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Kosovo's first and voluntary Nationally Determined Contributions (NDC)

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Executive Summary

By presenting its first and voluntary NDC, Kosovo is emphasizing its full commitment to contributing to regional and global efforts in combatting climate change by enacting efficient policies to curb emissions and increasing resilience to climate hazards. This report provides a detailed account of Kosovo's climate policy ambitions in the areas of climate change mitigation and adaptation, presenting policies and measures in both domains against the background of the country's geographic and social context.

Kosovo's commitments to the Green Agenda for the Western Balkans and the Decarbonization Roadmap of the Energy Community set the stage for the country's ambitions when it comes to **climate change mitigation**. The legislative framework for achieving these commitments has been outlined in several laws, including the recently adopted Climate Change Law. Concrete policies and measures towards the implementation of these commitments are outlined in sectoral strategies such as the Climate Change Strategy or the Energy Strategy, including most notably the partial phase out of lignite-based electricity generation and the large-scale promotion of renewable energy sources through, for example, auctions.

This voluntary NDC provides a comprehensive account of these policies and measures, including policies and measures across all sectors of the economy from energy over waste management to agriculture and forestry. Together with additional policies and measures based on Kosovo's National Energy and Climate Plan (NECP), the analysis presented in this NDC shows that Kosovo has the potential to reduce its emissions **by up to 42%[1] by 2030 compared to 2016 levels, conditional with access to climate finance. As for the set goal in the NECP, unconditional to access to multilateral climate finance, Kosovo has a target to reduce its annual GHG emissions by 16.3% for 2030, compared to 2016 levels, specifically bringing it down to 8.95 Mt CO2-eq by the year 2030.**

In terms of **climate change adaptation,** the NDC showcases the urgent need for building resilience, as Kosovo is already affected by manifold climate hazards whose effects will intensify in the future. First steps in this regard are taken in several sectoral strategies such as the Climate Change Strategy or the Agriculture Strategy that contain adaptation policies which form the basis for the adaptation part of this NDC. Key measures in this regard include green infrastructure promotion and reforestation, but also awareness-related measures such as the implementation of a heat-warning system. In addition, the Climate Change Law sets the basis for the development of a dedicated Adaptation Strategy in which these avenues will be explored further.

[1] The measures described in this document are part of a voluntary and conditional Nationally Determined Contribution (NDC). Apart from those approved at the government or parliamentary level through sectoral strategies, these measures are not commitments for which Kosovo assumes legal obligations and are not budgeted at the central level. Therefore, the goal of reducing emissions by 42% under the NDC depends on Kosovo's access to multilateral climate funds. If Kosovo is not included in multilateral climate funds and other international mechanisms, then it does not aim to reduce emissions beyond the level defined in sectoral strategies and consequently in the National Energy and Climate Plan (NECP). Within the NECP, a document that needs to be drafted because Kosovo has a legal obligation under the Energy Treaty, Kosovo aims to reduce annual greenhouse gas (GHG) emissions by 16.3% compared to 2016 levels, keeping emissions below 8.95 Mt CO2-eq.

This NDC outlines Kosovo's significant ambitions and potential when it comes to climate change mitigation, as well as pathways for policy actions towards urgently needed climate change adaptation measures to build resilience. Realizing this potential is, however, **conditional** on being able to access the necessary **financial means**, which amount to an estimated **2.9 billion Euros** of uncovered investment needs until 2030 for mitigation policies only. In this regard, the NDC also emphasizes Kosovo's unique position as the country is currently not a member of UNFCCC, leaving it without access to many important international climate finance mechanisms. This underscores the need to explore new avenues for obtaining the financial resources necessary for realizing the potential outlined in this NDC.

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List of Abbreviations

AFOLU	Agriculture, Forestry and other Land Use
BAU	Business as Usual
BCM	Billion Cubic Meters
BESS	Battery Energy Storage System
BRS	Building and Renovation Strategy
CEFTA	Central European Free Trade Agreement
CH_4	Methane
CO_2	Carbon Dioxide
DH	District Heating
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
EPC	Engineering, Procurement, and Construction
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign Direct Investments
FOLU	Forestry and other Land Use
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEIA	Gender Equality Impact Assessments
GHGs	Greenhouse Gases
Ha	Hectares
HFCs	Hydrofluorocarbons
IAMO	Leibniz Institute of Agricultural Development in Transition Economies
IMCCS	International Military Council on Climate and Security
IMF	International Monetary Fund
IPPU	Industrial Processes and Product Use
KAS	Kosovo Agency of Statistics
KCCC	Kosovo Climate Change Council
KEK	Kosovo Energy Cooperation
KEPA	Kosovo Environmental Protection Agency
KfW	Kreditanstalt für Wiederaufbau
$ktCO_2eq$	Kilotonnes of Carbon Dioxide Equivalent
LEAP	Low Emissions Analysis Platform
MAFRD	Ministry of Agriculture, Forestry and Rural Development
MCC	Millenium Challenge Corporation
MCM	Million Cubic Meters
ME	Ministry of Economy
MESPI	Ministry of Environment, Spatial Planning, and Infrastructure
MIET	Ministry of Entrepreneurship and Trade

MRV	Monitoring, Reporting and Verification System
MSMEs	Micro, Small and Medium Enterprises
MSW	Municipal Solid Waste
$MtCO_2eq$	Million Tonnes of Carbon Dioxide Equivalent
MW	Megawatt
MWh	Megawatt hours
N_2O	Nitrous Oxide
NDC	Nationally Determined Contributions
NECP	National Energy and Climate Plan
PV	Photovoltaics
PPP	Public Private Partnership
RES	Renewable Energy Sources
SC	Subcommittee
SCCA	Scenario Climate Change A
SCCB	Scenario Climate Change B
SDGs	Sustainable Development Goals
SIDBS	Strategy for Industrial Development and Business Support
TWh	Terawatt hours
UAA	Utilized Agricultural Area
UN	United Nations
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
USAID	US Agency for International Development
WAM	With Additional Measures
WB	World Bank
WBIF	Western Balkans Investment Framework

1. Introduction

The Republic of Kosovo (hereafter: Kosovo) is fully committed to contributing to regional and global efforts in combatting climate change by enacting efficient policies to curb emissions and increasing resilience to climate hazards. Having committed to the Green Agenda for the Western Balkans, Kosovo is committed to setting out a path towards a carbon neutral economy. As a signatory party to the Energy Community Treaty and by adopting the Decarbonization Roadmap by the Energy Community Ministerial Council in November 2021, Kosovo has shown preparedness to align its legislation and policies with European parties to achieve this goal.

This ambition becomes concrete in the draft National Energy and Climate Plan (NECP) that Kosovo submitted to the Energy Community Secretariat in 2023. A final version is expected before the end of 2024. The NECP summarizes decarbonization policies set out in key strategic documents such as the Climate Change Strategy and sectoral strategies, clearly indicating how Kosovo is planning to achieve the set ambitions.

While Kosovo is not yet a signatory party to the UNFCCC or the Paris Agreement, the country has decided to put forward a voluntary Nationally Determined Contributions (NDC) to showcase its efforts and contributions towards both regional and global decarbonization efforts, as well as a more resilient trajectory. As such, this voluntary NDC will make Kosovo's contributions towards achieving the defined 2030 targets more transparent, thereby positioning the country as a responsible global actor in the fight against climate change.

To this end, the voluntary NDC will present Kosovo's policy plan across two key domains: climate change mitigation policies, aiming at reducing greenhouse gas emissions related to human and economic activities in the country and climate change adaptation, aiming at reducing potential damages resulting from climate change. In doing so, the NDC ensures the inclusivity needed to work effectively on decarbonisation and resilience, taking into account gender-responsive approaches, human rights obligations (incl. children rights) and peace-positive climate action to address the growing national security risks of climate change on social cohesion and socio-economic stability.

As will become clear, Kosovo's legislative framework and strategic documents already contain a wide range of policy measures. Additional policies will equip the country to reduce emissions by up to 42%[2] by 2030 compared to 2016 levels, while at the same time building the resilience needed to face climate hazards.

