis on local communities located in zones of increased risk, with the aim of preventing and reducing damages.</p> <p>The recommendation was adopted with 100% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - Preventing human casualties - Communities located in zones with an increased risk of natural disasters (e.g. floods, landslides, land degradation) often lack access to knowledge and practical tools to prevent and reduce damages 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - With the support of the competent Civil Defence service, organize media campaigns and education once per month. - Invite to education via a leaflet delivered to the citizen's address. - Create 3–4 educational posts per month (prevention and advice) on existing social media networks. - Inform via social media networks seven days before the start of educations. - Organize educations on the premises of the municipality – local community.

RECOMMENDATION 3:

Educate primary and secondary school students of all grades through stays in nature and organizing (extra)curricular activities on topics in the field of AFOLU.

The recommendation was adopted with 100% of the votes.

EXPLANATION	POSSIBLE ACTION
<ul style="list-style-type: none"> - Education within the curriculum leads to building awareness of the importance of nature conservation, as well as the reduction of pollution 	<ul style="list-style-type: none"> - Revise and update the school curricula of primary and secondary schools in terms of introducing more hours of practical classes in relation to theoretical hours related to the AFOLU field. - Introduce theoretical and practical AFOLU classes into the education system. - Expand the existing project "Education in the mountains" from 7th–9th grade of elementary school and 1st–4th grade of secondary school. - Provide at least once during the school year a "School in Nature" for all classes in nature (education on planned afforestation and environmental protection). - Reintroduce scouts', youths' and mountaineers' organisations into schools. - Conduct comprehensive education of teaching staff. - The Ministry should make an activity plan for the "School in Nature". - The competent institution should make a plan where students will carry out afforestation (planting seedlings). - Formulate a plan for afforestation of one seedling per student financed by the ministry and the school. - Organize an outdoor classroom: Schools that have the opportunity to plant and take care of the school yard within which educational activities



	for students will take place (grass maintenance, planting and taking care of seedlings...).
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SUBJECT MATTER:	Heating and cooling strategy	
TOPIC:	RESTORATION OF HEATING AND COOLING ENERGY EFFICIENCY	
<p>RECOMMENDATION 1:</p> <p>Establish annual subsidies in the amount of 50% to 70% of the total necessary costs for the renovation of buildings related to energy efficiency.</p> <p>The recommendation was adopted with 100% of the votes.</p>		
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - Because of high heating costs and consequently high air pollution, it is necessary to establish a subsidy system related to the thermal insulation of walls, roofs and replacement of joinery (mandatory RAL installation) due to the insulation of apartment buildings and individual buildings. The application of subsidies will reduce heating costs and air pollution. 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Draft a document on the energy characteristics of the apartment building (audit). - Develop a database of energy inefficient apartment buildings, in order to determine the current situation and make preparations for actions. - Make the amount of subsidy proportional to the income of citizens (higher subsidies for lower-income citizens). - Introduce a Tuzla model according to which a building/urban planning permit is not a condition for obtaining a subsidy. - Establish a strategic investment fund at the level of FUA Sarajevo for the planning and implementation of subsidies. 	
<p>RECOMMENDATION 2:</p> <p>Install calorimeters or heat distributors, and thermostatic valves in energy-remediated condominium buildings.</p> <p>The recommendation was adopted with 97% of the votes.</p>		
EXPLANATION	POSSIBLE ACTION	

<ul style="list-style-type: none"> - Since energy consumption is not controlled, this measure would encourage consumer responsibility for more economical consumption. 	<ul style="list-style-type: none"> - Promote the importance of using calorimeters and the benefits it brings. - Conduct a pilot project for the procurement and installation of calorimeters at two locations (SC and ES). - Enable long-term interest-free repayment in instalments with existing joint maintenance accounts for apartment buildings.
<p>RECOMMENDATION 3: Participation of local self-government units (LGUs) in covering the costs of construction materials needed to insulate individual residential buildings. The recommendation was adopted with 100% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - This system would accelerate the process of insulating individual residential buildings, since the existing system of subsidies is slower and more difficult to achieve. 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Ensure the participation of LGUs in the costs of construction materials for the insulation of individual residential buildings through an invoice. - Provide participation in the costs of materials to natural persons for individual buildings, and the users bear the costs of installation. - Define the criteria of eligibility for support. - Prioritize persons of lower financial standing. - Set a deadline of 12 months for the installation of the donated material and the realisation of insulation - Strictly control the implementation of works and the quality of materials.
<p>RECOMMENDATION 4: Participation of LGUs in covering the costs related to construction materials necessary for the insulation of condominium buildings.</p>	



The recommendation was adopted with 100% of the votes.

EXPLANATION	POSSIBLE ACTION
<ul style="list-style-type: none">- Because of the risk of existing façades collapsing, worn-out windows which do not properly seal, the removal of asbestos façades and roofs, because of safety and thermal efficiency measures	<ul style="list-style-type: none">- Enable RAL installation of windows.- Ensure the participation of LGUs in the costs of building materials to the condominium owners, and the manager to coordinate the installation costs with the owners.- Perform an analysis of the thermal efficiency of the apartment building on the basis of which priority apartment buildings will be assessed.- Set a deadline of 12 months for the installation of the donated material and the realisation of insulation.- Strictly control the implementation of works by the donor (experts) and the quality of materials.

SUBJECT MATTER:	Heating and cooling strategy	
TOPIC:	CENTRAL DISTRICT HEATING	
<p>RECOMMENDATION 1:</p> <p>Build energy plants for the production and use of alternative energy in the wider area of Sarajevo to be used in the central district heating system (modelled after Stockholm and Uppsala).</p> <p>The recommendation was adopted with 98% of the votes.</p>		
<p>EXPLANATION:</p> <ul style="list-style-type: none"> - The construction of energy plants would simultaneously solve the problem of the lack of waste landfills in the area of FUA Sarajevo and provide an alternative energy source for central district heating. 	<p>POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Form an expert team composed of domestic and foreign experts. - Draft a feasibility study in the next year. - Source funding for construction (e.g. European and other international funds). - Construct an energy plant/incinerator and accompanying infrastructure buildings modelled after large European cities in the next three years after approval of the project (Buća Potok or Butiła as potential locations). 	
<p>RECOMMENDATION 2:</p> <p>Construct adequate infrastructure for connecting 50% of consumers to the central district heating system in the wider urban area of Sarajevo.</p> <p>The recommendation was adopted with 100% of the votes.</p>		
<p>EXPLANATION</p> <ul style="list-style-type: none"> - A large number of old apartment buildings and individual consumers need to be connected to the district heating 	<p>POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Draft a feasibility study in the next year. 	



<p>system in order to increase security of supply and reduce air pollution</p>	<ul style="list-style-type: none"> - Organize an awareness raising campaign on the benefits of the project. - Determine the interest of citizens in the implementation of said project. - Construct the necessary infrastructure in the next three years. - Subsidize individual connection to the network in the amount of 70%.
<p>RECOMMENDATION 3: Complete the planned heat pump projects and launch new ones in the wider urban area of Sarajevo (such as heat pump projects: Butile 1, Ilidža, Vogošća and Mojnilo). The recommendation was adopted with 98% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - Transition to environmentally friendly heating modes in FUA Sarajevo while reducing costs 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Complete the third phase of the Butila 1 project as soon as possible. - Obligate the authorities to provide funding for the implementation of new projects in the next three years. - Implement new projects in the next five years (Ilidža, Vogošća, Mojnilo).

SUBJECT MATTER:	Heating and cooling strategy	
TOPIC:	LEGAL FRAMEWORK	
<p>RECOMMENDATION 1:</p> <p>Introduce a new law that will secure subsidies through a special fund for increasing energy efficiency (energy renovation, transition to environmentally friendly energy sources) for all individual and condominium buildings (regardless of the possession of a building permit) in the wider urban area of Sarajevo.</p> <p>The recommendation was adopted with 98% of the votes.</p>		
<p>EXPLANATION</p> <ul style="list-style-type: none"> - Because of the reduction of harmful gas emissions - Because of the reduction of heating and cooling costs 	<p>POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Facilitate existing legislation for more efficient implementation. Develop a strategy. Establish a fund. - Abolish the building permit requisite in tenders for subsidies. - Introduce a categorization of the subsidy amount level according to whether the building is legalized. - Provide a subsidy of 70% minimum for condominium buildings and for private buildings that have all documents and 50% for private buildings that do not have all documents. - Provide a legal framework for the accelerated legalization of non-legalized facilities under more favourable conditions (as a prerequisite for the implementation of energy efficiency programmes), in order to use the funds from legalization for energy efficiency programmes. 	

RECOMMENDATION 2:

Amend the existing legal framework governing the manner of decision-making in condominiums so as to reduce the threshold to 60% of consent when deciding on energy renovation and energy efficiency of condominium buildings in the wider urban area of Sarajevo.

The recommendation was adopted with 98% of the votes.

EXPLANATION	POSSIBLE ACTION
<ul style="list-style-type: none"> - Because of the increase in energy efficiency - Because of the reduction of environmental pollution - Because of cost reduction - Because of the sustainability of the housing stock 	<ul style="list-style-type: none"> - By a majority decision, all tenants should undertake to cover the costs of increasing the energy efficiency of the apartment building. - Socially disadvantaged categories (including people with lower financial standing) should have a special payment method (lending, payment in instalments, additional subsidies, etc.).

RECOMMENDATION 3:

Adopt legal regulations that will regulate the field of generation, use and sale of electricity in all residential buildings (via solar panels) in the wider urban area of Sarajevo.

The recommendation was adopted with 95% of the votes.

EXPLANATION	POSSIBLE ACTION
<ul style="list-style-type: none"> - Greater flexibility and autonomy in the use of electricity - Cost reduction - Greater incentives to switch to ecological fuels - Protecting the environment - Reducing deforestation 	<ul style="list-style-type: none"> - Allow 100% of own production and disposal of electricity exclusively via solar panels, without the obligation of approval and mandatory contractual relationship with the power company. - Equip/strengthen the power grid to enable the service of purchasing electricity from citizens. - Enable the signing of a contract with the power company exclusively in the event of selling the generated surplus electricity.

	<ul style="list-style-type: none"> - Ensure minimum quality standards of equipment used to generate electricity via solar panels.
<p>RECOMMENDATION 4: Ensure adequate implementation of the Law on Environmental Protection and the Law on Air Protection while increasing human resources in the field of control of the implementation of laws/inspections. The recommendation was adopted with 98% of the votes.</p>	
<p>EXPLANATION</p>	<p>POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Strengthen the control of home fireboxes. - Provide conditions for carrying out inspections.
<p>RECOMMENDATION 5: Adopt a legal obligation for all suppliers of thermal energy to install calorimeters for users at their own expense, from their budget. The recommendation was adopted with 98% of the votes.</p>	
<p>EXPLANATION</p> <ul style="list-style-type: none"> - Reducing energy wastage and optimizing costs 	<p>POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Organize payment collection per consumption and not per square footage of space.

SUBJECT MATTER:	Heating and cooling strategy	
TOPIC:	EDUCATION AND COUNSELLING OF THE POPULATION	
<p>RECOMMENDATION 1:</p> <p>Conduct a mass survey of the population, by local community, for the purpose of collecting information on the types of heating and energy products used, and (lack of) awareness of the population about the harmfulness or benefits of using them.</p> <p>The recommendation was adopted with 97% of the votes.</p>		
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - Conducting a survey would provide insight into the (lack of) information the population has on the harmfulness of energy sources to air quality and health. Based on the information obtained, concrete steps could be taken in educating the population 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Create a questionnaire at the level of FUA Sarajevo. - Create a campaign to promote the survey (on social media networks – city and local level, as well as on available media – TV, radio). - Share surveys at the local community level (online on social media networks, create info posters on all ad spaces with a QR code and distribute <i>hard copies</i> into mailboxes). 	
<p>RECOMMENDATION 2:</p> <p>It is imperative to create informative shows and advertisements for the education of the population through public media, which will be broadcast every day in prime time (before/after the daily news).</p> <p>The recommendation was adopted with 100% of the votes.</p>		
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - Informative broadcasts will enable mass informing of all categories of the population through public media 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Bring in an expert to create them. - Promote professional content by experts in the field. 	

	<ul style="list-style-type: none"> - Promote materials on public television/media with the support of celebrities/public figures in the field of sports and culture. - Involve business entities which will organize prize games. - Promote advertising content on social media networks.
<p>RECOMMENDATION 3: Introduce additional educational content on the topic of environmental and energy awareness and efficiency in the formal educational system. The recommendation was adopted with 100% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - Introducing these topics into education increases the likelihood of raising awareness and educating generations on these topics 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Submit initiatives to the line ministry. - Organize student workshops/competitions with mixed groups and various topics in this field.
<p>RECOMMENDATION 4: In cooperation with the non-governmental sector, work on promoting and raising awareness of the local population through educational content on the topic of ecological and energy awareness and efficiency in the wider urban area of Sarajevo. The recommendation was adopted with 98% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - This recommendation is important in order to expand the awareness of the population about the existing problem, and to introduce the population to new more economical forms of heating and environmentally friendly options, in order to encourage personal responsibility and a better standard of living 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Plan a budget at the municipal level for educations and spreading awareness on this topic. - Open a singular free advisory service for citizens (providing advisory assistance in the selection of heating and cooling systems



	<p>and other issues related to environmental/energy awareness and efficiency).</p> <ul style="list-style-type: none">- Provide more public calls for NGOs to implement these actions.- Organize public forums, workshops.- Create educational brochures and distribute materials to citizens.- Establish an information desk at municipalities and other public institutions with educational materials.- Advertise on billboards.
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SUBJECT MATTER:	Mobility strategy
TOPIC:	CAR-CENTRIC CITY
<p>RECOMMENDATION 1:</p> <p>Modernize traffic signalization in terms of adaptability in the wider urban area of Sarajevo (with a focus on the City of East Sarajevo).</p> <p>The recommendation was adopted with 89% of the votes.</p>	
<p>EXPLANATION</p> <ul style="list-style-type: none"> - Since FUA Sarajevo is not sufficiently connected, it is necessary to connect areas in order to speed up the flow of traffic and reduce pollution, save time, energy sources and stimulate economic activity 	<p>POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Source funding for setting up and maintaining the system. - Involve citizens in the process of public debates (or through other participatory mechanisms) from the area of FUA (City of Sarajevo, City of East Sarajevo).
<p>RECOMMENDATION 2:</p> <p>Close the inner core of the City of Sarajevo to cars, and connect it to the established infrastructure, starting from Vilsonovo šetalište (pedestrian, bicycle, and scooter path).</p> <p>The recommendation was adopted with 85% of the votes.</p>	
<p>EXPLANATION</p> <ul style="list-style-type: none"> - Adequate infrastructure for pedestrian movement will enable greater accessibility and mobility, reduce pollution and increase the quality of life, while enriching the tourist offer. Development of public spaces for meetings, social cohesion and relaxation and entertainment. We are raising the safety of pedestrians and other users of alternative modes of transport 	<p>POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Start a pilot project (with smaller sites, step by step) - Determine the exact locations to be closed off, proposal: Zelenih Beretki – Branilaca Sarajeva – Miss Irbina – Kotromanića – Skenderija – Vilsonovo šetalište (which should be completely closed to motor vehicles) - Plan a parking space on the periphery of a closed pedestrian ring - Increase parking prices in urban areas. The line ministry should define which vehicles can enter the closed zone.