[2] The measures described in this document are part of a voluntary and conditional Nationally Determined Contribution (NDC). Apart from those approved at the government or parliamentary level through sectoral strategies, these measures are not commitments for which Kosovo assumes legal obligations and are not budgeted at the central level. Therefore, the goal of reducing emissions by 42% under the NDC depends on Kosovo's access to multilateral climate funds. If Kosovo is not included in multilateral climate funds and other international mechanisms, then it does not aim to reduce emissions beyond the level defined in sectoral strategies and consequently in the National Energy and Climate Plan (NECP). Within the NECP, a document that needs to be drafted because Kosovo has a legal obligation under the Energy Treaty, Kosovo aims to reduce annual greenhouse gas (GHG) emissions by 16.3% compared to 2016 levels, keeping emissions below 8.95 Mt CO2-eq.

These ambitions are presented against the backdrop of the specific context Kosovo finds itself in. This includes not only the geographic and socio-economic background of the country, but also its difficult situation when it comes to climate finance. Not being a member of UNFCCC excludes Kosovo from many key funds for financing its climate policy ambitions. For the mitigation part only, around 2.9 billion Euros of the total estimated needs of 4.9 billion Euros until 2030 are not yet secured, making it necessary to explore new avenues for securing the funds required to realize the ambitions outlined in this NDC.

This NDC report is structured as follows: **Chapter 2** outlines the national circumstances that form the background for the development of this voluntary NDC. **Chapter 3** presents the mitigation domain, outlining the policies planned and their emissions reduction potential. The adaptation domain is illuminated in **Chapter 4**, focusing on the agriculture, forestry and other land use (AFOLU) and the population and settlement sectors when it comes to climate risks and adaptation measures. Key success factors for implementation of the ambitions outlined in this voluntary NDC are presented in **Chapter 5,** also illuminating the challenge of accessing climate finance. **Chapter 6** concludes by providing an outlook into Kosovo's further climate policy trajectory based on this voluntary NDC.

2. Country context and characteristics

This chapter provides the basis for the present voluntary NDC by introducing the national circumstances under which the ambitions presented here have been developed and will be implemented. This includes, most notably, geographic and climate conditions (2.1.), socio-economic conditions (2.2.), climate policy commitments (2.3.), access to climate finance (2.4.) and the NDC development process (2.5.).

2.1 Geographic and climate conditions

Kosovo is the youngest independent state in Europe. The country lies landlocked in the centre of the Balkan Peninsula (in Southeast Europe), bordered by Albania, Montenegro, Serbia and North Macedonia. Kosovo is surrounded by mountains: The Sharri Mountains located in the south and southeast; the mountain ranges of Bjeshkët e Nemuna (Accursed Mountains, part of the Albanian Alps) in the west; and the Kopaonik Mountains in the north.

With a land area of 10,905.25 km^2, Kosovo has a comparatively small territory which is distinguished by its bent relief and characteristic topography, consisting of high peripheral mountains on the one hand which differ according to their extent, exposure and shape.[3] On the other hand, the country is marked by hilly areas, mountain and pit fields as well as valleys traversed by water courses which have influenced the formation of the hydrographic network and the development of the plant world.

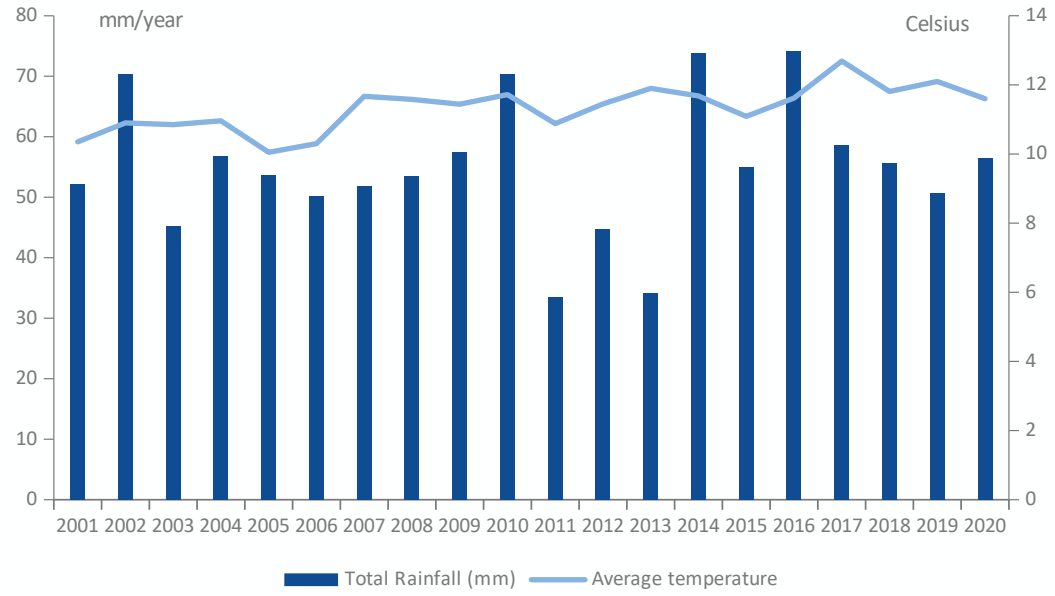
[3] Ministry of Environment and Spatial Planning, Institute for Spatial Planning (2010), Spatial Plan of Kosova Spatial Development Strategy 2010-2020.

Water resources in Kosovo are limited.[4] The country is divided into four river basins: Drin, Ibri, Morava e Binçës, and Lepenci.[5] The main rivers in Kosovo are the Drin, which flows toward the Adriatic Sea; the Morava river in the Gollak area; and the Ibri in the north. Sitnica, a tributary of the Ibri, is the longest river lying completely within Kosovo. Several small natural glacial lakes are found in the high mountains, but Kosovo's most important lakes are artificial: Ujamni Lake (380 million m³); Radoniqi Lake (113 million m³); Batllava Lake (40 million m³) and Badovci Lake (26 million m³).[6]

In terms of biodiversity, Kosovo is distinguished by its rich flora, fauna and vegetation as well as the presence of relict, endemic and other important species.[7]

Kosovo's climate is largely continental, resulting in warm summers and cold winters with Mediterranean and Alpine influences. Temperatures in the country range from +30°C in the summer to -10°C in the winter. However, due to uneven elevations in some parts of the country, there are changes in temperature and rainfall distribution. The mean annual temperature (2001-2020) was 11.3°C, with a mean precipitation of 54.8 mm.[8]

Figure 1: Total annual rainfall and annual average temperature



Source: Kosovo Agency for Environmental Protection (KEPA) 2020

Climate change is projected to affect these conditions in Kosovo, with impacts already being felt today. Even in a scenario where global average temperatures only slightly exceed the targets of the Paris Agreement, average surface temperatures in Kosovo are projected to increase by two degrees compared to last century. In the case of larger

[4] World Bank, Kosovo Water Security Outlook: https://documents1.worldbank.org/curated/en/496071548849630510/Water-Security-Outlook-for-Kosovo.pdf

[5] Kosovo Environmental Protection Agency (2020), The State of Water in Kosovo Report.

[6] Review of the State Water Strategy 2023-2027 and the Action Plan 2023-2025

[7] USAID (2018), Kosovo Biodiversity Analysis.

[8] KHMI, Meteorological data, monthly average 2001-2020

increases, average temperatures are estimated to risega by up to 6.5°C. By the end of the century, this temperature increase would bring several adverse effects to the region, such as the appearance of hot days at higher altitudes, an increase of 20-30 hot days at lower altitudes, 2-5 more heat waves per year with a prolonged duration of 5-15 days. In addition to an expected increase in temperatures, precipitation patterns are being influenced by climate change too, with the estimated drop in rainfall levels ranging from -6% to -23%[9].

2.2 Socio-economic conditions

Kosovo is an upper-middle-income country which has experienced strong economic growth over the last decade, with a nearly 50% increase in per-capita income and a 35% reduction in the poverty rate. The unemployment rate in 2023 was 11.5% with women and young people aged 15-24 being mostly affected by unemployment[10]. At the same time, the Labour Force Participation Rate was at 38.6%[11].