	<ul style="list-style-type: none"> - Provide privileged parking for tenants (parking permits for citizens living in a closed, pedestrian zone – zones for citizens to park). - Connect the parking space with the existing public city transport (<i>park and drive</i>); - Free first hour of using the public bicycle and scooter system.
<p>RECOMMENDATION 3: Set up pedestrian zones and pedestrian amenities. The recommendation was adopted with 98% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - Arrange existing pedestrian paths and expand them, because the current situation prevents the free movement of disabled people, of mothers with children in prams, and of the elderly, and does not encourage physical activity. Walking is good for public health, and by providing access to various amenities (such as benches, public toilets, culture amenities), we raise the quality of life in the city and the appearance of the city (tourist offer). Raising awareness of sustainable modes of transport 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Increase penalties for endangering pedestrians (parking, driving in pedestrian zones, etc.). - Ensure that footpaths are not interrupted by parking lots. - Make tartan trails; set up street furniture: benches, waste bins, public city fountains, exercise equipment. - Introduce social and cultural activities (chess, public events – “car-free” week). - Construct a public water closet (toilet) in Veliki park, along pedestrian zones. - De-asphalt and increase the number of green spaces and plant tree lines along the pedestrian paths with the support of experts.

SUBJECT MATTER:	Mobility strategy	
TOPIC:	PUBLIC TRANSPORT	
<p>RECOMMENDATION 1:</p> <p>Extend the operation of public transport to 24 hours in the wider urban area of Sarajevo, i.e. on routes where it has not yet been established.</p> <p>The recommendation was adopted with 85% of the votes.</p>		
<p>EXPLANATION</p> <ul style="list-style-type: none"> - Increasing traffic safety during night hours - Accessibility of transport at night - Reducing car traffic - Impact on tourism development 	<p>POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Increase the number of public transport vehicles. - Employ an additional number of drivers. - Consult the tourist boards of Sarajevo Canton and East Sarajevo in terms of tourist needs. - Adjust the night driving schedules (period 22:00–06:00) in accordance with the needs of citizens, and in accordance with the instructions of experts (test the routes in terms of whether they are justified). 	
<p>RECOMMENDATION 2:</p> <p>Connect the area of the City of Sarajevo and the City of East Sarajevo with environmentally friendly public transport (primarily electric buses, and in the long term by trams and trolleybuses).</p> <p>The recommendation was adopted with 80% of the votes.</p>		
<p>EXPLANATION</p> <ul style="list-style-type: none"> - The lack of public transport between the cities of Sarajevo and East Sarajevo creates huge problems for citizens (congestion caused by the unavoidable use of private cars) 	<p>POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Construct infrastructure for the performance of public transport, with the expansion of the existing infrastructure wherever possible. - Re-actualize pre-war plans for the route Hrasnica – Grlica – Vojkovići – Kotorac – Lukavica – Vraca – Grbavica – Okretaljka. 	

<ul style="list-style-type: none"> - Implementation of this recommendation would increase the accessibility/mobility of citizens within FUA Sarajevo, reduce pollution, and relieve the parking spaces 	<ul style="list-style-type: none"> - Re-actualize pre-war plans for the route Grica – Vojkovići – Kotorac – Dobrinja – Lukavica. - Organize public discussions in terms of solving the aforementioned problems.
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RECOMMENDATION 3:

Reserve one lane exclusively for public city transport and emergency vehicles (police, firefighters and ambulances) in the wider urban area of Sarajevo, i.e. from Ilidža to the City Hall.

The recommendation was adopted with 82% of the votes.

EXPLANATION	POSSIBLE ACTION
<ul style="list-style-type: none"> - Faster public transport/ensuring the accessibility of public urban transport in all conditions, reducing congestion, increasing traffic safety. More efficient operation of emergency services. - The safety of participants in alternative modes of transport in traffic is increased, the number of vehicles is reduced and the use of public urban transport is promoted, air quality is improved, more efficient and faster movement is enabled and the time necessary for moving between two destinations is reduced, the development of entrepreneurship is bolstered 	<ul style="list-style-type: none"> - Adapt traffic for redirecting vehicles. - Introduce a monitoring system at places reserved for public city transport. - Introduce cameras in public city transport vehicles which travel in a lane reserved for public city transport in order to monitor vehicles in front of and behind the vehicle, which may violate the rules. - Introduce misdemeanour provisions for non-compliance with traffic rules/introduction of sanctions and severe fines for violators. - Intensify the penal policy related to the use of the reserved lane. Video monitoring should also be established. - Introduce tagging sensors so that not everyone can drive in this lane. - Physically fence off lanes for public transport, taxi transport and delivery vehicles (buses, commercial lines). - Example of good practice: tram rails are used as a special lane for this type of traffic (public city transport buses, emergency services – police, fire, ambulance, taxi?) – find a way to connect this system. Initially, the idea was to enable their use when renovating tram rails.

<p>RECOMMENDATION 4: Increase the frequency of public transport vehicles during "rush hour", i.e. increase the number of trams on the lines Čengić Vila – Bašćaršija, trolleybuses from the starting station Otoka and eco-minibus lines on the hillsides of the city. The recommendation was adopted with 95% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - Relieving morning congestion (specifically at the turnpike Ilidža – terminal, trolleybus turnpike Dobrinja), more regular transport for the hillsides of the city - Less everyday stress because of being late for work, school, etc. 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Increase the number of trams. - Increase the number of eco-minibus. - Increase the number of trolleybuses. - Modify/optimize routes where possible (e.g. route no. 15, so that the turnpike Otoka is in Buća Potok).

SUBJECT MATTER:	Mobility strategy	
TOPIC:	PARKING/GARAGE	
<p>RECOMMENDATION 1:</p> <p>Reconstruct the existing parking lots as multi-level garages (underground and/or above-ground) and build new multi-level parking lots without endangering the green areas in the area of all municipalities of Sarajevo Canton and the City of East Sarajevo (on sites which do not belong to the inner core of the city).</p> <p>The recommendation was adopted with 95% of the votes.</p>		
<p>EXPLANATION</p> <ul style="list-style-type: none"> - There are not enough parking spaces in the city, which leads to congestion. A lot of motor vehicle users drive around the city for a very long time until they find a parking space, which further pollutes the city. Multi-level parking garages would increase accessibility and reduce illegal parking (e.g. parking on sidewalks, tram stops, bus stops, etc.). 	<p>POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Create a professional survey of all the places where it is possible to build multi-level parking garages and with exactly how many levels (underground or above-ground). - Reconstruct parking garages in Dobrinja, Alipašino polje, Nedžarići, Sarajevo Twist Tower. - In the inner core of the city centre (from Skenderija to Baščaršija), determine which parking lots are only for residents of the area – with a special pass. 	
<p>RECOMMENDATION 2:</p> <p>Provide a close connection of existing parking spaces with public transport and/or alternative modes of transport in Canton Sarajevo and in the area of the City of East Sarajevo.</p> <p>The recommendation was adopted with 97% of the votes.</p>		
<p>EXPLANATION</p> <ul style="list-style-type: none"> - Citizens are more likely to use public transport if the connectedness to parking spaces is better 	<p>POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Draft a study of multimodal transfer points. - Create parking spaces for bicycles, scooters as an intermediate means of transport between the parking lot and public transport on the outskirts of the 	

<ul style="list-style-type: none"> - Health benefits from using alternative means of transport 	<p>city, wherein the number of bicycles and scooters should cover at least a third of parking spaces.</p> <ul style="list-style-type: none"> - Conduct a study of how many bicycles and scooters are needed in those places. - Enable the use of the parking ticket as a public transport ticket.
<p>RECOMMENDATION 3: Ensure an adequate number of parking spaces for residents of new residential units. The recommendation was adopted with 94% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - There are not enough parking spaces between residential buildings (e.g. Aneks, Vojničko and Alipašino polje, Malta, Hrasno, Dobrinja, Alifakovac) 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Limit the number of available free parking spaces: one vehicle per residential unit. Each subsequent parking space is charged. - During the construction of a residential unit, perform an analysis of the adequate number of parking spaces and comply with that analysis during construction. - Install vertical rotating parking lots.
<p>RECOMMENDATION 4: Encourage citizens to use marginal parking spaces, instead of travelling by car to the inner city. The recommendation was adopted with 95% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - This reduces congestion, environmental pollution and leads to the occupancy of existing parking spaces 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Introduce a symbolic price for parking spaces on the outskirts of the city (parking price policy).



	<ul style="list-style-type: none"> - Conduct a poll of citizens, what a symbolic and acceptable price would be for them. - Enable the use of the parking ticket as a public transport ticket as well. - Increase the number of physical barriers that will prevent parking in all illegal places (sidewalks, green areas).
<p>RECOMMENDATION 5: Build a large central underground garage according to the "park and go" principle in the area of the railway station, with a park and/or green area on the roof. The recommendation was adopted with 95% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - This would allow for improved traffic flow and greater functionality in the inner city centre. There already exists developed public transport infrastructure and rail transport connectivity which enables more efficient mobility for citizens. There is also a transfer connection via Vilsonovo šetališče and the use of alternative transport to the city centre. 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Amend the regulatory plan. - Increase the number of trams and minibuses on the route Railway station – Baščaršija and Railway station – Ilidža. - Enable the <i>park and go system</i>: a parking ticket is at the same time a ticket for public transport or alternative means of transport. - Secure a discount on intercity rail tickets. - Centralize bus traffic on the route Vogošća – Railway station through the Ciglane tunnel. - Supplement the already existing route Velešiči – Koševsko brdo, Breka, Pofalići. - Redirect the existing routes Drvenija – Pofalići to the route Railway station – Pofalići.

SUBJECT MATTER:	Mobility strategy
TOPIC:	PRICING POLICY AND SUBSIDIES
<p>RECOMMENDATION 1:</p> <p>Subsidize legal entities engaged in transport, including public city transport, taxis and delivery vehicles, and adapt infrastructure for the purpose of transitioning to fully environmentally friendly transport.</p> <p>The recommendation was adopted with 94% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - The need for decarbonisation while improving public transport and the environment. 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Subsidize, on an annual level, the purchase of electric and hybrid vehicles by 2030 in a fixed amount (harmonise the criterion with experts). - Launch a digital database/e-taxi application that will be available for citizens to request transport, while adapting the legal framework. - Introduce "<i>Ride sharing companies</i>" (Uber, Bolt, Lift) by adjusting the legal framework with the condition of owning electric vehicles. - Consider banning legal entities in the field of public transport that have not transitioned to an environmentally friendly mode of transport by 2035. - Act preventively and remediate the disposal of environmentally hazardous waste (lithium batteries). - Improve/adapt the infrastructure for electric vehicles (charging stations, etc.) – pilot project in smaller city streets for a period of up to two years. - Introduce free electric vehicles in the central city/tourist zone modeled after Ljubljana. - Draft a study on the impact and cost-effectiveness of the use of electric vehicles taking into account the use of lithium batteries (prices, pollution, etc.).

RECOMMENDATION 2:

Draft and adopt a new pricing policy for public transport in the wider area of Sarajevo.

The recommendation was adopted with 98% of the votes.

EXPLANATION	POSSIBLE ACTION
<ul style="list-style-type: none"> - The existing pricing is not adapted to all categories of the population, nor the lengths and routes of travel 	<ul style="list-style-type: none"> - Further promote the existing system of purchasing electronic tickets (single use and monthly) for public transport. - Regulate pricing by number of stations. - Categorize public transport prices for different categories of users (free of charge for: the unemployed, full-time university students, primary and high school students, pensioners with minimum and guaranteed pensions). - Secure the possibility of purchasing a single daily ticket for all types of public transport. - Lower parking prices in the outskirts of the city. - Create a catalogue of public transport tickets. - Introduce the possibility of purchasing daily, weekly, monthly, family/group tickets. - Include the price of parking on the outskirts of the city in the price of public transport.

RECOMMENDATION 3:

Establish a public-private company for the use of alternative transport, with an incentivising pricing policy, for citizens who use alternative means of transport (bicycle, electric bike, scooter, electric scooter, etc.)

The recommendation was adopted with 98% of the votes.

Note: the measure is similar to the one in group 5, but they are different actions!



EXPLANATION	POSSIBLE ACTION
<ul style="list-style-type: none">- Health benefits, reduction of harmful exhaust gases;- Reducing the need for parking spaces;- Improved accessibility and mobility	<ul style="list-style-type: none">- Transfer the positive practice from Ljubljana (the first hour is free of charge for alternative means of transport, and after the first hour an acceptable price is BAM 0,50/km).- Increase the number of recycling machines (more affordable) for paying for public transport, Bin-Bin and electric bicycle vouchers, etc.- Introduce benefits such as free public transport (or other public services) for users of electric scooters, bicycles, electric bicycles, etc.- Improve the parking furniture for bicycles.- Provide subsidies/discount when registering private vehicles using LPG/natural gas.

SUBJECT MATTER:	Mobility strategy
TOPIC:	MOBILITY OF CITIZENS
<p>RECOMMENDATION 1:</p> <p>Construct and connect an infrastructure network for the use of alternative modes of transport (bicycles, electric scooter, etc.) by establishing a ring that connects the entire space of the wider area of Sarajevo (Hrasnica – City Hall – East Sarajevo – Hrasnica), and enable the availability of their use and greater user accessibility in the wider area of Sarajevo. This should be done by establishing reserved lanes for pedestrians and alternative transport, which will be independent of the main roads.</p> <p>The recommendation was adopted with 95% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - Reducing congestion and emissions - Increasing the safety of commuters - Improving health and general quality of life 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Establish a ring that connects the entire area of FUA Sarajevo (Hrasnica – City Hall – East Sarajevo – Hrasnica). - It is necessary to establish reserved lanes for pedestrians and alternative transport – independent of the main roads. - The paths must be made according to EU standards that will, above all, guarantee safety. - Build safe parking lots for alternative means of transport that will be covered with video monitoring, and evenly distributed within the ring of FUA Sarajevo. - Gradually expand the ring/connect it by integrating all local communities in the area of FUA Sarajevo.
<p>RECOMMENDATION 2:</p> <p>Amend the existing Traffic Law (vehicle categorization, penalties and safety measures) with a focus on alternative modes of transport (electric scooter, electric bicycle and bicycle, etc.) with the aim of more efficient legal regulation of their traffic, and ensuring the safety of their users and their faster flow in traffic.</p> <p>The recommendation was adopted with 94% of the votes.</p>	

<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - Improving the safety of commuters, and greater accessibility - Low misdemeanour penalties for users who disrupt alternative transport (cars and others) 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Establish a special lane/special lanes for alternative transport. - Increase fines for all commuters. - Limit the maximum speed for alternative transport (up to 30 km/h). - Determine the minimum age for alternative transport users – electric scooter and electric bicycle (minimum 14 years). - Introduce video monitoring at pedestrian crossings. - Establish a system for correct parking, in such a way that alternative vehicles cannot obstruct the flow of traffic and other commuters (including pedestrians) - Establish a system of records of alternative transport users that will require that the vehicle identification number (plate) is displayed on all alternative vehicles. - Introduce mandatory use of protective equipment (helmets, protectors, etc.) for all users of alternative transport. - Introduce into the existing school classes “My environment” a portion related to education on alternative transport in primary schools.
<p>RECOMMENDATION 3:</p> <p>Establish a public and/or public-private company that will regulate alternative transport in the wider area of Sarajevo (level of Sarajevo Canton and the City of East Sarajevo) with the aim of managing the fleet and creating a wider offering,</p> <p>The recommendation was adopted with 91% of the votes.</p>	
<p style="text-align: center;">EXPLANATION</p> <ul style="list-style-type: none"> - In order to increase the number of uses of alternative transport, and thus reduce the use of personal vehicles 	<p style="text-align: center;">POSSIBLE ACTION</p> <ul style="list-style-type: none"> - Procure a fleet (electric bicycles, bicycles and electric scooters) that will be used to enable citizens to travel at more affordable conditions. - Construct a sufficient number of stations whose purpose will be to rent and park the fleet, according to the principle from Ljubljana. - Establish a fleet maintenance system.