Kosovo's population is the youngest in Europe. 66.1% of the population is between 15 and 64 years old and the average life expectancy in Kosovo is estimated to be at 76.7 years. In 2023 the natural increase was positive, as the number of births exceeded the number of deaths by 4,248. Overall, however, the population is on a declining trend due to ongoing emigration trends as well as a declining birth rate.

With a population of about 1.8 million[12] and a resulting density of around 162.70 inhabitants per km^2, Kosovo is comparatively densely populated. In comparison to the average density of the other countries in the region, Kosovo is twice as densely populated. The country has experienced a strong urbanization trend: While the percentage of the population that lived in rural areas was 62% in 2011, urban areas have grown a lot in the past decade with less than 45% of the population living in rural areas today. The largest city is the capital Pristina, home to an estimated population of around 200,000. Other major cities include Prizren, Gjilan, Peja and Mitrovica. Since 2017, the population density of Kosovo is on a declining trend, reflecting the high emigration rate the country is experiencing and manifesting in a growing Kosovar diaspora.

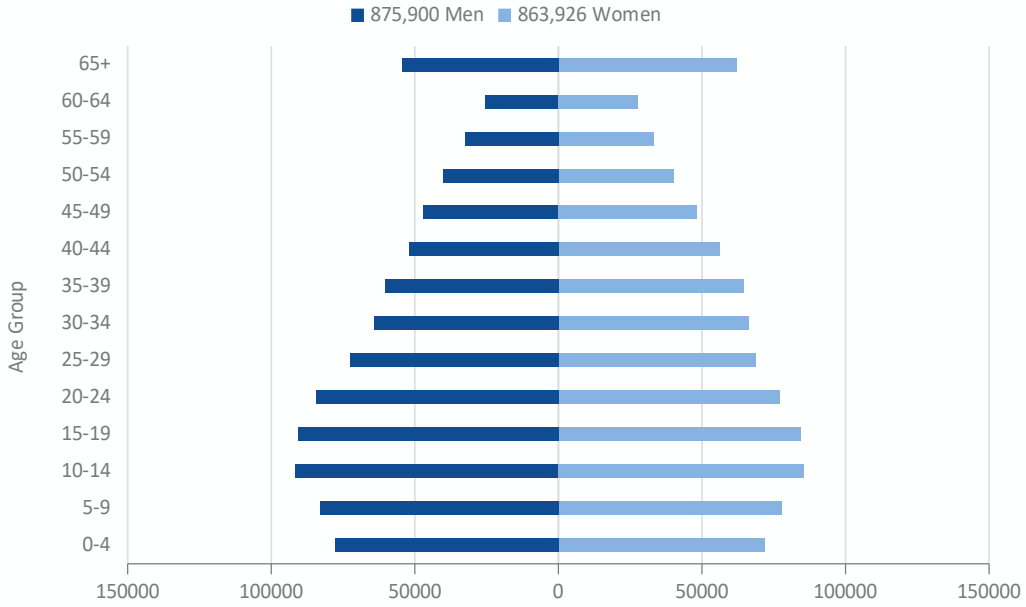
Figure 2: Population of Kosovo in 2011

[9] World Bank Climate Change Knowledge Portal. https://climateknowledgeportal.worldbank.org/.

[10] Kosovo Agency of Statistics, Key Indicators

[11] Kosovo Agency of Statistics, Results of the Labor Force Survey (LFS), 2022

[12] This number is based on the last nationwide census conducted in 2011. A new census is currently being carried out, with first estimations indicating a decline in the population since 2011.



Source: Kosovo Agency of Statistics (KAS) 2011

Since 1999, Kosovo has been transformed from a centralist and controlled economy to a free-market economy. Kosovo is a member of CEFTA, IMF and the World Bank. Over the past years, Kosovo has successfully transitioned away from a growth model based on high dependence on foreign aid inflows, outperforming peer countries of similar per-capita income thanks to a steady expansion in consumption and investment, with a strong impetus from diaspora inflows, public investment in infrastructure, and financial deepening, amid a stable fiscal stance and an environment of low inflation.

Kosovo's main economic sectors for 2023 were: services (trade and IT), industry and construction. For 2024, Kosovo foresees an increase of 4.2% in the country's economic activity as a result of domestic demand – consumption and investments – as well as exports. The economic contribution of the agriculture sector has been slightly increasing over the past year, in 2022, the sector's share of GDP was at 7.4%[13].

For 2023, the GDP per capita is estimated at 5,519 EUR. Inflation, which peaked at 11.6% in 2022, declined to 5% in 2023 and is expected to continue declining in 2024. Among the key drivers of growth in 2023 were public investment and public as well as private consumption, the latter also fuelled by the strong remittances' inflows into Kosovo. In 2023, remittances inflows amounted to 1.3 bn Euros and thus 14% of GDP.[14] FDI inflows also mark a record high, amounting to 9% of GDP in 2023. Real estate and leasing activities are the largest beneficiaries of FDI, followed by financial services and energy. Nevertheless, challenges remain, relating for instance to the large imbalance between goods imports and exports and resulting current account deficit. In addition, the lack of formal recognition by some countries and international organizations poses barriers for doing business.

[13] MAFRD (2023). Green Report. https://www.mbpzhr-ks.net/repository/docs/Green_Report_2023.pdf.

[14] Central Bank of Kosovo, Time Series, Remittance inflows by channel.

Kosovo's European perspective shapes its development trajectory and context. In this regard, the Stabilization and Association Agreement (SAA) between the EU and Kosovo was signed in Strasbourg in October 2015 and entered into force on April 1, 2016. In the course of 2016, the joint institutional structures of the SAA between the EU and Kosovo were established to monitor its implementation. The relevant structure for the discussion of topics around environmental protection and climate change is the Subcommittee (SC) on Environment, Climate Change, Energy, Transport and Regional Development. The conclusions of the 8th SC meeting, among many jointly agreed conclusions, include various climate change measures to further align climate change legislation and policies with those of the European Union. Kosovo formally submitted its application for EU membership in December 2022.

2.3 Climate policy commitments

Kosovo is strongly committed to contributing to the global fight against climate change, among others as a signatory to the Sofia Declaration on the Green Agenda, which aligns Kosovo and other Western Balkan countries with the EU Green Deal. By signing the Sofia Declaration on the Green Agenda for the Western Balkans, Kosovo (and other WB countries) has committed to a number of actions such as market-based renewables support schemes.

Although Kosovo is not a signatory to Agenda 2030 and the Sustainable Development Goals at the UN General Assembly because of its status as a non-member, Kosovo took the decision to join global efforts to embrace sustainable development and the SDGs. The implementation of Agenda 2030 and the SDGs, which has been voluntary in this context, is ensured through the Kosovo Assembly's January 2018 adoption of a parliamentary resolution endorsing the SDGs.[15]

Additionally, as a member of the Energy Community, Kosovo is required to transpose core EU climate, energy and environmental legislation and implement the Clean Energy Package targets adopted by the Energy Community Ministerial Council. The Energy Community is an international organisation bringing together the EU and a number of non-EU neighbouring countries to create an integrated regional energy market on the basis of a legally binding framework. The Energy Community goals include to establish a path towards achieving climate neutrality by 2050 and decreasing dependence on fossil fuels in the shorter term. Thus, as a signatory of the treaty, by 2030, Kosovo's climate policy ambitions include: emissions reduction by 16.3% compared to 2016[16]; the transitioning of the energy sector from a highly lignite-based system to at least 32% of gross final energy consumption from renewables; implementing ambitious mitigation measures in key sectors like the electricity sector, buildings sector (residential, public and commercial buildings), agriculture, forestry and other land-use (AFOLU) and waste.

To that end, Kosovo has developed ambitious climate policies in key strategic documents:

[15] Kosovo Assembly, Resolution on the adoption of Sustainable Development Goals (No.06-R-001)

[16] 2016 is the base year used for Kosovo in the calculation of the percentage reduction figure in the Decision No 2022/02/MC-EnC of the Ministerial Council of the Energy Community (see ANNEX XIV TARGETS FOR NET GREENHOUSE GAS EMISSIONS IN 2030 and respective footnotes 1 and 3 on p. 6 of the Decision document).