	<ul style="list-style-type: none">- The business should work on promoting the use of alternative transport services.- Secure effective control of users of alternative transport (mandatory registration before using the fleet).
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Climate City Challenge

2030 Climate Neutrality Commitments

Climate Neutrality Commitments of
the Sarajevo Functional Urban Area



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1 Introduction

The decision to join the EU's Mission: 100 Net Zero Emission Cities and develop a Climate City Contract (CCC) stems from Sarajevo FUA's commitment to addressing its severe environmental and health challenges. By joining this initiative, Sarajevo seeks to transform itself into a sustainable, resilient urban area that can effectively tackle the impacts of climate change. The Net Zero Cities Mission provides an invaluable opportunity to access resources, expertise, and support to implement comprehensive climate strategies. Developing a CCC, as well as Climate Neutrality Action Plan (CNAP) and Climate Neutrality Investment Plan (CNIP), will help Sarajevo FUA establish clear, actionable goals and foster collaboration among local government, businesses, and citizens to achieve net-zero emissions.

Sarajevo FUA's current commitment to climate neutrality is grounded in its mission to establish a smart, net-zero emissions area, with a vision that includes:

- Developing efficient and high-quality infrastructure for water and energy management.
- Creating zero-emission public and private mobility systems.
- Implementing circular waste management and pollution elimination strategies.
- Enhancing high-quality and accessible green spaces and restoring biodiversity.

Vision for a Climate-Neutral Sarajevo FUA:

The vision for a climate-neutral Sarajevo FUA is to create a forward-thinking, resilient urban area that champions sustainability, enhances quality of life, and sets a benchmark for climate action across the Western Balkans. By 2030, Sarajevo FUA will be a hub of green innovation, where renewable energy powers households, businesses, and public infrastructure, significantly reducing greenhouse gas emissions and dependence on fossil fuels.

This transition will deliver clear, measurable benefits to the people of Sarajevo FUA. Cleaner air resulting from lower emissions will lead to improved public health, reducing the incidence of respiratory diseases and enhancing overall well-being. The expansion of green spaces and nature-based solutions will improve urban environments, providing healthier and more accessible areas for recreation and contributing to the mental and physical health of residents. Circular waste management and pollution elimination strategies will be at the core of this transformation, creating a cleaner, healthier city while fostering sustainable industries and green jobs ensuring that the transition is equitable and inclusive for all. Through these actions, waste will be minimized, resources will be reused, and pollution will be systematically reduced, ensuring a positive impact on both the environment and public health.

Sustainable mobility, including electric public transportation and non-motorized options, will reduce traffic congestion, lower noise pollution, and promote safer, more efficient travel throughout the urban area. Energy efficiency improvements in buildings and homes will not only lower energy costs for citizens but also drive economic resilience, creating jobs and stimulating green industries.

In achieving climate neutrality, Sarajevo FUA will demonstrate the transformative potential of climate action, proving that sustainability can drive economic growth and social equity. This vision underscores the commitment to fostering a prosperous, healthy, and inclusive future for all residents, aligning with European and global climate goals.

The Net Zero Cities Mission enables Sarajevo FUA to build on its existing efforts by providing a structured framework for achieving these goals.

The Mission offers opportunities for:

- **Resource allocation and support:** Access to funding, technical expertise, and best practices to implement ambitious climate initiatives.
- **Innovation and collaboration:** Encouraging cross-sectoral and citizen-inclusive approaches to develop innovative solutions for sustainable urban living.



- **Capacity-building and knowledge sharing:** Establishing a continuous process of collective learning and feedback, allowing for rapid improvements and adaptation.

By participating in the EU Net Zero Emission Cities Mission, Sarajevo FUA aims to improve air quality, reduce health and social costs, and foster a prosperous green economy. The area's commitment to the mission underscores its dedication to creating a sustainable, healthy, and attractive region for current and future generations.

The "Net Zero Mission Sarajevo FUA" aspires to meet the challenges of climate change and significantly reduce the area's carbon footprint, aligning with global sustainability goals while ensuring a **just transition** that leave no one behind. By addressing social equity and creating opportunities for vulnerable groups, the mission enhances the quality of life for all residents, fostering inclusive economic growth, and building a more resilient, sustainable future.

The EU Net Zero Emission Cities Mission for Sarajevo FUA presents several key opportunities that will drive the transition toward climate neutrality while fostering innovation, efficiency, and sustainable growth. Enhancing ongoing improvements in digital technologies and e-governance is crucial to accelerating processes, minimizing delays, and boosting transparency, in alignment with strategic policy goals. Moreover, developing a comprehensive GHG inventory will serve as a foundational tool for further monitoring, reporting, and verification (MRV), providing a robust framework to support climate strategies.

There is also a significant opportunity to develop innovative financing models, including public-private partnerships and the exploration of international financial mechanisms to fund climate initiatives. A binding plan to ensure the continuation of project activities, with clearly defined responsibilities, will be essential for ongoing success. Equally important is the continued development of incentives for energy efficiency and renewable energy projects, supporting sustainable development across sectors.

Investments in circular economy principles, particularly in waste management, will play a critical role. Enhancing waste segregation, advancing recycling initiatives, and exploring waste-to-energy solutions will reduce landfill impact and support the overall sustainability. Likewise, comprehensive public awareness campaigns will promote sustainable practices in energy, mobility, and agriculture, ensuring broad community engagement and support. Lastly, in sectors like agriculture and forestry, adopting a unified legal framework, and promoting territorial cohesion through coordinated spatial plans will protect key ecosystems and enhance land use management. These combined efforts present a clear pathway toward achieving the climate neutrality goals of Sarajevo FUA, while addressing the needs of both urban and rural communities.

During the last decade, Sarajevo FUA has made notable policy progress in its journey towards climate neutrality. Several strategic sectoral documents have been adopted at national, entity, cantonal, city, and municipality levels, including:

- Bosnia and Herzegovina (BiH) Climate Change Adaptation and Low-Emission Development Strategy for the period 2020-2030.
- Environmental Protection Strategy of Federation of BiH for the period 2022-2032.
- Environmental Protection Strategy of Republika Srpska for the period 2022-2032.
- The new draft Sarajevo Urban Spatial Plan 2016-2036, which is currently in the process of adoption.
- The Sustainable Energy Action Plan (SEAP) of City of Sarajevo from 2011.
- Sustainable Energy and Climate Action Plan (SECAP) of City of East Sarajevo for the period 2020-2030, which is currently in the process of adoption.
- Draft Development Strategy of City of East Sarajevo for the period 2023-2029.
- The Sustainable Urban Mobility Plan (2021-2025) of the Canton Sarajevo and the City of Sarajevo.
- The Sustainable Urban Development Strategy (SuDs), also known as the Green Cantonal Action Plan (GCAP), from 2021.
- The Cantonal Environmental Action Plan (KEAP) from 2017.
- The Sarajevo Canton Development Strategy (2021-2027).



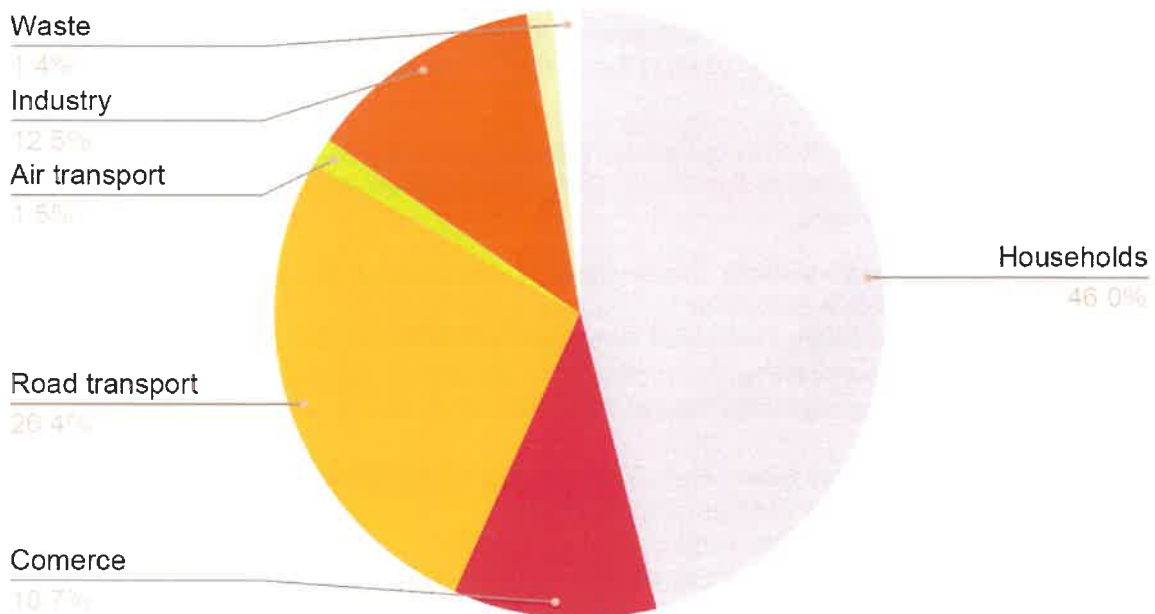
- Strategy for Limiting the Use of Coal and Other Solid Fuels in Sarajevo Canton for the period 2023-2033.
- Sustainable Energy and Climate Action Plan (SECAP) of Municipality of East Ilidza for the period 2020-2030.

The Government of Sarajevo Canton has begun implementing priority measures from strategic documents, focusing on traffic and energy efficiency in buildings. Although the 2022 report on the implementation of these measures indicated that many were not fully implemented or remained at the study documentation level, these efforts represent a crucial step toward addressing the environmental challenges. East Sarajevo has followed the same pathway, developing a SECAP document that identifies priority measures for climate change adaptation and mitigation.

The Sarajevo Functional Urban Area (FUA) includes Canton Sarajevo (Municipalities of Centar, Hadzici, Ilidza, Ilijas, Novi Grad, Novo Sarajevo, Stari Grad, Trnovo, Vogosca), City of East Sarajevo (Municipalities of East Ilidza, East Novo Sarajevo, East Stari Grad, Pale, Sokolac, Trnovo), and City of Sarajevo. The Sarajevo FUA, with its unique geographical location, situated in a valley surrounded by mountains, faces a fundamental problem of air pollution. The area experiences heavy fog in winter that easily transforms into smog when combined with high pollution levels resulting from the use of fossil fuels, increased frequency and density of traffic, and the non-implementation of energy efficiency measures. This results in Sarajevo being one of the most polluted cities on the planet, with particulate measures exceeding 400 µg/m³ for over a dozen days during the winter period.

Despite various efforts to tackle this challenge, fossil fuel consumption and Greenhouse Gas (GHG) emissions have been rising steadily at 2.7% per year for at least a decade. Estimates show that each citizen of Sarajevo produces approximately 5.5t of CO₂e per annum, primarily from heating and transport, posing a direct threat to inhabitants' health, general well-being, and the city's tourism appeal. The incremental approach has not been working and hence the need for a Mission approach which will address the underlying structural issues as Sarajevo originally did in the 1970's.

GHG emissions in year 2020





2 Goal: Climate neutrality by 2030

Sarajevo FUA's commitment to reducing GHG emissions is clearly articulated in its 2022 Expression of Interest (EoI) for the Net Zero Emission Cities Mission, affirming the ambition to reach climate neutrality.

The EoI specified that the GHG reduction targets would be refined in subsequent phases of the Mission. After extensive consultations with various stakeholders over the past two years, and recognizing the need for meticulous planning, **Sarajevo FUA is committed to reducing GHG emissions to Net Zero (an 80% reduction in emissions and a 20% offset) by 2030 compared to 2018 levels.** These ambitious targets encompass the entire Sarajevo FUA, including all municipalities within Canton Sarajevo (and the City of Sarajevo), and the City of East Sarajevo.

While Sarajevo FUA's targets align with the overarching goal of the Cities Mission, there is a slight deviation in the timeline for achieving net-zero GHG emissions by 2030. This adjustment is primarily due to the comprehensive planning required for such a transition. The drafting of the CNAP and CNIP is scheduled to begin in 2024 and to be completed by 2025 and gives only 5-year period to implement actions and achieve the target. In the limited timeframe to achieve climate neutrality, Sarajevo FUA will encounter several significant challenges.

A critical constraint faced by Sarajevo FUA in achieving full climate neutrality, thus resulting in the setting of an 80% reduction target by 2030, is related to electricity generation, specifically Scope 2 emissions (see table below for draft results 2022 GHG inventory), that is managed at the entities level Federation of BiH and Republika Srpska, and currently relies heavily on fossil fuels. The Sarajevo FUA has limited influence over the national electricity planning and management system.

TJ	Transport/Mobility	Electricity	Buildings	Industry
	158.90	27.19	92.23	0.12
	Transport/Mobility	Electricity	Buildings	Industry
2022	33.48%	29.07%	32.41%	5.04%

The Sarajevo FUA has potential for renewable energy production and is well covered by the electricity distribution network. However, it faces limitations in integrating renewable energy sources (RES) due to insufficient capacity of distribution network. Additionally, challenges include securing adequate land and resources for large-scale RES deployment. Fossil fuel subsidies and unfavourable power pricing rules further hinder climate neutrality. Subsidies make conventional energy cheaper, reducing the attractiveness of renewable energy and efficiency investments. Moreover, current pricing rules do not sufficiently incentivize clean energy projects, impeding progress towards climate neutrality.

To address these issues, the Sarajevo FUA intends to leverage the Mission to explore opportunities for stronger coordination with national entities, facilitating better alignment between local and national efforts to achieve GHG reductions. The Mission's collaborative approach, engaging a wide range of stakeholders, will be critical in identifying these opportunities. Hence, the CCC will play a pivotal role in enhancing collaboration among stakeholders, ensuring initiatives are aligned and contribute toward broader climate goals. As part of this effort, the CNAP and CNIP will prioritize identifying and expanding RES capacities (particularly through small-scale projects like rooftop installations) wherever feasible. These initiatives will be paired with efforts to boost energy efficiency across all sectors. The impact of these actions will be evaluated through GHG modelling, while also taking into account national commitments outlined in the National Energy and Climate Action Plan, including expected changes in the grid emission factor due to substantial planned investments in RES by the Government.