- As a cornerstone for policy action in the mitigation and adaptation space, Kosovo drafted and approved its **National Climate Change Strategy 2019-2028**.
- The **Energy Strategy 2022 – 2031** commits to finding potentials for phasing out coal; achieving a higher target for renewable energy sources; ensuring a just and affordable transition; incorporating innovation and technology and strengthening cyber resilience in the energy sector.
- Kosovo's first **Law on Climate Change** (08/L-250 approved on January 2024) aims to improve environmental protection through the prevention and control of greenhouse gas emissions from a wide range of industrial, transportation, agricultural and other sources. In addition, the Climate Change Law also provides the legislative provision for the mandate of the Kosovo Climate Change Council (KCCC) and its technical secretariat as a means for strengthening Kosovo's institutional arrangements for addressing climate change. The KCCC was established with support of UNDP and is also the initiator of the process to develop a voluntary NDC.

All these important strategic documents form the basis for the **National Energy and Climate Plan (NECP)** and this **voluntary Nationally Determined Contributions (NDC)**, which have been drafted in parallel and in close coordination.

The NECP is mandatory in the context of Kosovo's membership in the Energy Community. As a cross-sectoral document, the NECP outlines policies and measures needed across all sectors of the economy to achieve energy and climate targets and provides a framework to implement the 2030 targets defined by the Ministerial Council. Kosovo has submitted its draft NECP for the period 2025-2030 in July 2023 and a final version is expected before the end of 2024.

In contrast to the NECP, Kosovo is not obliged to develop an NDC as it is not a signatory party to the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement. Nevertheless, Kosovo has decided to voluntarily develop an NDC to showcase it ambitions and resolve to contribute to the global fight against climate change (see section 2.5.). The voluntary NDC presented in this document is closely aligned with the NECP (see also chapter 3) and thus with all the relevant sectoral strategic documents of Kosovo.

2.4 Access to international mechanisms for climate finance

The ambitions set out in Kosovo's key strategic and legislative documents, and mirrored in this NDC, require substantial financial resources for successful and timely implementation. For mitigation policies only, uncovered financial needs are estimated at 2.9 billion EUR until 2030 (see Chapter 3).

In acquiring these financial resources, Kosovo has been successful in securing funds from international donors. A few prominent examples include:

- The total **EU funding** for the energy and environment sector from 2014 to 2023 surpassed EUR 370 million (EUR 220 milllion for energy projects and EUR 150 million for environmental projects).[17] Energy projects supported include the following: the rehabilitation of the district heating network in Prishtina,

[17] EU infographic – Energy and Environment (2023).

construction of a biomass-based heating plant in Gjakova, support to the Kosovo Energy Efficiency Fund. Environmental projects supported were: waste management schemes, infrastructure facility for waste storage in Kosovo, construction of water treatment plant for regional water company 'Prishtina'.

- **The Western Balkans Investment Framework (WBIF)** has supported Kosovo with EUR 297 million grants, out of which EUR 180.8 million were allocated for sustainable transportation, EUR 79 million for clean energy and EUR 31.5 million for environment and climate (the rest for human capital, digital future and private sector competitiveness).
- The **International Monetary Fund (IMF)** through the Resilience and Sustainability Facility Arrangements made available about EUR 78 million to support Kosovo's climate change mitigation and adaptation efforts including through greener electricity production and more efficient energy use.[18]
- The **European Bank for Reconstruction and Development (EBRD)**, to date, has invested over EUR 660 million in Kosovo through 108 projects.[19] EBRD is implementing the Kosovo-Denmark Partnership for Green and Just Energy Transition project financed by Danish funds of EUR 27.5 million.[20]

However, the fact that Kosovo is not yet fully integrated into the global climate agenda limits Kosovo's access to many of the key international funding mechanisms and support opportunities for national or regional projects in the context of climate change mitigation and adaptation. This includes, but is not limited to, funding mechanisms connected to the UNFCCC, such as the Global Environment Facility (GEF), the Green Climate Fund (GCF) or the Adaptation Fund. Thereby, Kosovo is in a disadvantaged position compared to other countries in the region and beyond. For instance, from the GEF alone, the other Western Balkan-6 countries (Albania, Bosnia and Herzegovina, Montenegro, North Macedonia and Serbia) have received around one billion EUR in total funds for climate policy since the inception of the fund.

Kosovo's voluntary initiative to develop an NDC showcases the awareness and importance the country attaches to playing its part in the global fight against climate change. Yet, its competing priorities, low budget, and exclusion from important international climate change mechanisms make this transition a little harder. As such, the voluntary NDC can serve as a showcase for Kosovo's ambitions to tackle climate change in order to attract financing which are imperative for the country.

2.5 Process of NDC development and stakeholder involvement

With the support of the United Nations Development Programme (UNDP), Kosovo initiated the process of drafting the voluntary Nationally Determined Contribution (NDC). This made it possible for Kosovo representatives to present key policy ambitions at COP28 in Dubai in November 2023, where positive feedback for the initiative was received by representatives of different countries.

[18] International Monetary Fund (November 16, 2023), Press release No.23/396

[19] European Bank for Reconstruction and Development: https://www.ebrd.com/news/2024/ebrd-eu-and-japan-boost-residential-energysaving-investments-in-kosovo.html.

[20] Kosovo-Denmark Partnership for Green and Just Energy Transition

In January 2024, Kosovo adopted its first Law on Climate Change, which enhances Kosovo's commitment to combat climate change and sets the legislative basis for the NDC (Article 18). As such, on January 13, 2024, the NDC Working Group was established by the Minister of Environment, Spatial Planning, and Infrastructure with the mandate to design the methodology and draft the NDC.

The Working Group consists of representatives from different ministries and agencies: Ministry of Environment, Spatial Planning, and Infrastructure (MESPI), Kosovo Environmental Protection Agency (KEPA), Ministry of Industry, Entrepreneurship and Trade (MIET), Ministry of Economy (ME) and Ministry of Agriculture, Forestry and Rural Development (MAFRD).

In addition to the Working Group, the voluntary NDC has undergone a process of public consultation, including the publication of the document for comments and the public presentation of the draft to stakeholders and the wider public including children and youth. The youth consultation process was jointly organized with UNICEF. The draft was also presented to and discussed with the Kosovo Climate Change Council (KCCC).

Throughout the process of the NDC's development, UNDP and Berlin Economics supported the Working Group with research and identifying priority sectors based on the availability of data, drafting the document, and finalizing the document after incorporating comments of stakeholders following the consultation process.

3. Mitigation

Key takeaways:

1. By 2030, Kosovo has the **potential to reduce emissions by up to 42%**[21] compared to 2016 levels, **conditional upon access to climate finance (NDC scenario)**

2. To implement the additional policies and measures needed to realize this potential, **additional financing needs** are estimated at **EUR 2.9 billion**

3. Existing policies and measures for which funding is already secured **(BAU scenario)** are **close but not sufficient** to meet Kosovo's 2030 decarbonization targets

3.1 Mitigation commitments: Key strategic and legislative documents and emissions reduction targets

As a signatory party to the Energy Community Treaty and by adopting the Decarbonization Roadmap by the Energy Community Ministerial Council in November 2021, Kosovo has shown preparedness to align its legislation, climate commitments and policies with European and global parties. On December 15, 2022, the Energy Community Ministerial Council approved Decision 2022/02/MC-EnC, which outlines the 2030 energy and climate targets for Contracting Parties. According to the **Decarbonization Roadmap**, Kosovo is mandated to achieve a reduction of -16.3% in net greenhouse gas emissions by 2030 compared to 2016 levels. In absolute terms, this translates to limiting emissions to 8.95 $MtCO_2eq$ by 2030. Furthermore, as per the Energy Community Ministerial Council Decision 2022/02/MC-EnC, Kosovo is mandated to limit its 2030 final energy consumption to 1.8 Mtoe and primary energy consumption to 2.7 Mtoe. These commitments altogether underscore Kosovo's dedication to combating climate change and aligning with international efforts to foster a sustainable future.