Also, **energy poverty** poses a significant barrier to the implementation of a climate-neutral strategy. Despite government efforts to subsidize the replacement of fossil fuels, many households still struggle to afford clean energy solutions in the long term. These subsidies provide temporary relief, but they fail to address the underlying issue of affordability. Without a comprehensive, systemic solution, such as broader financial support mechanisms or structural energy reforms, overcoming energy poverty remains difficult, hindering the widespread adoption of sustainable energy and slowing progress toward climate neutrality. The Sarajevo FUA Governments are committed to improving the economic situation and raising living standards to address energy poverty challenges in the Sarajevo FUA. These efforts aim to ensure that all residents have access to affordable, sustainable energy solutions, thereby supporting the region's transition towards climate neutrality.

Although investment in climate neutrality projects has been increasing in recent years, insufficient financial resources and restricted access to funding still pose significant obstacles. City and municipal budgets are often constrained, and there may be a lack of available grants or loans for net-zero projects. Moreover, the high initial capital costs can be prohibitive for many stakeholders, including businesses, and households. To overcome the barrier of insufficient financial resources, international financial institutions and the business community will be involved in the CCC, to establish partnerships and to join efforts for implementing climate neutral actions.

The implementation of solutions for sustainable mobility, circular economy, greening of cities, renewable energy sources require that the solutions are planned with spatial planning documentation and appropriate urban rules. The Sarajevo FUA area does not currently have an urban plan or urban rules that support climate neutrality. The NetZero vision will have to be incorporated into the spatial planning documentation of the Sarajevo FUA area as soon as possible, to enable implementation. The Sarajevo FUA regional governments are committed to supporting the harmonization of spatial planning documentation with the NetZero vision.

Enhanced climate action and reduced dependency on fossil fuels in Sarajevo FUA are expected to result in multiple co-benefits:

- **Public health improvements** – Reducing air pollution will significantly lower the incidence of respiratory and cardiovascular illnesses, leading to improved public health outcomes. The reduction in health-related issues will also reduce healthcare costs and enhance the overall quality of life for residents.
- **Economic growth and job creation** – The increased use of RES technologies, the development of sustainable infrastructure and shifting from linear to circular economy are expected to stimulate economic growth. This shift will create new job opportunities in green industries, from renewable energy production, construction industry, circular economy-based businesses and start-ups, IT sector, etc.
- **Environmental restoration** – Initiatives to restore biodiversity and expand green spaces will enhance environmental quality, benefiting both the natural ecosystem and the community. The restoration effort will also help mitigate urban heat islands, manage storm water, and improve air quality.
- **Enhanced urban quality of life** – Cleaner air, more green spaces, and sustainable urban planning will significantly improve the quality of life in Sarajevo FUA. These improvements will make the area more attractive to residents, tourists, and investors, fostering a vibrant and healthy urban environment.



3 Strategic priorities

To meet the ambitious climate goals, Sarajevo FUA has identified several strategic priorities that will drive its efforts toward sustainability and energy efficiency. These priorities focus on enhancing energy performance, energy switching from carbon to zero emission sources, expanding sustainable zero emissions heating solutions, advancing zero-emission transportation, and improving waste management practices. Each priority is supported by a preliminary set of key indicators to measure progress and success.

Based on the latest data on sector contributions to total GHG emissions, as detailed in the Sustainable Energy Action Plans (SEAP) for the City of Sarajevo and Sarajevo Canton, and the Sustainable Energy and Climate Action Plan (SECAP) for East Sarajevo, and the draft GHG inventory 2022, the two key contributor to GHG emissions are buildings and transportation (see also chart on page 7).

This highlights the critical need for targeted interventions in both sectors to achieve substantial emissions reductions within the Sarajevo FUA.

Priority	Description	Indicator
Development of sustainable and low-emission urban mobility infrastructure	Sarajevo FUA aims to transform urban mobility by establishing a robust public transport system with zero-emission electric vehicles and promoting low-emission travel options. Key actions include deploying small electric vehicles, creating efficient transport lines, procuring zero-emission vehicles for municipal services, transitioning existing fleets to biogas or electric, and expanding tram and bus infrastructure. The construction of electric vehicle charging stations and the enhancement of cycling and electric scooter infrastructure are also planned.	<ul style="list-style-type: none"> • Percentage of zero-emission vehicles in total public transport fleet • Number of km of new cycling lanes, pedestrian only walkways and electric scooter paths created • Number of charging stations installed • Annual fuel consumption of public vehicles (per fuel types) • Changes in modal split including cycling and walking • Annual report on GHG emissions by vehicle type
Improvement of energy efficiency in public and residential buildings and integrating renewable energy sources (RES)	This priority aims to enhance the energy efficiency of both public and residential buildings within Sarajevo FUA. Key initiatives include upgrading public buildings, such as educational facilities and administrative offices, through measures like thermal insulation, boiler and burner replacements, and the installation of renewable energy systems. Additionally, residential buildings will be renovated and retrofitted to reduce energy consumption and improve performance. The overall goal is to lower energy use, integrating renewable energy sources, cut GHG emissions, and transition to more sustainable energy practices.	<ul style="list-style-type: none"> • Annual energy consumption of residential buildings (per fuel types) • Annual energy consumption of public buildings (per fuel types) • Number of buildings upgraded • Renewable energy capacity installed • Annual report on GHG emissions by building function/type
Increasing efficiency and expanding the district heating (DH) systems	The priority focuses on improving the efficiency and expanding the coverage of DH systems within Sarajevo FUA – DH system of the Canton Sarajevo and DH system of the Municipality of Pale. Key projects include subsidizing new connections to DH systems, upgrading distribution networks, and modernizing infrastructure by replacing outdated boilers and burners. The	<ul style="list-style-type: none"> • Number of new DH system connections • Annual fuel consumption per connection • Annual heat losses in DH systems • Number of km of newly constructed and refurbished network



Priority	Description	Indicator
	construction of new boiler rooms, as well as wood biomass plants (specifically in Ilijas and Sokolac), along with enhancements to the SCADA system, are also central to this effort.	<ul style="list-style-type: none"> • Annual report on GHG emissions reduction
Advancing integrated waste management and circular economy practices	This priority is aimed at improving waste management through enhanced municipal waste collection, selective waste sorting, and comprehensive recycling infrastructure. Key projects include upgrading waste disposal practices at the existing landfills, exploring cogeneration options, and extending wastewater treatment capabilities. Enhancements in waste and sludge management are also integral to this priority.	<ul style="list-style-type: none"> • Recycling rate of municipal waste • Volume of waste sent to landfills • Number of new waste management facilities, including recycling yards and waste treatment infrastructure • GHG emissions from waste disposal • GHG emissions from wastewater treatment

It is important to emphasize that the priorities outlined are derived from existing strategic documents and previously identified priority areas, which have consistently been the main sources of GHG emissions in the Sarajevo FUA. Hence, these priorities are designed to address long-standing issues and focus on the most significant GHG contributors. However, the specific actions, measurable short- and long-term targets, as well as the assignment of responsible parties, will be meticulously defined during the ongoing implementation of Mission activities. This will be articulated in the forthcoming CNAP and CNIP, which are currently scheduled for completion by June 2025. The CNAP and CNIP will provide detailed frameworks and benchmarks to guide the strategic execution and ensure effective management of the priorities. Their development will require the involvement of a broad range of stakeholders, as outlined in the subsequent section.



4 Process and principles

The Sarajevo FUA recognizes that reaching its ambitious climate neutrality target requires the establishment of a robust and systemic work process. This process hinges on creating favourable systemic conditions, which will be realized through two key approaches: (i) governance innovation interventions and (ii) social innovation interventions.

To ensure a coordinated and inclusive approach, Sarajevo FUA has laid a strong foundation for collaboration among diverse stakeholders. Recognizing the complexity of its multi-level governance structure, the FUA has established the Governing Body and the Operational Team. These bodies are composed of representatives from the Sarajevo Canton, the City of Sarajevo, and the City of East Sarajevo, and are supported by the Net Zero Sarajevo Mission Coordinator. As the Mission progresses, the Operational Team will be expanded to include representatives from all municipalities within the Sarajevo FUA, ensuring that local conditions and possibilities are fully integrated into the climate action strategy.

To drive systemic change, the Net Zero Transition Hub has established three key coalitions:

- **Net Zero Coalition of International Financial Institutions (IFIs):** This coalition brings together key development banks, donor partners, and financial institutions committed to aligning their resources towards zero-emission projects within Sarajevo FUA. The coalition's partners include prominent entities such as the European Bank for Reconstruction and Development (EBRD), World Bank (WB), European Investment Bank (EIB), and others. Their collective goal is to redirect financial resources in support of projects that contribute to a cleaner, sustainable environment, signifying a fundamental shift in resource allocation towards climate neutrality.
- **Net Zero Alliance of Businesses:** Recognizing the critical role of the private sector in achieving the climate neutrality target, Sarajevo FUA has established this alliance to foster strong collaboration between government and business. The alliance aims to catalyse significant private sector investment in clean energy products and sustainable practices, thereby driving changes in both the market and citizen lifestyles. This group will be instrumental in providing actionable insights and spearheading initiatives that align with the Mission's objectives.
- **Civil Society Platform:** To ensure transparency and inclusivity in the Mission's implementation, the Civil Society Platform has been established as a key stakeholder. This platform ensures that civil society organizations are actively involved in the decision-making process, contributing to a trajectory that reflects the interests and concerns of the wider community.

These coalition partners were invited to an information session co-hosted by the EU Delegation in the presence of the Prime minister a.i. of Canton Sarajevo, the President of the East Sarajevo Parliament and members of the City of Sarajevo Net Zero team. The attendance list and the minutes of their recommendations and feedback are attached as an appendix)

In addition to governance innovation, the Sarajevo FUA is committed to fostering social innovation through the establishment of three Citizens Assemblies (CA) – an innovative approach for this area. These assemblies will enable direct citizen participation in the decision-making process, thereby strengthening the climate dialogue and ensuring that the transition to climate neutrality is community driven.

The CA will be created by the process of sorting. This means aggregating the in-situ population into different units, representing distinct population profiles. The profiles will include age, gender, inclusivity factors such as ethnicity (in multi-ethnic population), occupation/professions, etc. From the applications received and the questions answered by potential participants, the randomized process will be used to select individuals who fit the demographic quotas. To foster maximum involvement, each assembly member will be offered compensation acknowledgment for their time commitment. This approach aims to facilitate the inclusion of individuals from diverse backgrounds, including those with limited incomes or caregiving responsibilities. Each CA will be moderated by an expert with knowledge of the specific sector component which will be discussed at the CA. Citizen Assembly Process is illustrated in figure 1.

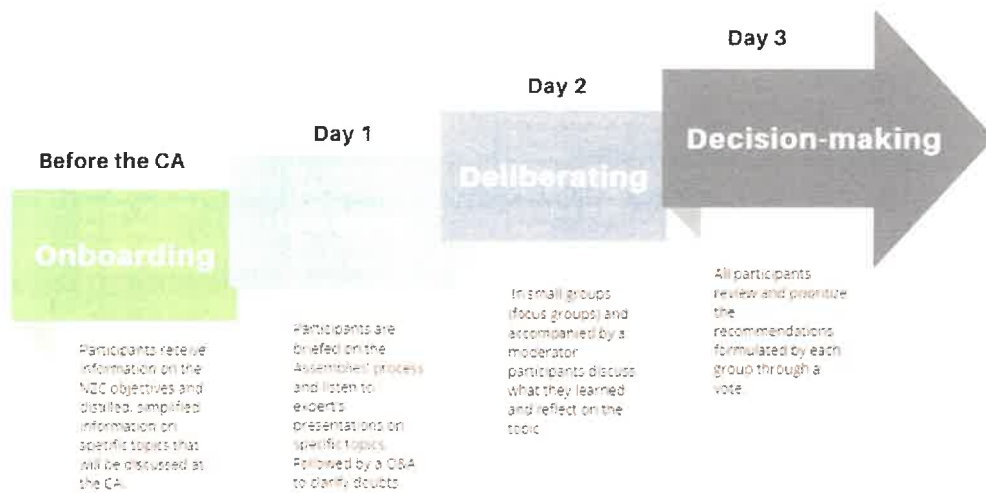


Figure 1 Citizen Assembly Process

In embracing this comprehensive and collaborative approach, Sarajevo FUA is not only paving the way for climate neutrality but also setting a new standard for urban transformation. This process is more than a strategic plan – it is a movement that unites government, businesses, civil society, and citizens under a shared vision of a sustainable future, by fostering innovation, inclusivity, and resilience at every level.

Central to this effort is the development of the CCC, a dynamic, living document crafted through an iterative co-creation process. The CCC will be periodically updated to incorporate new stakeholders, commitments, actions, and investments, and to reflect on what is effective and what requires adjustment.

The Sarajevo FUA is at the early stages of its journey toward decarbonization, fully recognizing that this will entail experimentation and the testing of various solutions and pathways to achieve climate neutrality. The pursuit of multidimensional outcomes, beyond merely reducing emission levels, is crucial for understanding the best way forward. In this regard, the Sarajevo FUA is committed to regularly monitoring the implementation of the CNAP and updating the CCC every two years. A comprehensive Monitoring Plan will be developed as part of the CNAP, outlining the key steps required to ensure effective monitoring and facilitate learning. This approach will help identify which solutions are effective, under what circumstances, and for whom, providing valuable insights into the efficacy of different strategies.

Achieving substantial reductions in GHG emissions demands urgent and transformative action on a large scale. Quick technological fixes alone are insufficient. The challenges cities face in mitigating and adapting to climate change are complex, rooted in a myriad of interconnected systems, including technological, economic, financial, organizational, political, cultural, and social dimensions. These interdependencies can impede necessary changes, underscoring the need for a comprehensive and systemic approach to address the multifaceted nature of climate issues.

The Sarajevo FUA is deeply committed to a transformative process that is guided by the principle of intensive stakeholder engagement, which includes active participation from citizens. This underscores the importance of transparency, participation, and accountability in the decision-making process and ensures that the voices of those affected by climate policies are heard and considered. Furthermore, a multi-level governance and collaborative approach is essential, given the diverse administrative levels within the FUA, encompassing canton, cities, and municipalities. The Sarajevo FUA is committed to develop adequate institutional mechanism and partnership arrangements that are needed to support



development and implementation of the CNAP. This should consider all levels of government (eg. city/regional/national) that are required to implement climate mitigation policies and actions .

These principles are already evident in the approach outlined earlier, at the beginning of this Section.

An additional guiding principle is climate justice, which acknowledges that BiH, as a developing country on its path to EU integration, therefore requiring careful consideration of the social dimensions of its society. The involvement of local experts, who possess a profound understanding of the local context, alongside the experience and insights of international experts, ensures that the actions outlined in the CNAP and, consequently, reflected in the CCC, are both meaningful and tailored to the specific needs and circumstances of the Sarajevo FUA.

Through these guiding principles, Sarajevo FUA is committed to a transformative process that not only targets the reduction of GHG emissions but also fosters a resilient, inclusive, and sustainable urban future.