Table 1: Energy Community 2030 Targets for Kosovo

Target/objective	
GHG emissions reduction (compared to 2016 levels)	-16.3% / to 8.95 $MtCO_2eq$
Share of renewable energy in gross final energy consumption	32%
Primary energy consumption	2.7 Mtoe

[21] The measures described in this document are part of a voluntary and conditional Nationally Determined Contribution (NDC). Apart from those approved at the government or parliamentary level through sectoral strategies, these measures are not commitments for which Kosovo assumes legal obligations and are not budgeted at the central level. Therefore, the goal of reducing emissions by 42% under the NDC depends on Kosovo's access to multilateral climate funds. If Kosovo is not included in multilateral climate funds and other international mechanisms, then it does not aim to reduce emissions beyond the level defined in sectoral strategies and consequently in the National Energy and Climate Plan (NECP). Within the NECP, a document that needs to be drafted because Kosovo has a legal obligation under the Energy Treaty, Kosovo aims to reduce annual greenhouse gas (GHG) emissions by 16.3% compared to 2016 levels, keeping emissions below 8.95 Mt CO2-eq.

Final energy consumption	1.8 Mtoe

Kosovo has reinforced its environmental stewardship by pledging support for the **Global Methane Pledge**. This international commitment, designed to curb methane emissions, highlights Kosovo's dedication to addressing climate change on a global scale. The pledge aims to collectively reduce global methane emissions by 30% by 2030, relative to 2020 levels[22].

Moreover, Kosovo has also endorsed the **Global Renewables and Energy Efficiency Pledge** at COP28 and the **Declaration to Triple Nuclear Energy Capacity by 2050** at COP29, thereby underscoring Kosovo's commitment to contributing to the collective goal of the Paris Agreement. The **Global Renewables and Energy Efficiency Pledge**, endorsed by 133 signatories, aims to triple global installed renewable energy capacity and double energy efficiency measures by 2030[23].

In practice, Kosovo has created a solid **legal framework** in recent years to promote energy efficiency and decarbonisation efforts in various sectors. The adoption of the laws listed below testifies the determination of Kosovo in promoting the sustainability of its energy system and pursuing its climate pledges:

- Law on Thermal Energy No. 05/L -052
- Law on Energy No.05/L-081
- Law on Energy Regulator nr.05/L-084
- Law on Electricity No.05/L-085
- Law on Energy Performance of Buildings No. 05/L-101
- Laws on Energy Efficiency No.06/L –079, No.04/L –016
- Law on Promotion of Renewable Energy Sources No.08/L-258

Additionally, Kosovo aims to achieve its climate targets by implementing a wide array of policies and measures envisioned in several key strategic and legislative documents:

1. The **Energy Strategy of the Republic of Kosovo 2022–2031** outlines a dedicated commitment to explore potentials for a coal phase out, setting ambitious targets for renewable energy adoption. Additionally, the strategy prioritizes ensuring a just and affordable transition by protecting and empowering consumers, promoting innovation and technology disruption into the Kosovar energy system.

2. An initial **draft NECP** has been submitted to the Energy Community Secretariat, delineating comprehensive policies and measures for fostering a low-carbon, regionally integrated and secure energy system. A final version for the 2025-2030 period is expected before the end of 2024. One of the key scopes of the NECP is to design a policy roadmap to reach its decarbonisation targets.

3. The development of the **Long-Term Decarbonisation strategy** draft is currently underway. The document analyses potential pathways for Kosovo to reach climate neutrality of the economy by the year 2050 in line with the Sofia Declaration on the

[22] https://www.globalmethanepledge.org.

[23] https://www.cop28.com/en/global-renewables-and-energy-efficiency-pledge.

Green Agenda for the Western Balkans and the ambitions levels of EU member states.

4. The **Climate Change Law**[24], adopted in 2024, is a testament to the resoluteness and determination of Kosovo in contributing to global climate change mitigation efforts. The main purpose of the Law is "to define duties and responsibilities of state authorities in taking measures aimed at mitigating the effects of climate change, coordination and monitoring their results, as well as the fulfilment of obligations according to international agreements binding for Kosovo".[25] With the adoption of the Climate Change Law, Kosovo has set the legislative framework for the implementation of the greenhouse gases Monitoring, Reporting and Verification System (MRV) and has thereby specified guidelines for the preparation process of the national emissions inventory by including quality assurance and control procedures, with the aim of measuring national progress in climate change mitigation. The Climate Change Law also foresees the establishment of the National Climate Change Council (KCCC), composed by the Ministers of responsible Ministries for the purpose of mitigating and adapting to climate change, as well as a technical secretariat in support of this mission.

5. The **Climate Change Strategy 2019-2028** along with its Action Plan for 2019-2021, establishes a comprehensive framework to address the impacts of climate change, focusing on greenhouse gas emissions reductions and climate change adaptation. The strategy identifies specific sectors contributing to GHG emissions and those impacted by climate change, proposing sector-specific measures for mitigation and adaptation. It also establishes objectives for GHG reduction and climate change adaptation, focusing on building national capacities to meet international obligations, promoting sustainable resource management, and increasing public and private sector involvement. The Strategy will be reviewed and integrated into the newly developed Climate Change Adaptation Strategy in 2025.

6. The **Kosovo Strategy for Agriculture and Rural Development 2022-2028** focuses on enhancing the agri-food sector's competitiveness and sustainability, alongside the sustainable management of natural resources, and boosting rural area businesses to improve employment and social infrastructure.

7. The **Kosovo Multimodal Transport Strategy 2023-2030** aims to enhance the sustainability, integration, and efficiency of the transport system, aligning with the EU's Zero-Emission vision and Green Agenda. It focuses on developing robust infrastructure across road, rail, and air transport to provide seamless, and eco-friendly transportation options.

8. A new **Strategy on Renovation of Buildings** is currently under development, which includes a wide range of energy efficiency measures. A critical objective of the strategy is to renovate 3% of the public buildings per year with state-of-the-art energy efficiency standards and certification schemes. The target is also a conditional element for the National Growth Plan under development.

[24] Republic of Kosovo (2023) – Law No. 08/L-250 on Climate Change

[25] Republic of Kosovo (2023) – Law No. 08/L-250 on Climate Change

9. The Kosovo **Integrated Waste Management Strategy (2024-2035)** and **Action Plan (2024-2026)** aims to develop a sustainable, integrated approach to waste management that safeguards public health and minimizes environmental impact by reducing greenhouse gases emissions.

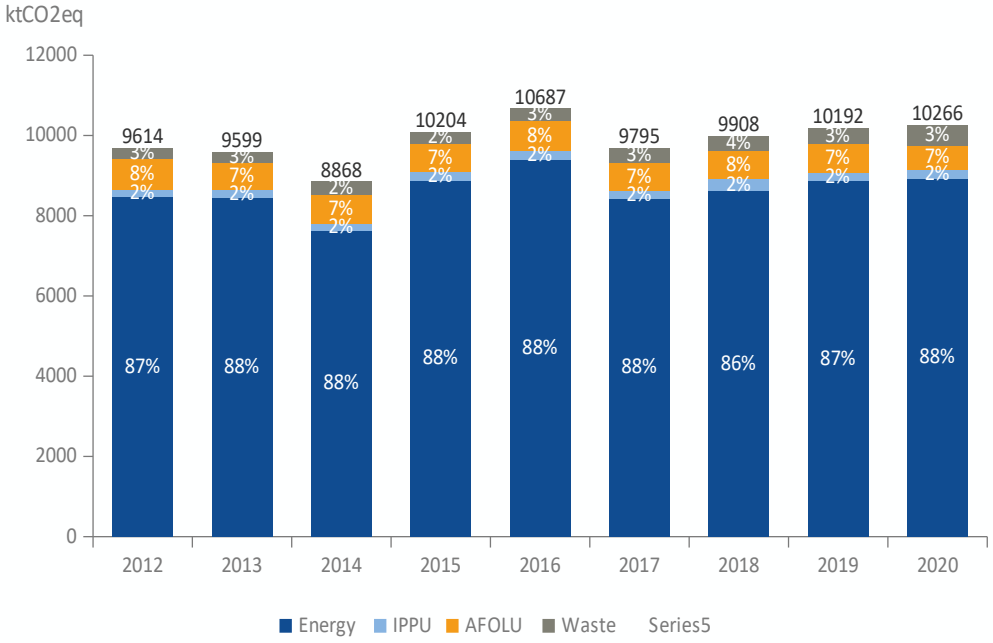
10. The **Policy and Strategy on Forestry Development in Kosovo (2022-2030)** plays a vital role in Kosovo's environmental strategy, emphasizing sustainable forest management and biodiversity conservation. This strategy is designed to enhance forest health and productivity, contributing significantly to carbon sequestration efforts. By improving forest management and increasing the area of sustainably managed forests, the strategy aims to boost the ecological stability of these ecosystems and their capacity to absorb CO_2, aligning with Kosovo's climate change mitigation goals.