5 Signatories

The table below enlists the signatories¹ who are committing to this CCC, and thereby to help the city achieve its goal to reach climate neutrality by 2030. Specific agreements that articulate the details of the climate action(s) between the municipality and signatories are added to the individual contracts in Appendix 1 (see sample in section 6). The number and relevance of signatories' commitments is likely to increase over time. The FUA Sarajevo specifically aims to engage additional stakeholders, such as the Net Zero Coalition IFIs, Net Zero Alliance of Businesses and Civil Society Platform to secure their commitments and signatures in the subsequent stages of the Mission.

Benjamina Karić, Mayor of the City of Sarajevo

Signed _____

date/stamp

September 13, 2024, No. 01/13-04-6315/24

Nihad Uk Prime Minister of the Sarajevo Canton

Signed _____

date/stamp

September 13, 2024, No. 02/01-45-42024/24

Ljubiša Čović, Mayor of the City of East Sarajevo

Signed _____

date/stamp

September 13, 2024, No. 02-014-772/24

¹ Climate City Contract signatories may be individuals or organisations. They ideally include national and/or regional governments, for example concrete agreements/ commitments made through the multi-level governance engagement processes supported by NetZeroCities, CapaCities, and other emerging national level initiatives.

877.



Appendix 1: Minutes of information session provided for IFI/Embassy Net Zero Coalition, Enterprise Alliance and Civic Platform, and recommendations

Meeting Minutes

Topic: *NZC platform meeting - Presentation of the Sarajevo FUA Commitment Document*

Project: Technical Assistance to the Net Zero Mission – Sarajevo Functional Urban Area

Date: 11th September 2024

Time: 11:00 - 12:00 CET

Location: European Union Delegation to Bosnia and Herzegovina, Skenderija 3a, Sarajevo, BiH

Attendees included members of the IFI/Embassy Net Zero Coalition, the Enterprise Alliance, and the Civic Platform

Stefano Ellero, Head of Cooperation, EU Delegation to BiH
Nadia Bergamino, Programme Manager, EU Delegation to BiH
Garret Patrick Kelly, Sarajevo FUA Net Zero Mission Coordinator
Sanda Midžić - Kurtagić, Project Coordinator, NTU
Mladen Đurović, Head of NZS Operational team, City of East Sarajevo
Branko Koroman, President of East Sarajevo City Assembly
Nermina Suljević, Head of NZS Operational team, City of Sarajevo
Dalila Zečić, Head of NZS Operational team, Canton Sarajevo
Amir Salkanović, CEO, Procredit Bank
Darija Softić-Kadenić, Prime minister a.i., Government of Canton of Sarajevo
Riccardo Righelli, 1st Secretary, Embassy of Italy
Emily Coffman Kronic, Deputy Director, USAID, BiH
Armin Hodžić, Chamber of Economy of FBiH
Adnan Džananović, EBRD
Armin Ridžalović, IFC
Felicitas Siek, GIZ
Aida Cerkez, OCCRP
Mejrema Zatrić-Šahović, Association of Architects of BiH/International University of Sarajevo
Aisa Bijedić, Embassy of Sweden
Lejla Bešlagić, City of Sarajevo
Timothy Jenkins, Country Director, People in Need
Amar Taso, NGO
Dubravka Bošnjak, GIZ
Magdalena Popovic, Sarajevo Film Festival
Nedim Pinjo, ESG Coordinator, Intesa Sanpaolo Bank
Michele Castoro, CEO, Intesa Sanpaolo Bank
Ishak Sikira, UWC Mostar
Miran Stambol, Porsche BiH
Podic Anes, NGO EKO AKCIJA
Jasmin Omerdić, UNOPS BiH
Tarik Atović, BIN BIN BH
Damir Margeta, GIRO DI SARAJEVO
Anela Karahasan, Chamber of Economy of FBiH
Velida Mehić, City of Sarajevo
Emil Ahmagić, U.S. Embassy Sarajevo
Haris Muratović, Toyota BiH
Esma Krešo, WorldBank
Alma Midžić, Bankwatch
Sabina Nikšić, AP

Purpose of the meeting: NZC platform meeting - Presentation of the Sarajevo FUA Commitment Document

- Mr. Stefano Ellero, Head of Cooperation, EU Delegation to BiH:

Mr. Stefano Ellero, opened the meeting by highlighting the European Union's strong commitment to the Net Zero Mission in Sarajevo, as it is one of the European Commission's flagships endeavors. He emphasized the significant role Sarajevo FUA partners play in contributing to this objective. Mr. Ellero underscored the importance of joint efforts from local authorities, businesses, and citizens to drive the transition towards a carbon-neutral future.

- Mr. Garret Patrick Kelly, Mission Coordinator, Net Zero Sarajevo:

The presentation outlined the overall objectives of the Net Zero Mission in Sarajevo FUA, focusing on achieving climate neutrality by 2030. Mr. Garret Patrick Kelly provided the summary of the Net Zero GHG Inventory conducted for the Sarajevo FUA. He outlined the primary sources of GHG emissions, with particular emphasis on the mobility and building sectors.

- Ms Sanda Midzic Kurtagic, Project Coordinator, NTU

Ms. Sanda Midžić Kurtagić presented the Sarajevo FUA Commitment Document, outlining the key priorities, opportunities, and challenges for the implementation of the carbon-neutral strategy. She emphasized Sarajevo's FUA strong commitment to achieving climate neutrality by 2030, in alignment with the EU's Green Deal and sustainability goals.

Questions and Answers (QA) Session, for which the coordinator undertook to reply to the questions that could be replied to immediately and to note, for action, issues raised which could not be dealt with on the spot would be reviewed by the team and NTU for action. The minutes of the meeting are being submitted to the Net Zero Platform as a supplement to the Commitment Framework:

- **Q1, Ishak Sikira, SSST, UWC Mostar:** Considering the need for a more effective measurement of success of the mission, which measurement approach will you use to demonstrate that we are on the right track, especially considering the credibility issues with GDP as a tool for measuring a broader societal impact?
- **A1:** Given that the Mission is about "Net Zero" the primary indicators will be from the greenhouse gas inventory. The coordinator complimented the detailed data available in the Canton Annual Energy Balance, but stressed the importance of having more precise data for East Sarajevo to maintain the long-term effectiveness of the measurement tool. He also noted in the course of the discussion that more attention needed to be paid in the document to the concept of "Just Transition" and this would be better reflected in the next draft.
- **Q2: Mejrema Zatrić-Šahović, Association of Architects of BiH:** She asked whether the concept of circular economy includes the building stock, highlighting the importance of social justice and the need to consider the construction industry's significant contribution to emissions.
- **A2:** The Net Zero mission does not currently calculate embedded carbon so for now the focus is on integrating recycling of all building materials into the circular economy through material reuse.
However, there is significant potential for the transition of the building sector to a zero carbon, wood based building technology, which should ideally be a feature of our future strategy.

- **Q3: Miran Stambol, Audi Brand Manager, Porsche BiH:** He expressed his satisfaction in seeing, for the first time, the prioritisation of building electric infrastructure for electric vehicles, noting that the current lack of investment is a major barrier to the adoption of electric cars. He did however ask why, if mobility was now the number one source for energy demand, that it was not the number one priority for action. Porsche would like to contribute to implementation of such a scenario and would like to have an opportunity to explore this partnership idea with relevant stakeholders.
- **A3:** the team will be reviewing the priority areas for work and indeed agrees that Mobility is now by most metrics the most significant area of energy demand while also being the area of urban transformation which is usually first tackled as it provides substantial early successes.
- **Q4: Damir Margeta, Bicycle Advocacy Organization in Sarajevo,** raised two questions. First, he inquired whether there would be education for major consumers on internal GHG inventories, as compliance reporting is becoming mandatory and the understanding of Scope 1, 2, and 3 carbon emissions and how supply chain value is created and reported, emphasising that this issue needs to be addressed. Secondly, when surveyed people of Sarajevo say that their preferred mode of travel- between 3 kms and 5 kms distance - would be a bike and more emphasis should be put on this sustainable form of mobility, with special focus on passing the necessary legal frame and design guidelines that have been missing for quite a long time now.
- **A4:** To the first question, yes there are going to be programmes to deal with this topic. In relation to the second question, Governments are beginning to recognize the significance of electric vehicles and scooters, but this recognition has been a long time coming. The key question is how bicycles, pedestrians and scooters can coexist with buses and cars. A recent IPSOS Survey on Mobility in Sarajevo FUA reveals that 60% of people would prefer walking and cycling if the environment was conducive to that. Decarbonization must be prioritised through both behavioural and technological shifts. To achieve this, we need a collective commitment to prioritise less harmful modes of getting about as part of a strategy for reducing emissions and delivering value for money, all supported by data-driven evidence. It's time to come together and set clear priorities.
- **Q5: Amir Salkanović, ProCredit Bank:** He noted that the GHG inventory for households, at 46%, is exceptionally high. What are the main obstacles to starting reductions, and what strategies do you expect us to implement to address this issue?
- **A5:** An initial strategic activity, which would reduce emissions and be led by Local Government involves transitioning from fossil fuels to renewable district heat pumps; Butile is an excellent example of the cost effectiveness of this approach. This shift has the potential to make a substantial impact, given that one-third of all district heating emissions currently originate from the Butile district heating systems powered by carbon based fuels.
- **Q6: Anes Podić, NGO EKO-Akcija:** Net Zero Mission is an important process for Sarajevo FUA that offers a number of opportunities. Instead of a question directly addressing the Mission, a dilemma: are the governments really committed to such a challenging pathway? He specifically requested, in that context, that the Urban Plan be subjected to a Strategic Environmental Assessment (SEA) in order to ensure that it is aligned with the Net Zero Mission.

- **A6:** The text of the Commitment framework already mentions the need to align the Urban Plan with the Net Zero Mission, so this suggestion represents a practical tool for achieving that alignment and will be examined.
- **Q7: Timothy Jenkins, Country Director, People in Need** posed a question about when financial and technical support will be provided to civil society, to become involved in achieving/delivering this ambitious agenda. Large funding support that is given only to inter-governmental agencies, like the UN, undermines the important role CSOs play in delivery of such agendas.
- **A7:** It is true that in most EU member states NGOs are seen as partners in the delivery of complex solutions; in Poland for example it is NGOs who are delivering Citizens Assemblies but here in BIH the role of CSO is confined largely to „watch dog“ status without funding or encouragement yet to become part of the solution. However, the Net Zero Mission has established a Civic Platform to begin the process of inclusion and the Mission also plans the formation of a Citizen Assembly, which will actively engage citizens in the decision-making process.

Key messages:

The participants were thanked for their support to the Sarajevo FUA mission to date and invited to take an active role in the upcoming consultation process.

The convenors, for their part, undertook to address the 7 issues raised by participants

GreenHouse Gas Inventory Sarajevo Functional Urban Area (FUA)

Methods and Results

Published by the Sarajevo Net Zero Transition Hub, January 2025




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Executive Summary

Context

This document details the data and methodologies involved in determining FUA Sarajevo's GreenHouse Gas (GHG) inventory 2016 - 2022. The inventory covers the buildings, electricity, transport and industry sectors and emissions associated with municipal waste disposal. The conclusions, which form the basis of this report, emanated from a workshop funded by Canton Sarajevo, which occurred on the 14th and 15th of March 2024 hosted by the EU Delegation and included relevant sectoral experts from Canton Sarajevo, as well as participants from City of Sarajevo and City of East Sarajevo (Appendix 2).

Data availability

This GreenHouse Gas (GHG) 2016 - 2022 inventory covers the area described as the Sarajevo Functional Urban Area or FUA¹. However, at present, we are only in a position to present detailed analysis for the Cantonal energy and emissions system - which includes the City of Sarajevo - as the City of East Sarajevo lacks appropriate data for the period 2016 to the present; waste data being the only exception.

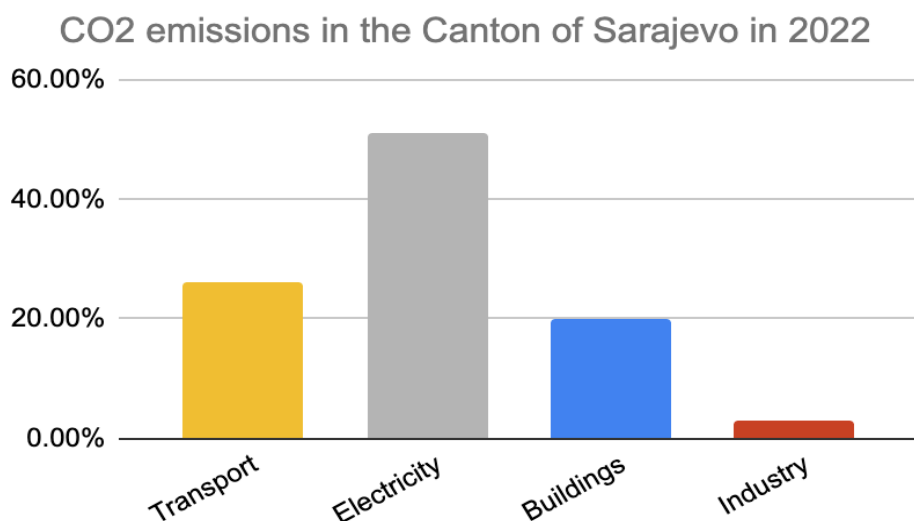
- The annual Energy Balance Report currently produced by Canton Sarajevo offers a practical mechanism for creating a GHG Inventory, though some further work on granularity of data is advised.
- East Sarajevo does not have a systematic data collection mechanism and until such practice is introduced, East Sarajevo's GHG data will remain less comprehensive.
- In the absence of East Sarajevo data this report follows the practice of the baseline assessment and uses GHG emissions per capita for the Canton as a proxy for East Sarajevo estimated total GHG emissions, based on a reported population² of roughly 60,000. The estimated per capita emissions for Sarajevo FUA are 5,7 CO₂e.tonnes/per capita.

¹ Sarajevo Functional Urban Area or FUA includes: Canton Sarajevo, Centar, Hadžići, Iliđa, Ilijaš, Novi Grad, Novo Sarajevo, Stari Grad, Trnovo, Vogošća, City of East Sarajevo, Istočna Ilidža, Istočno Novo Sarajevo, Istočni Stari Grad, RS Pale, Sokolac, Trnovo and City of Sarajevo.

² Institute of Statistics Republic of Srpska, <https://www.rzs.rs.ba/front/category/2/131/?&add=None>, accessed 16.08.2024.

Overview

The Sarajevo Functional Urban Areas emissions can broadly be divided into three significant source factors namely Transport/Mobility sector, Buildings sector and Electricity as energy source. This picture is somewhat complex because of what are known as scope 1, scope 2 and scope 3 emissions³ where emissions occurring physically within the city (scope 1), are differentiated from those occurring outside the city (scope 3) and from the use of electricity, steam, and/or heating/cooling supplied by grids which may or may not cross city boundaries (scope 2). The extent of scope 2 emissions are substantial for Sarajevo and they do cross the FUA boundary as the electricity is produced outside the boundary but used within though not under the jurisdiction of local Government.