11. The **Strategy for Industrial Development and Business Support (SIDBS) 2030** focuses on fostering industrial development in Kosovo. A key focus of the strategy is on green industrial development, aimed at transitioning the manufacturing sector towards more sustainable and environmentally friendly practices. The strategy outlines specific objectives, such as the facilitation of green industry and the maximization of domestic value addition, to promote circular strategies, renewable energy use, and efficient resource utilization. Through these objectives, the strategy aims to reduce CO_2 emissions, improve resource circularity, and enhance the overall environmental performance of Kosovo's industrial sector.

3.2 Historical emissions trends

According to the latest GHG inventory data by the Kosovo Environmental Protection Agency (KEPA), Kosovo emitted 10.617 $MtCO_2eq$ in 2021.[26] Compared to 2011, aggregated emissions rose only moderately, by 4.12%.

Figure 3: Estimated emissions by sector (2012-2020)



Source: Definition of base year for GHG emissions estimation for Kosovo (2022)[27] and data provided by KEPA.

The energy sector is the largest emitting sector in Kosovo. According to KEPA, in 2021 the sector accounted for 87% of Kosovo's emissions, while the remaining sectors such as industrial processes and product use (IPPU), AFOLU and waste accounted for the remaining 13% (3%, 7%, 4%, respectively).[28] Energy supply related emissions stemmed primarily from lignite-based electricity and heat generation, the main source of greenhouse gas emissions in Kosovo.

In fact, whilst in 2021 the energy demand sectors (Manufacturing Industries and Construction, Transport, Other Sectors[29]) emitted 2.473 $MtCO_2eq$ (27.6% of total energy)

[26] The year 2021 was chosen as reference year due to comprehensiveness of available data. The figure does not include GHG emissions and removals from the forestry sector, estimated to be a net-negative emitter (Müller et al. (2023) - https://www.german-economic-team.com/publikation/national-energy-and-climate-plan-necp-of-the-republic-of-kosovo-the-afolu-sector/."National Energy and Climate Plan (NECP) of the Republic of Kosovo: The AFOLU sector")

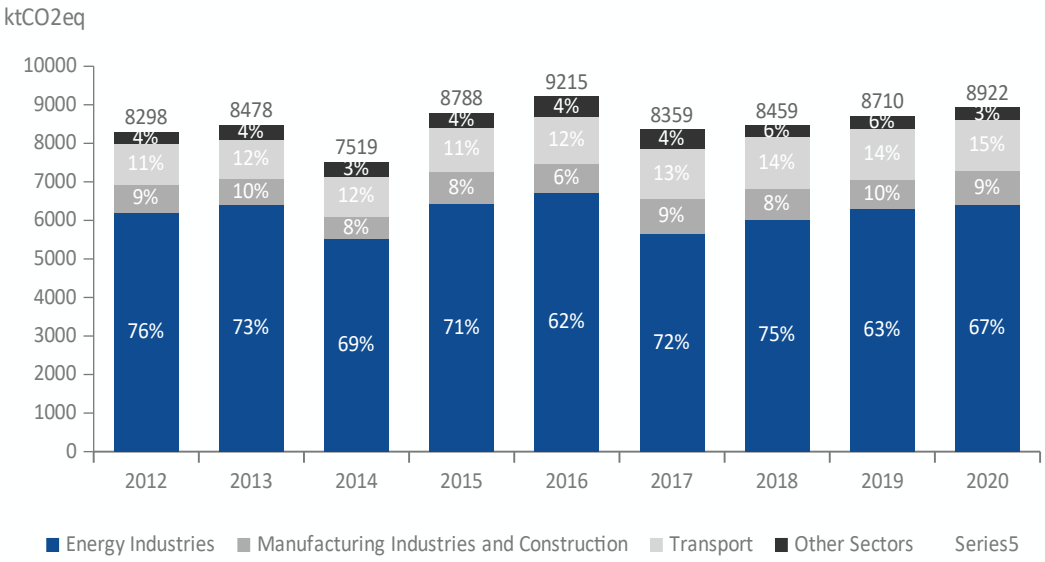
[27] Taseska – Gjorgievska (2022) – Definition of base year for GHG emissions estimation for Kosovo

[28] Kosovo Environmental Protection Agency (2022)- Annual Report on the State of the Environment 2022.

[29] Energy emissions from "Other sectors" include residential buildings, service sector buildings (public and private), agriculture and forestry.

directly, electricity and district heating supply amounted to 6.489 $MtCO_2eq$ (72.4% of total energy).

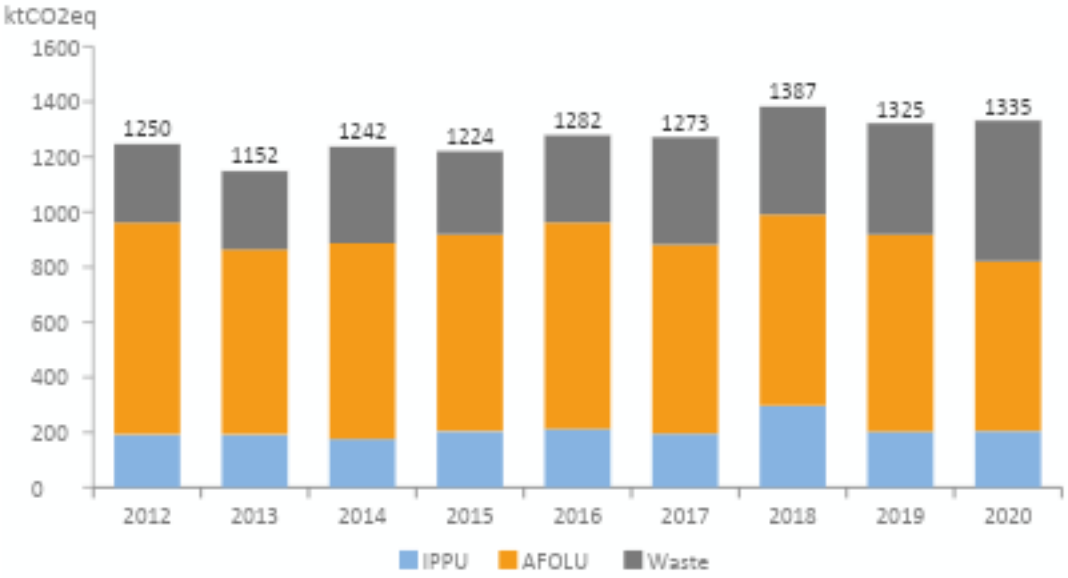
Figure 4: Emission trends from the energy sector (2012-2020)



Source: Definition of base year for GHG emissions estimation for Kosovo[27] (2022) and data provided by KEPA.

Nevertheless, as Figure 4 demonstrates, emissions from the energy sector peaked in 2016 with 9.215 $MtCO_2eq$ and increased overall by 1% in the 2012-2020 period. The increase is to be attributed mainly to the growth in Kosovo's economy and population and only partially dampened by energy efficiency gains.

Figure 5: Estimated emissions from non-energy sector (2012-2020)



Source: Definition of base year for GHG emissions estimation for Kosovo[27] (2022) and data provided by KEPA.

Between 2012 and 2020 emissions from the non-energy sector experienced a modest increase overall. A closer examination reveals that emissions from the AFOLU sector decreased by 3% during this period, with 616 $ktCO_2eq$ emitted in 2020, down from 2012 levels, with about 23% attributable to crop cultivation and 77% attributable to livestock. Whereas the IPPU sector saw a 6% increase in emissions, mainly due to growing activity levels in the industrial sector, amounting to 205 $ktCO_2eq$ in 2020. Emissions from the waste sector surged by 63% over the same timeframe, reaching 513 $ktCO_2eq$ in 2020, significantly impacting the overall trends of the non-energy sector. Growing emissions levels in the waste sector have to be imputed to raising consumption levels in the analysed timeframe and to resulting higher levels of municipal solid waste production.