Share of CO2 emissions per sector/source for Canton of Sarajevo in 2022

Methodology

The methodology used for this report is described in detail on pages 20 to 26 and uses a selection of sources and metrics for the calculation of emissions from International Energy Agency (IEA)⁴ and the Intergovernmental Panel on Climate Change⁵ (IPCC), etc.

³ <https://ghgprotocol.org/ghg-protocol-cities>

⁴ <https://www.iea.org/>

⁵ <https://www.ipcc.ch/>

Transport

- At almost 40% of the total energy usage in Canton Sarajevo in 2022, liquid fuels are the dominant energy carrier in Canton Sarajevo according to the scope in the energy balances,
- Diesel is by far the dominant carrier of energy accounting for about 75% of all energy from liquid fuels between 2016 and 2022.
- Private passenger transport is the dominant activity consuming both diesel and gasoline in Canton Sarajevo. An estimated 75% of diesel is used for this purpose while gasoline is estimated at 95%.
- Reflecting the intermediate calculation by fuel, the transport energy demand in Canton Sarajevo is dominated by private transport, making up nearly 79% of the total energy use. Public transport accounts for only about 2% while freight transport 19%.
- For a population of approximately 420,000⁶ with private vehicle ownership of 162,560⁷ where almost half the population⁸ never or rarely use private vehicles (as either drivers or passengers) - relying instead on public transportation or walking - this represents a significant imbalance.

Buildings

- Buildings constituted close to 60% emissions of the Canton (of which approximately 33% Scope 1, 67% Scope 2).
- In buildings, households and services included, the largest share of energy consumption by type of fuel consisted of gas and electricity⁹, with 45% and 42% in the total respectively

⁶ Estimate of the total population for the Federation of BiH, by cantons and municipalities, as on June 30, first release, Institute of statistics of FBiH, Sarajevo 31.08.2023.

⁷ INFORMATION ON REGISTERED/REGISTERED ROAD/ROAD VEHICLES IN BOSNIA AND HERZEGOVINA IN THE PERIOD JANUARY – DECEMBER 2023; BIHAMK 2024

⁸ Mobility Survey EUSR/IPSOS July/August 2023

⁹ One important shortcoming of the Cantonal energy balance data relates to limited granularity for electricity data, especially in the category 10(20) kV and category Others. For the purpose of this GHG inventory, category Others has been fully allocated to Buildings (Services).

in 2022. Solid fuels share in the same year was at 13%, including coal and biomass (firewood¹⁰, pellets and wood chips).

- The district-heating system comprised close to 10% of total CO₂ emissions from buildings in 2022. Based on the EBRD Butile study¹¹, if extrapolated, emissions could be reduced to almost zero by transitioning from current - gas and light oil – district heating system to ground source heat pumps combined with a wastewater heat exchange system.
- Close to 70% of total emissions from buildings in 2022 consisted of electricity emissions. While a significant share of these emissions can be reduced by measures taken by the Canton, it should be noted that Electricity is scope 2 emissions and as such it - electricity generation - is outside the jurisdiction of Canton.

Industry

Emissions from industry constitute a less significant but important component of the overall picture at 16% of CO₂ emissions (3% scope 1, 13% scope 2) in 2022.

Waste

Top-down estimates of waste generated and deposited in landfill were estimated using data from [Statistical annual bulletin of the Canton of Sarajevo for 2022](#) and the data supplied by the City of East Sarajevo. The per capita factor 0.42 tons of waste generated is estimated at 18363 tons of municipal waste generated in 2022. This number is then converted to tons of organic waste disposed of in landfill in order to estimate methane emissions. It is assumed that there is no methane recovery at landfill and hence all emissions resulting from decomposition of waste are released into the atmosphere. The methodology assumes no changes in the waste generation habits of the population nor its composition took place between 2016 and 2022, which constitutes a caveat. Accordingly, the waste figures mostly reflect the trends in population growth.

Trends

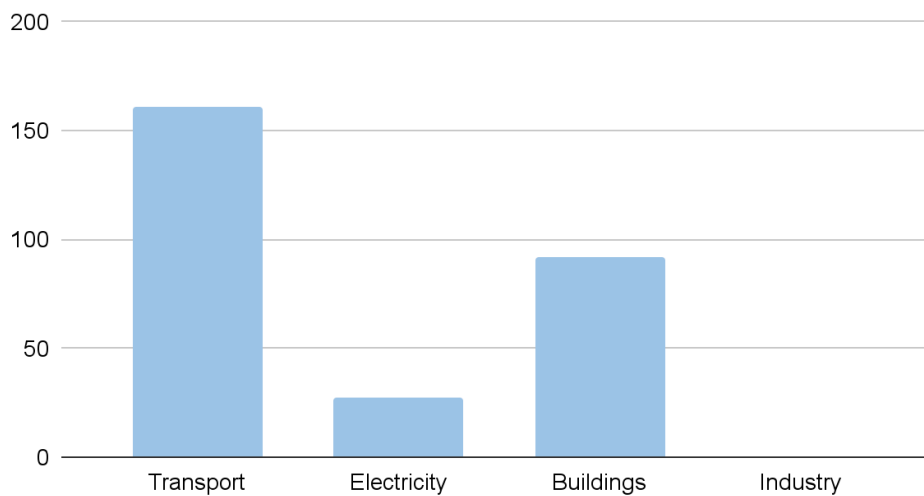
The transport sector and the building sector are responsible for the greatest observed increases. Throughout the investigated time frame they were responsible for an annual average increase of about 150 Tj (Transport) and 100 Tj (Buildings), respectively, per year to the total energy budget of

¹⁰ It should be noted that firewood consumption in reality is likely significantly higher than recorded in the energy balance.

¹¹ Presentation EBRD support for low carbon and renewable district energy Energy Community workshop on efficient district heating, June 2020

Canton Sarajevo (see below). Consumption of electricity has also increased by about 25Tj per year, while there has been no discernible trend in the energy consumption of industry.

Average Tj increase per year (2016-2022)



Average Tj (terajoule) increase per sector from 2016 to 2022/Energy Balance reports 2016 - 2022



Inventory Introduction

This document details the data and methodologies involved in determining FUA Sarajevo's GreenHouse Gas (GHG) inventory 2016 - 2022. The inventory covers the buildings, electricity, transport and industry sectors and emissions associated with municipal waste disposal.

Context

As part of the Expression of Interest (EOI) to join the Net Zero 100 Cities Mission, Sarajevo Functional Urban Area's 2022 application included a baseline GHG inventory (Appendix 1).

In 2024 a Framework provider was sought to provide technical support to the Net Zero Mission Sarajevo Functional Urban Area in preparing the Cities Mission Climate City Contract (CCC), the City's Climate Neutrality Action Plan (CNAP) and the Climate Neutrality Investment Plan (CNIP).

According to the TORs for the Framework provider's contract the baseline energy consumption data available for 2021 and 2022 from Canton Sarajevo - produced after the original baseline report was created in 2020 as part of Sarajevo's EOI - would be translated into additional baseline data and that the Contractor would then be required to clearly set out the approach and methodologies to be used to complete gaps in the existing city data and information required for the baseline (particularly under Task 3) in relation to the GHG emissions estimates etc.

A draft updated GHG Inventory emanated from a workshop funded by Canton Sarajevo, which occurred on the 14th and 15th of March 2024 hosted by the EU Delegation with opening words and guidance provided by Head of Cooperation, Stefano Ellero.

The Working Group which updated the GHG Inventory included relevant sectoral experts from Canton Sarajevo, as well as participants from City of Sarajevo and City of East Sarajevo (Appendix 2).

In the subsequent interval many requests for additional data were made - and supplied - including the exploration of the issue of the reliability of baseline data for East Sarajevo. The main recommendations from these additional consultations were a) that a calculation of East Sarajevo's GHG emissions should be calculated for now on a pro rata population

basis, b) that in future efforts should be made to establish an energy balance report for East Sarajevo and c) that within the next two years a bottom up inventory for GHG emissions in the Sarajevo FUA should be carried out by the Transition Hub.

The final draft was circulated on the 10th of October to the Working Group described above for any clarifications or questions and was deemed approved on the 19th of October 2024.

Emissions boundary

The inventory intends to capture the usage of energy in the Sarajevo FUA¹². It covers scope 1 and 2 emissions, that is, emissions related with the usage of energy within the FUA and those involved in the production of electricity that occur outside the FUA. In the case of transport, it cannot be excluded that some of the emissions will take place outside the borders of the FUA but these emissions are still accounted as scope 1 given that the required fuel was purchased in the FUA. The bulk of the data is taken from the energy balances of the Canton of Sarajevo published by the [Ministry of Economy](#). East Sarajevo lacks data for the period 2016 to present, the exception being waste.


Primary energy data sources

The bulk of the data used is taken from the energy balances published¹³ by the Ministry of Economy including electricity, natural gas, oil derivatives and solid fuels associated with annual consumption. Primary data sources for energy usage are listed below:

- Bilans energetske potrebe Kantona Sarajevo za 2023
- Bilans energetske potrebe Kantona Sarajevo za 2022
- Bilans energetske potrebe Kantona Sarajevo za 2021
- Bilans energetske potrebe Kantona Sarajevo za 2020
- Bilans energetske potrebe Kantona Sarajevo za 2019
- Bilans energetske potrebe Kantona Sarajevo za 2018
- Bilans energetske potrebe Kantona Sarajevo za 2017

¹² Canton Sarajevo, City of Sarajevo and the City of East Sarajevo

¹³ Courtesy English translations for each Energy Balance (AI assisted) available upon request



In the case of the City of East Sarajevo, data availability is limited to a single year, 2010, based on SECAP, published in 2024.

The Energy balance document, which is published every year by the Ministry of Economy of the Canton of Sarajevo, offers a mechanism for a quick annual update of the GHG Inventory. In the City of East Sarajevo however, a more regular data collection mechanism is yet to be established; this implies that the East Sarajevo section of the GHG Inventory is less comprehensive now and will continue to be less regularly populated in the future until either a new inventory is produced and data collection practice introduced.

Auxiliary data on transport energy

For the purposes of achieving a more granular representation of the transport sector's energy and GHG emissions breakdown additional data not present in the energy balances document was sourced. This included both data on fuel and energy consumption as well as so-called activity data on number of vehicles, kilometers traveled and fleet.

Electricity

Electricity consumption for the operation of trams and trolleybuses in the Sarajevo Canton was acquired from the [Gras operator](#) covering the time frame from 2016 to 2023 (see [tab activity of the GHG template](#)). Data request and acquisition was facilitated through the Ministry of Transport of the Canton. The electricity data for trams and trolleybuses is of the high v (10kV) type, which allowed us to carve the share of electricity used for public transport (see section [Main assumptions of the disaggregation of energy and emission in transport](#) for details). Importantly, Centrotans, the second public transport company, in the Canton Sarajevo does not operate a fleet that would use electricity as an energy source, meaning that the totality of electricity for public transport is linked to the operations from Gras.

Diesel

Both Gras and Centrotans operators own road transport fleets (buses and minibusses) that make use almost exclusively of diesel as fuel; with a share of Centrotans fleet using LPG. The data for both operators was acquired for the years between 2016 and 2023. The data was

gathered and provided through the Ministry of Transport of Sarajevo Canton. The joint usage of diesel by the two operators makes up the totality of diesel consumption for public transport in Canton Sarajevo. We use this value to enhance the granularity of total diesel-associated energy usage in Canton Sarajevo (see section [Main assumptions of the disaggregation of energy and emission in transport](#) for details).

Time and sector granularity

The inventory tracks GHG emissions on an annual basis from 2016 until present for Sarajevo Canton. It contains emissions from the energy use and municipal waste generation. Values are available per major energy fuel/source and emitting sector as detailed in the figure below. Major energy sources/fuel considered are electricity, gas, liquids and solids (details of each source/fuel considered under each of the broad categories can be consulted in the section [Methodological details](#)). The usage of energy from the major sources/fuel as indicated in energy balances are allocated to the major emitting sectors of households, services, industry, road transport, air transport, district heating and municipal services. The allocation was discussed together in a joint two-day workshop hosted at the EU Delegation to Bosnia and Herzegovina in Sarajevo in May 2024. The workshop gathered representatives of the Government of the Canton of Sarajevo (including Ministry of economy, Department of Energy and Department of Agriculture and Forestry, Ministry of Communal Economy, Infrastructure, Physical Planning, Construction and Environmental Protection, Ministry of Transport and Cabinet of the Prime Minister) and a representative of the City of East Sarajevo.

GHG Aggregation		Gas	Electricity	Liquids	Solids
Households	Households	Households	Households		Wood coal Wood briquettes Wood pellets Firewood Coal
Services	Health Education Religious institutions Public institutions Trade, hospitality, and tourism sector				
Industry	Industry		high v (35kV) high v (10kV)		
Road transport			Public transport (high v (10kV))	Diesel (private transport) Diesel (public transport) Gasoline	
Air transport				Kerosene	
District heating	District heating			Mazut	
Municipal services	Public institutions		Public lightening		
Others			Others	LPG LUEL	

Structure of the GHG template

All the calculations and results presented in this report are made available in the spreadsheet “GHG-template”, access to which is available upon request. The template basic structure is presented below:

Primary data collection	Energy (original)	TAB: fuel/source(original)	TAB: activities
		Sheets to collect primary data Energy usage from the original energy balances Granularity by fuel/source & sector as originally reported Details on transport energy consumption Details on Gras and Centrotans energy consumption	Auxiliary data on waste Details of transport activity Traffic counts
Conversions	Energy (Tj) GHG	TAB: fuel/source(Tj)	TAB: fuel/source(GHG)
		Aggregation of fuels/source(Tj) numbers Macroscopic view of totals per fuel/source	Aggregation of fuels/source(GHG) numbers Macroscopic view of totals per fuel/source
Aggregation	Energy (Tj) GHG	TAB: totals	
		Aggregation of fuels/source (both Tj and GHG) numbers by relevant sector (e.g., transport, buildings)	
Conversion factors	NA	TAB: factors	
		Energy conversion factors Emission factors CO2 and CH4	

There are a total of 6 tabs with relevant and dynamic information on energy and GHG. The Tab “fuel/source(original)” contains the primary data points sources from the energy balances in their original unit and in the granularity (that is fuel/source, year, sector) as originally reported. It also contains additional values of fuel usage specific for the two operators of public transport in Canton Sarajevo.

The Tab “activities” contains auxiliary data on waste generation for both Sarajevo Canton and East Sarajevo City and further details on transport activity in the Canton. This tab also collects primary data but unlike the previous one (“fuel/source(original)”) it does not document values on energy, only activities such as kms traveled by vehicles, kg of municipal waste or traffic counts.

Tab “fuel/sources(Tj)” converts the original data points from the tab “fuel/source(original)” to a common unit (Tj) that can be used to compare the relative contribution of each fuel/source in the total energy composition in a given year. The conversions are made using factors documented in Tab “factors”.