In 2021, carbon dioxide (CO_2) stood out as the primary greenhouse gas contributing significantly to national emissions, accounting for 88% of the total. Following closely were methane (CH_4) emissions at 10%, primarily stemming from the non-energy sector. The remaining emissions were attributed to the release of nitrous oxide (N_2O) and Hydrofluorocarbons (HFCs) into the atmosphere, summing up to 2% of the aggregate emissions (see Figure 6).

Key takeaways:

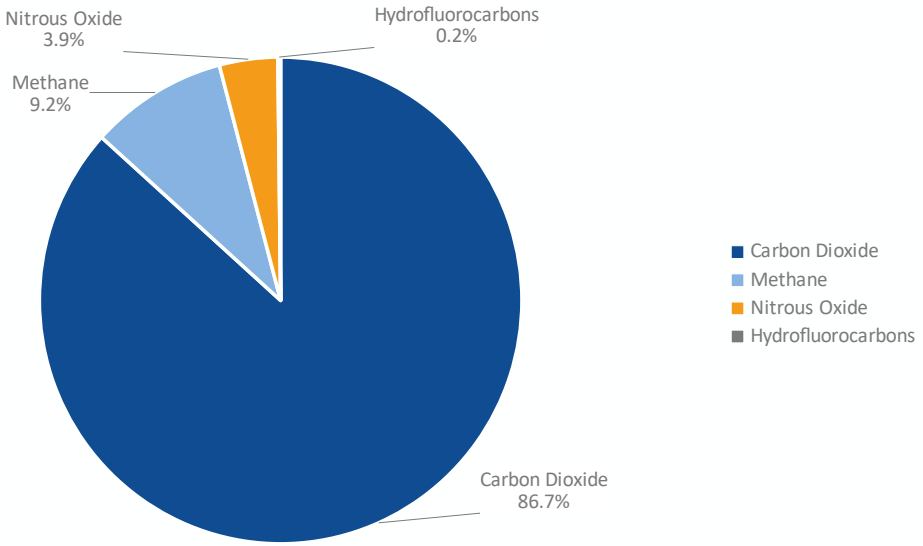
1. Emissions level of Kosovo in 2021[30] (base year): **10.617 $MtCO_2eq$**

2. Only **modest increase** in emissions over the past decade (2011 – 2021)

3. **Energy sector** as the main emitter (87% of total emissions), of which the largest share is emitted by the energy supply sector (electricity generation and district heating)

[30] At the time of publication of the document, the year 2021 was the latest year for which comprehensive data was available.

Figure 6: Disaggregation of the 2021 emissions stock into different greenhouse gases



Source: Definition of base year for GHG emissions estimation for Kosovo[27] (2022) and data provided by KEPA.

3.3 GHG Projections

This section illustrates the detailed development of the national GHG inventory and the impact of mitigation efforts of Kosovo's policies and measures.

3.3.1 Scenario design

For the purpose of quantifying the impacts of policies and measures, two core scenarios were developed in the framework of Kosovo's NDC:

- The **Business-As-Usual (BAU) scenario** serves as a baseline scenario and depicts the emissions pathways up to 2040 resulting from the implementation of policies and measures for which financial resources are available. The business-as-usual measures are based on the most recent strategic and legislative documents and action plans. Aggregated emissions levels in this scenario are influenced by the natural rate of change of the underlying emissions factors (e.g. technological progress).

- The **NDC scenario** contains emissions projections resulting from the adoption of additional mitigation measures, which are conditional on the availability of additional funding. The NDC scenario is in line with the most recent "With Additional Measures" (WAM) scenario developed as part of the National Energy and Climate Plan (NECP). This scenario features all the policies and measures adopted in the latest legislative and strategic documents of related sectors as well as additional policies and measures needed to reach all the targets of the Energy Community Clean Energy Package.

3.3.2 Modelling framework

The Low Emissions Analysis Platform (LEAP) is utilised to project Kosovo's future emissions pathways. LEAP is a widely adopted tool for constructing models, offering a user-friendly approach to assess integrated energy and environmental outcomes across different scenarios as key drivers evolve in time. The model uses the year 2021[31] as a baseline and contains annual energy demand projections up to 2040. Non-energy related emissions are also included in the LEAP model.

The energy supply side, encompassing electricity and district heating generation, transmission and distribution, is modelled in a custom-built sector-coupled techno-economic dispatch optimisation model based on the open-source energy systems modelling framework Calliope[32], and is soft-coupled with LEAP. The supply side model represents hourly supply and demand for district heating and electricity in all continental European countries including Great Britain and Ireland.[33] Modelling Kosovo's energy supply as part of the integrated European energy system allows to accurately represent

[31] At the time of publication of the document, the year 2021 was the latest year for which comprehensive data was available.

[32] Pfenninger, S., & Pickering, B. (2018). Calliope: a multi-scale energy systems modelling framework. *Journal of Open Source Software, 3*(29), 825.

[33] Excluding the Russian Federation and Belarus.

trade flows and policy interactions with neighbouring countries as well as the European Union.

3.3.3 Key assumptions

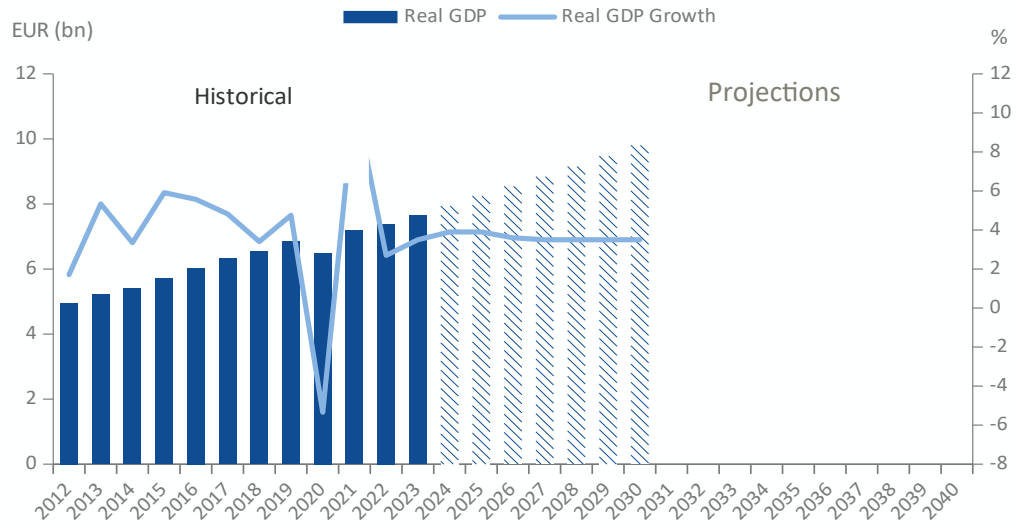
To isolate the effects of policies and measures and ensure comparability across scenarios, both the BAU and the NDC scenarios share key assumptions in terms of key demographic and economic data, which fundamentally influence energy and emissions forecasts.

Economic indicators are proven predictors of the development of energy demand in a country. In the model, there is a linkage between projected productivity levels and energy demand in sectors like freight transport, industry, industrial processes emissions, etc.

The economic data utilized for the model was sourced from the International Monetary Fund's World Economic Outlook as of April 2023[34], whose forecast spans until 2028. A projection averaging the growth rate over the IMF's forecast (2023-2028) is added to the timeseries.

As Figure 7 shows, Kosovo's GDP in 2021 reached EUR 7.2 billion, experiencing a notable 10.7% real growth rate driven by post-pandemic recovery. Projections indicate sustained growth above 3.5% annually until 2028, stabilizing thereafter at a constant 3.5% rate until 2040, resulting in a forecasted GDP of EUR 13.83 billion by 2040.