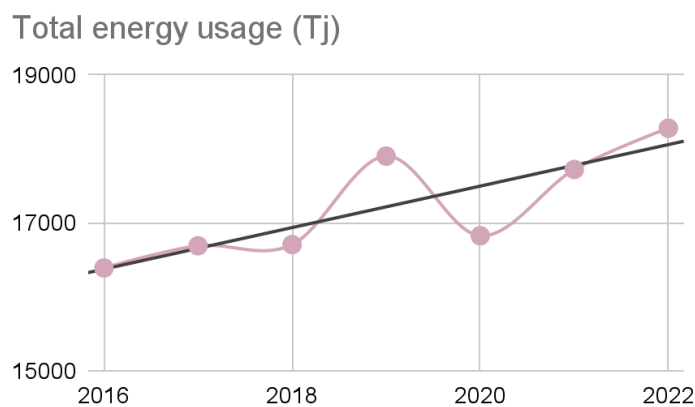
Tab “fuel/source(GHG)” converts the harmonized energy values in GHG following the emissions factors stored in the same “factors” tab as before.

Finally the tab “totals” makes the final aggregation of TJ and GHG values into logic sectors for the purposes of reporting - see also section Time and sector granularity.

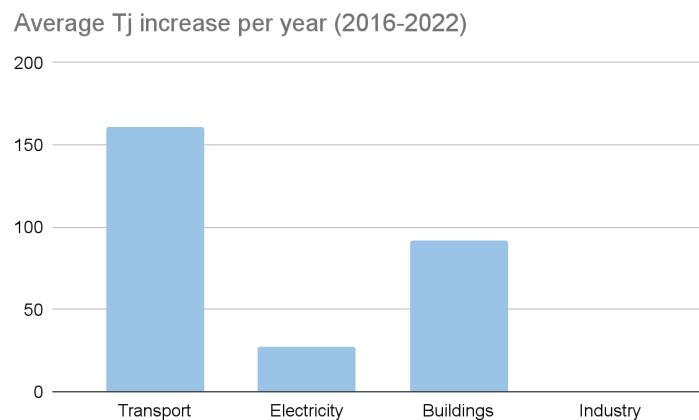
Aggregate energy trends in Canton Sarajevo

Total energy by fuel/source

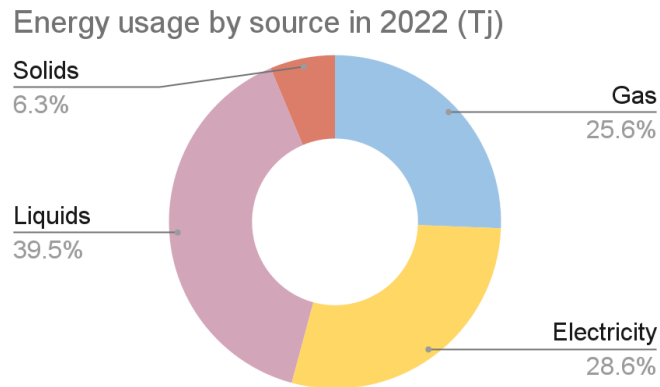
Energy consumption in Canton Sarajevo has increased significantly between the years 2016 and 2022, from a grand total of 16387 Tj to 18279 Tj. This represents an increase of 11.5% in only 6 years. On an annual average basis, this represents a nearly 2% increase, in line with the [global trend of energy consumption](#). Should the trend persist, Canton Sarajevo is expected to use 18618 Tj by the end of 2024 to fulfill its energy needs.



The transport sector and the building sector are mainly responsible for observed increases. Throughout the investigated time frame they were responsible for an annual average increase of about 150 and 100 Tj per year to the total energy budget of Canton Sarajevo (see below). Consumption of electricity has also increased by about 25Tj per year, while there has been no discernible trend in the energy consumption of industry.



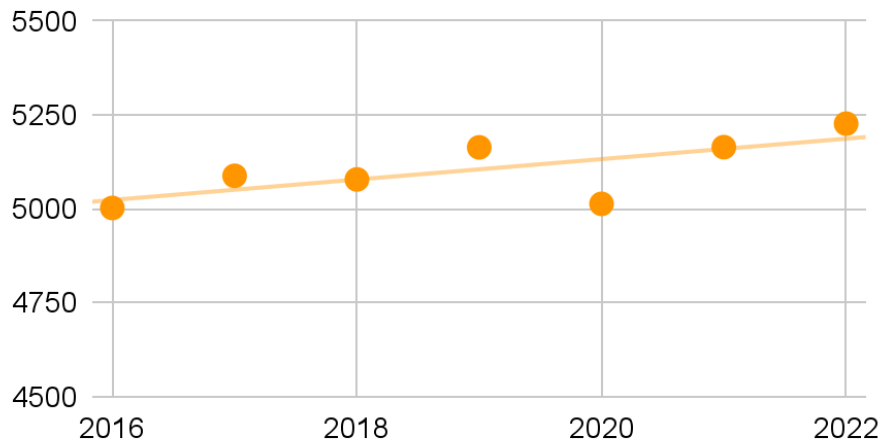
Reflecting the dominance of the transport sector in driving the macro energy trends of Sarajevo, in 2022 liquid fuels (the majority of which are used for transportation) make up about 40% of the energy usage in the Canton. Gas and electricity fulfill respectively 25% and 28% of the energy needs of Sarajevo Canton with the remaining 6% being supplied by solid fuels. The relative shares in 2022 of the highlighted fuels/sources have remained relatively stable between 2016 and 2022.



Electricity

The consumption of electricity in Canton Sarajevo has been on the rise (see figure below). In the year 2016 the consumption of electricity (including losses) added up about 5000 Tj. In 2022 that number reached 5226 Tj, an increase of 4.5%. In 2022, 28% of Canton's energy needs were supplied by electricity. Potentially motivated by the effect of Covid-19, the electricity consumption in 2020 shows a clear deviation from the overall trendline.

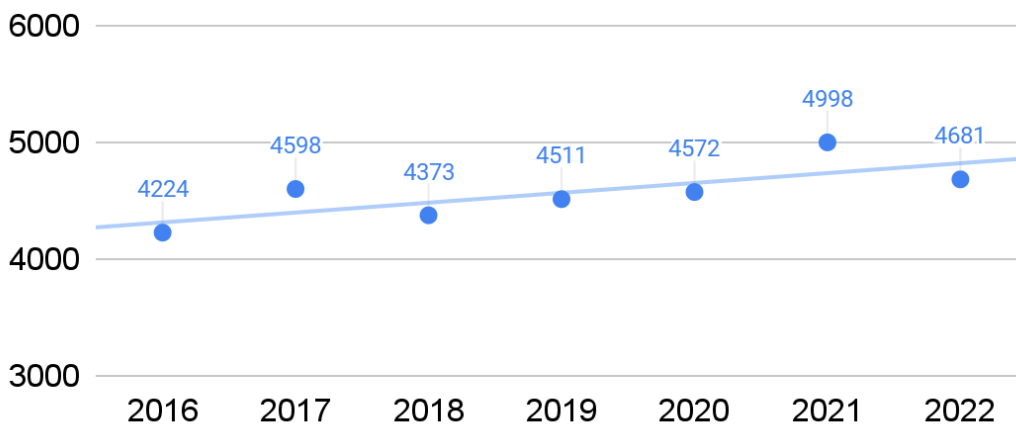
Electricity usage (TJ)



Gas

Between the years of 2016 and 2022 the usage of energy sourced from natural gas grew considerably (see below). In 2016, 3224 Tj of energy in Canton Sarajevo originated from the burning of gas, while in 2022 that number reached 4681 Tj. This represents an average increase of 1.8% a year during that time frame.

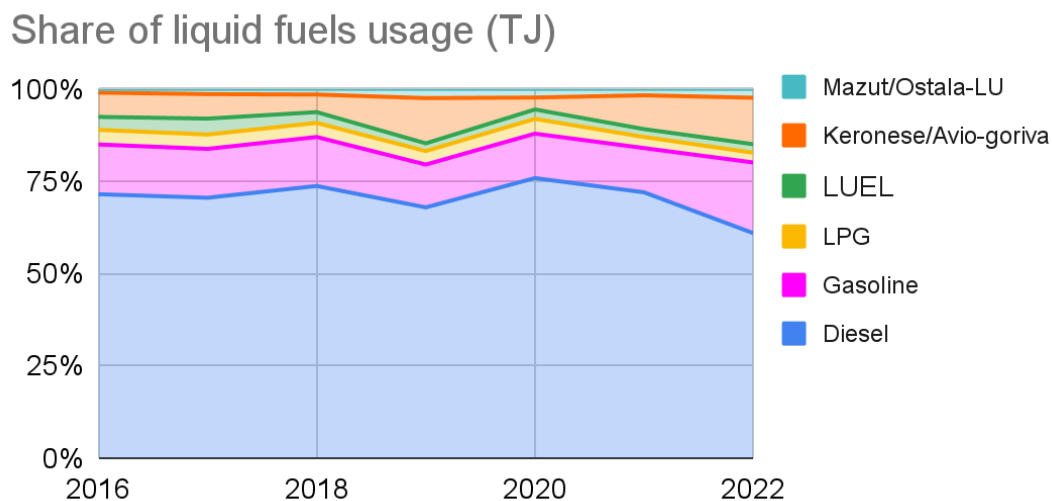
Total gas usage (Tj)



Liquids

As noted in an earlier section liquid fuels are the dominant energy carrier in Canton Sarajevo according to the scope in the energy balances. In 2016 all liquid fuels combined

made up 37% of the total energy usage in Canton Sarajevo, in 2022 that share remained virtually unchanged at 39% or 7213 Tj. The breakdown of energy use from liquid fuels in Canton Sarajevo is provided in the figure below. By far diesel is the dominant carrier of energy accounting for about 75% of all energy from liquid fuels between 2016 and 2022.



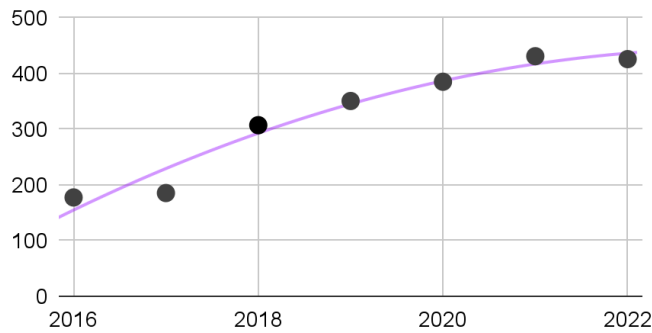
Solids

The figure below shows the time evolution of energy from firewood in Canton Sarajevo. According to the energy balances reports firewood ¹⁴made up 37% of total energy carried by solid fuels in the year 2022 while in the year 2016 fire wood made up only 16%. Lignite coal on the other hand has followed an opposite trend. In 2015 lignite coal made up 63% of the energy carried in solid fuels while in 2022 the share was 47%.

¹⁴ As discussed during the two day workshop in Sarajevo, firewood is probably the least well and fully recorded and reported in the canton's energy balance due to problems of illegal logging and trade.



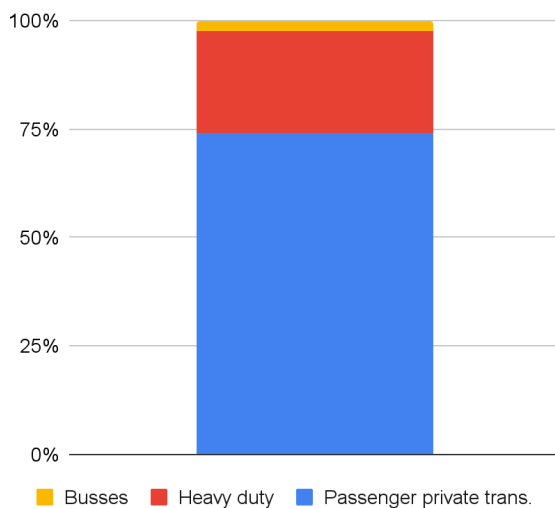
Firewood usage (TJ)



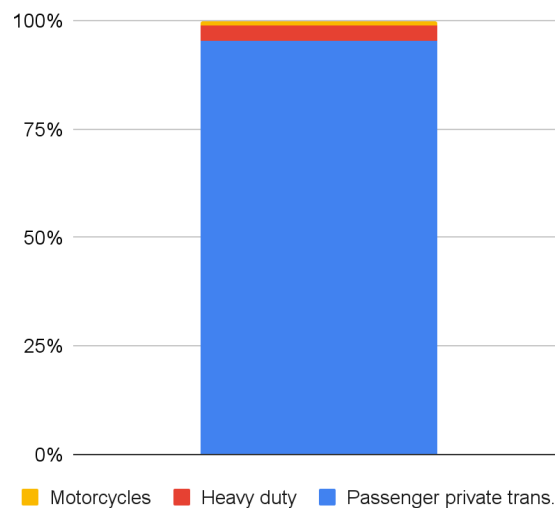
Transport energy disaggregation

Given the data caveats reported in the methodological details (see section [Main assumptions on transport disaggregation of energy emissions](#)) it is not possible to develop a time series of energy usage in transport disaggregated to its main contributors. The disaggregation is done for Private passenger transport (e.g., cars and vans), Buses, Heavy duty transport (e.g., trucks) and motorcycles (see figure below).

Diesel in the transport sector (2022/Tj)

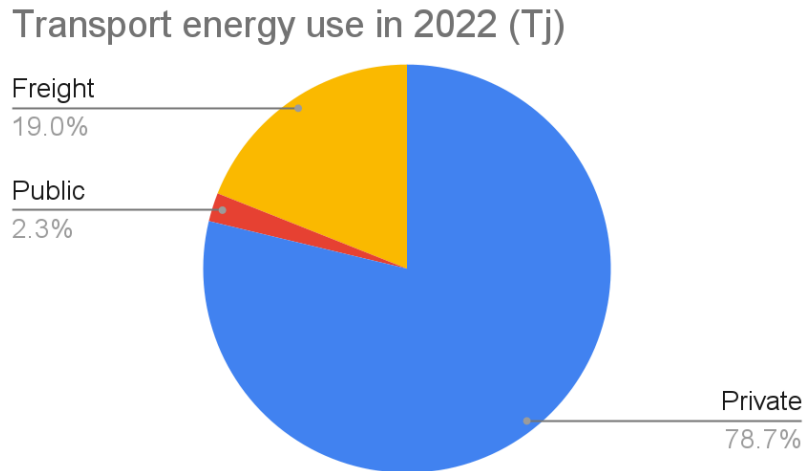


Gasoline in the transport sector (2022/Tj)



Private passenger transport is the dominant activity consuming both diesel and gasoline in Canton Sarajevo. An estimated 75% of diesel is used for this purpose while gasoline is estimated at 95%. Heavy duty transport is responsible for about 25% of diesel energy usage while buses a mere 5%. Aggregation of results for 2022 along the energy use for

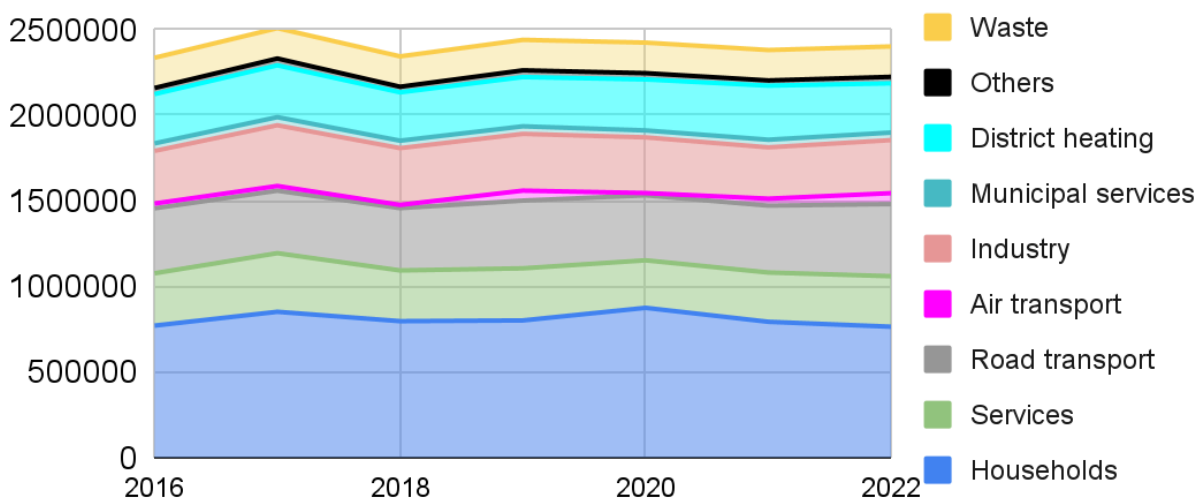
Private, Freight and Public transport (the latter including also the amount of electricity for trams and trolleybuses) is shown in the figure below.



Reflecting the intermediate calculation by fuel, the transport energy demand in Canton Sarajevo is dominated by private transport, making up nearly 79% of the total energy use. Public transport accounts for only about 2% while freight transport 19%.

Aggregate emissions in Canton Sarajevo

CO₂e emissions 2016-2022 (tons)



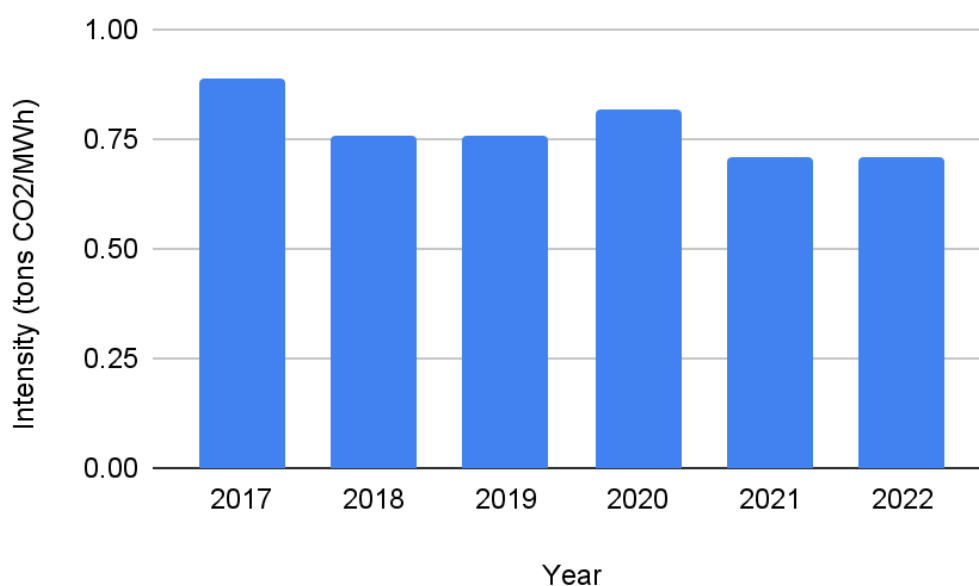
Methodological details

Fuel/sources & emissions factors

Electricity

Electricity consumption is provided for the categories "Households", "Others", "Public lighting", "High v (35kV)" and "High v (10kV)". MWh of electricity is converted to TJ by assuming 1 megawatt-hour to TJ = 0.0036 TJ. Emissions from electricity production are calculated by assuming that the electricity mix reaching FUA Sarajevo is the same as that of Bosnia and Herzegovina. An electricity production intensity in CO₂e/Mwh was determined using [national data on production and emissions sourced by the IEA](#) (see figure below).

Production intensity of electricity



Between the years of 2017 and 2021 the emissions intensity of the electricity production in Bosnia and Herzegovina decreased on average by about 5% a year but with marked annual variability. For example from 2018 to 2019 there was virtually no change while the intensity increased in 2020. Most likely this is connected to the annual variability of electricity production from hydro.

Gas

Gas usage is available for the categories "Households", "Industry", "Health", "Education", "Religious", "Public institutions", "Trade", "Hospitality, and tourism sector" and "District heating". Sm³ of gas is converted to TJ by assuming 1 Sm³ = 0,000034TJ. CO₂ emissions from the combustion of 1TJ of natural gas are taken from the Sarajevo 2008 SECAP and equal to 56.99 tonCO₂ /TJ. As for CH₄ missions, these are estimated at 0.005 tonsCH₄/TJ, this value is taken from [IPCC 2006 Guidelines for National Greenhouse Gas Inventories](#).

Liquids

Liquid fuel usage is available for the categories "Diesel", "Gasoline", "LPG", "LUEL", "Keronese/Avio-goriva", "Mazut/Ostala-LU". Litters of fuels are converted to TJ by assuming:

- 1l Diesel = 0.000035 TJ
- 1l Gasoline = 0.000032 TJ
- 1l Kerosene = 0.000034 TJ
- 1l LPJ = 0.000028 TJ
- 1l Fuel oil = 0.000038 TJ

Fuel oil factor is used for the "Mazut/Ostala-LU" while for the others there is a direct correspondence. CO₂ emissions from the combustion of liquid fuels are determined using the following factors:

- Fuel oil = 71.83 tonCO₂/TJ
- LPG = 63.89 tonCO₂/TJ
- Mazut = 78.23 tonCO₂/TJ
- Lignite = 101.2 tonCO₂/TJ
- Gasoline = 70.08 tonCO₂/TJ

- Diesel = 73.91 tonCO₂/TJ

Emission factors are taken from Sarajevo 2008 SECAP. For the case of CH₄ emissions, a common emission factor of 0.005 ton CH₄/Tj is used following [IPCC 2006 Guidelines for National Greenhouse Gas Inventories](#).

Solids

Usage of solid fuels is available for the categories "Brown coal", "Lignite coal", "Wood coal", "Wood briquettes", "Wood pellets", "Firewood", and "Others". Tons of solid fuels are converged to TJ by assuming:

- 1 ton Brown coal = 0.014 TJ
- 1 ton Wood coal = 0.0258 TJ
- 1 ton Lignite = 0.02 TJ
- 1 ton Firewood = 0.0037 TJ

Values are taken from [UN statistics](#). CO₂ emission from the combustion of solid fuels are taken from the Sarajevo 2008 SECAP and are equal to:

- Lignite 101.2 tonCO₂/TJ
- Wood 112.0 tonCO₂/TJ

CH₄ emissions are determined via the following factors sourced from the [IPCC 2006 Guidelines for National Greenhouse Gas Inventories](#).

- Lignite 0.010 ton CH₄/TJ
- Wood 0.3 ton CH₄/TJ

Waste

Waste production is not included in the above mentioned energy balances. Hence the approach to determine GHG emissions from this activity differs from the previous ones. Firstly the total amount of municipal waste is calculated via a multiplication of annual population estimates with the average per capita waste generation in the Canton and the City of East Sarajevo respectively According to the Institute of statistics of Sarajevo Canton and the data received from the JKP Rad the estimated average quantity of

municipal waste generated over the last 5 years was 420 kg per capita annually, or 1.15 kg per capita per day. Data provided by the Net Zero Coordinator of the City of East Sarajevo, including the SECAP document from 2024, indicate a lower than BIH average¹⁵ annual per capita waste generation, at 305 kg. Data estimates of population for the Canton of Sarajevo and the City of East Sarajevo are taken from the [Institute of statistics of FBiH](#) and [Institute of Statistics Republic of Srpska respectively](#)¹⁶. Of relevance for emission is the amount of organic fraction contained in the total waste generation and this is the fraction that will be converted to methane when placed in landfill. For the specific case of FUA Sarajevo, the organic fraction was set at 0.31 (31%) as indicated in the SECAP from 2024 and adjusted and adjusted via personal communication with Net Zero Coordinator of the City of East Sarajevo on Mon 26 Feb 2024.

CH4 emissions are determined via the application of the standard method as described in the "[Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories](#)" published by the IPCC (see figure below). The standard method requires the definition of a set of core parameters, most of which are given in the above mentioned document.

- Methane correction fraction = 0.6
- Organic fraction = 0.42
- Fraction of CH4 in landfill gas = 0.5
- Conversion of C to CH4 = 1.33
- Fraction of DOC dissimilated = 0.5
- Recovered CH4 = 0

¹⁵ According to the [Agency of Statistics of BiH](#), the estimated quantity of municipal waste generated in 2018 was 355 kg per capita annually, or 0.97 kg per capita per day.

¹⁶ Data has been adjusted to account for the fact that the Municipality Sokolac disposes waste in the Canton and East Sarajevo landfills.

EQUATION 1

$$\text{Methane emissions (Gg/yr)} = (\text{MSW}_T \bullet \text{MSW}_F \bullet \text{MCF} \bullet \text{DOC} \bullet \text{DOC}_F \bullet F \bullet 16/12 - R) \bullet (1 - \text{OX})$$

MSW _T :	total MSW generated (Gg/yr)
MSW _F :	fraction of MSW disposed to solid waste disposal sites
MCF:	methane correction factor (fraction)
DOC:	degradable organic carbon (fraction) (kg C/ kg SW)
DOC _F :	fraction DOC dissimilated
F:	fraction of CH ₄ in landfill gas (IPCC default is 0.5)
16/12:	conversion of C to CH ₄
R:	recovered CH ₄ (Gg/yr)
OX:	oxidation factor (fraction – IPCC default is 0)

Fuel/sources and emissions factors

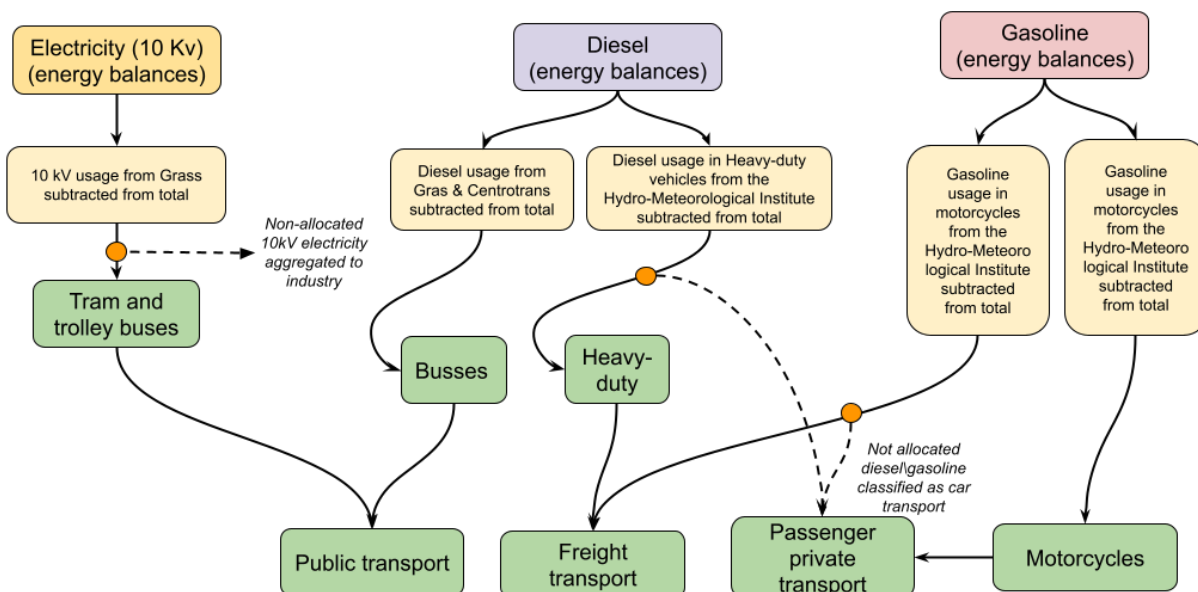
The compilation and further details on emissions and conversion factors used can be found in tab “factors” of the general GHG template sheet access to which is available upon request.

Main assumptions on transport disaggregation of energy emissions


For the transport sector, extra granularity is added by making use of auxiliary data detailed in section Auxiliary data on transport energy, access to which is available upon request. The rationale and disaggregation schemes are detailed as follows.

For the case of electricity we make use of the total consumption to operate the fleet of tram and trolley buses from Gras as the total of public transport electricity usage in Canton Sarajevo. In the year 2022 the operator used 8637 MWh of 10kV high-voltage electricity, equating to circa 3% of the Canton’s total usage of this type of electric current. To annual value of electricity consumption provided by Gras we add the typical loss-factor of electricity provided in the energy balances (see tab fuel/source(Tj) in the GHG template, access to which is available upon request.) in order to estimate the gross electricity needed to operate the tram and trolleybus fleet of Gras. The energy and respective emissions associated are then allocated to the public transport sector while

the remaining 10kV is allocated to industry as we failed to have more clarity on the potential end consumer of this type of electricity.



A similar approach is used to allocate diesel usage by the two bus operators in Canton Sarajevo to public transport. In this case the diesel consumption was summed and subtracted from the total usage reported in the energy balances documents (see figure above). Under this assumption, from 2016 to 2022 the consumption of diesel in Canton Sarajevo for public transportation ranged between 120 Tj in the year 2022 and 83 in the year 2020. The share of diesel used for public transport was on average 1.7% of the total diesel energy reported in the energy balances. This value is compared to that of diesel usage in buses reported in [Calculation of pollutant emissions from mobile sources - road traffic in the Federation of Bosnia and Herzegovina for 2022 \(HM 2022\)](#) published by the Federal Hydro-Meteorological Institute. The differences between the two approaches were significant. According to Gras and Centrotans the joint usage of diesel in their fleets totaled 3420673 liters in 2022. Estimates of the Hydro-Meteorological Institute place this value at 814000, circa 4 times lower. Accordingly, while in the Hydro-Meteorological Institute estimates buses make up only 0.6% of total diesel consumption in Canton Sarajevo, comparing the numbers from the operators to the total diesel reported in the energy balances delivers a value of 2.7%. In this report the values of diesel consumption provided by the operators are taken as more reliable as they derive directly from the source.



Regarding diesel usage in heavy duty vehicles (aka HDV) it was not possible to source data directly from operators and hence it was necessary to rely on a secondary approach. In the absence of better data the 2022 values of diesel consumption for HDVs reported in [HM 2022](#) were taken. The remaining diesel fraction that was not allocated to buses nor HDV is assumed to be used in private transportation. The same approach was applied in the case of gasoline. Values, in liters, for year 2022 estimated for HDVs and Motorcycles were subtracted from the total liters of gasoline reported in the Energy Balance reports. The remaining non-allocated gasoline is assumed to be used in private transport. Comparing the total gasoline values in the energy balances and in [HM 2022](#) reveals a very close match. In 2022 the energy balance reports a total gasoline consumption of 43158550 liters while in [HM 2022](#) gasoline consumption is 43509375, a difference of only about 1%. This provides more confidence in the approach taken.