Figure 7: Real GDP and real GDP growth rate 2012-2030



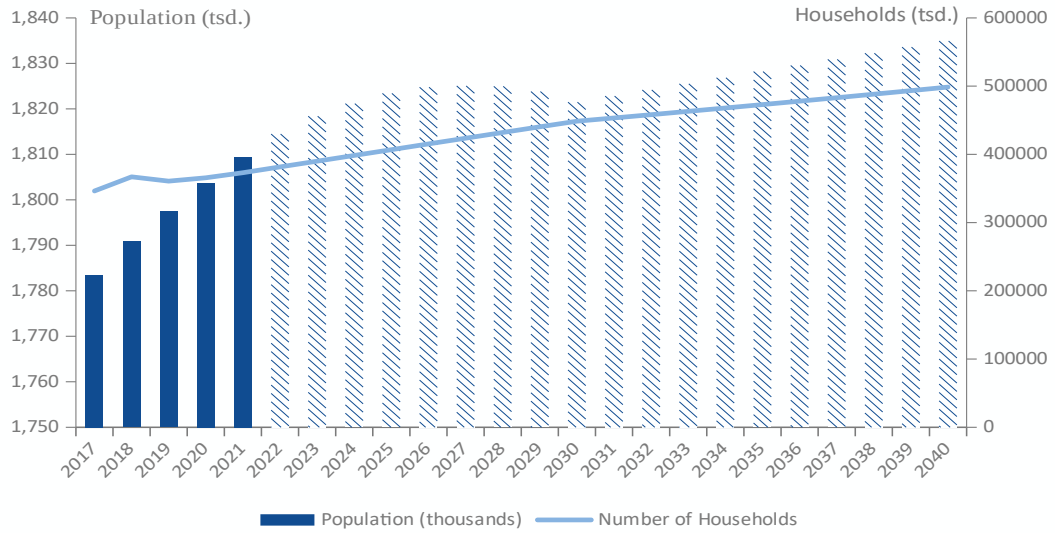
Note: Real GDP forecast from 2024 in dashed blue and corresponding real GDP growth forecast in grey. Source: IMF World Economic Outlook 2023

In addition to economic drivers, demographic dynamics play a crucial role in energy consumption patterns and have a central role in predicting the evolution of emissions pathways. In the model, demographic data is primarily connected to energy demand of the residential, passenger transport and waste sectors. In 2021, it is estimated that

[34] IMF WEO April 2023 - https://www.imf.org/en/Publications/WEO/weo-database/2023/April/

Kosovo had 1.81 million inhabitants residing in approximately 373,000 households, averaging 4.85 inhabitants per household. About 40% of the population in 2021 lived in urban areas and 60% in rural areas; 77.6% of all space heating was provided by solid biofuels, mostly firewood, 18.8% by electricity and 3% by district heating.[35] Utilizing data from the Kosovo Statistical Agency's Population Projection (Medium Variant)[36] a 0.66% increase in population is forecasted in the 2021-2030 period, reaching 1.82 million inhabitants in 2030. Between 2030 and 2040, a compound annual growth rate of 0.074% is projected, leading to a population surpassing 1.83 million by 2040. Figure 8 illustrates the evolution of population and the number of households.

Figure 8: Population Projection of Kosovo (2017-2040)



Source: Kosovo Agency of Statistics, Medium Variant Projection and MESPI

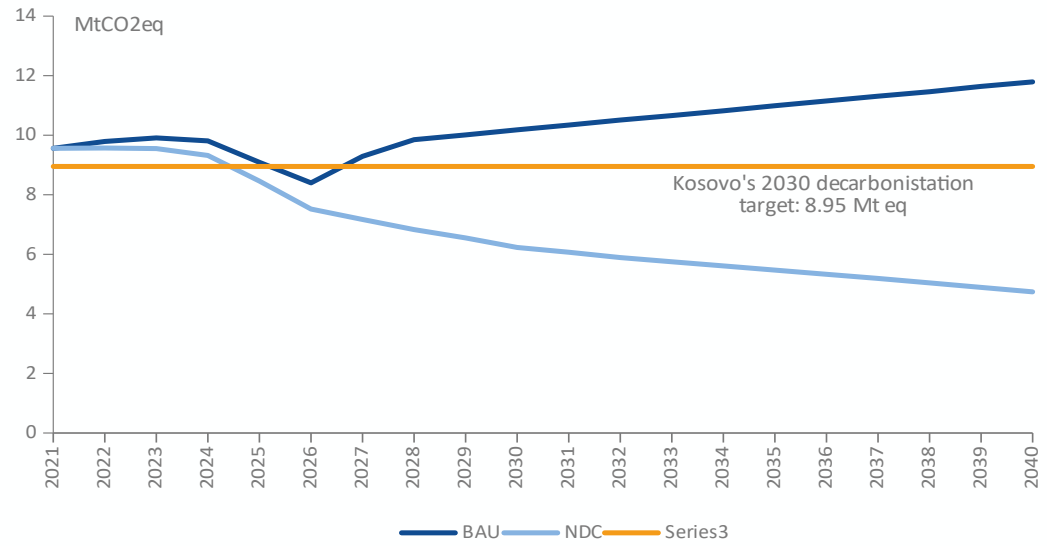
[35] Shares in terms of final energy consumption, source: Eurostat.

[36] Kosovo Statistical Agency - Population Projection (Medium Variant), link: https://askdata.rks-gov.net/pxweb/en/ASKdata/ASKdata__Population__Estimate%2C%20projection%20and%20structure%20of%20population/

3.4 Projected emissions pathways

This section illustrates the development of aggregated GHG emissions in both the BAU and NDC scenarios. It furthermore explores the overall potential for reducing Kosovo's GHG emissions conditional to the financing of additional policies and measures. Figure 9 illustrates the development of both the BAU and NDC scenarios in view of their suitability to achieve the decarbonisation target for 2030.

Figure 9: Projected emissions pathways, NDC and BAU scenarios



Source: MESPI

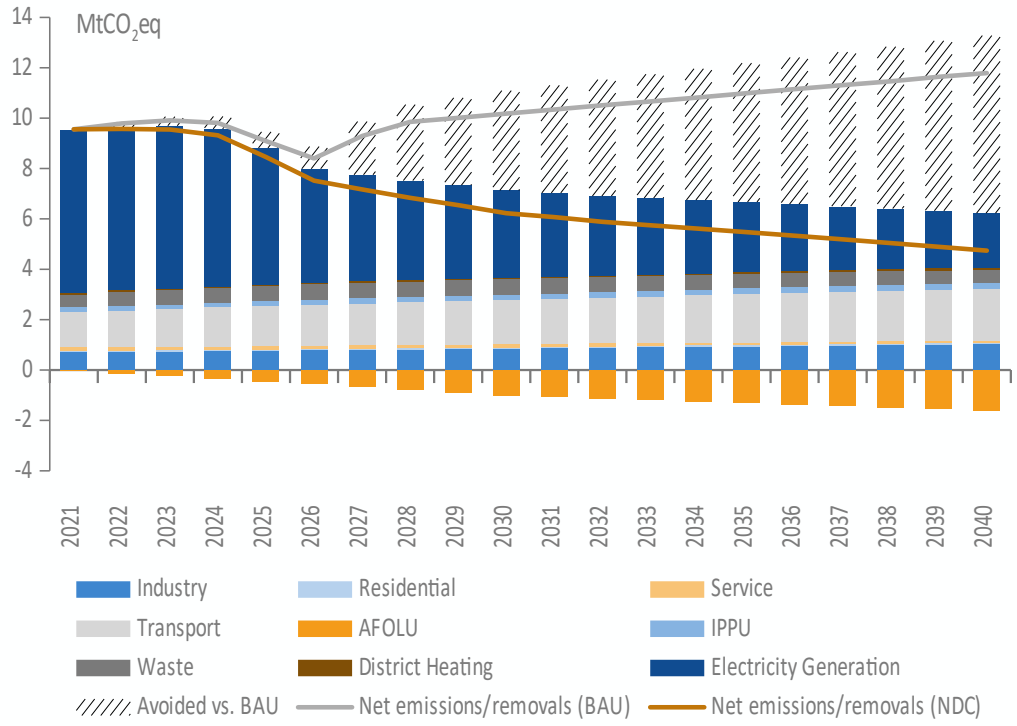
The sharp decline in emissions in both scenarios in 2026 is attributable to lower electricity generation from lignite and to the substantial increase in renewable energy capacity. Moreover, the divergence between the two scenarios after that year testifies the mitigation potential of implementing additional strategies and measures requiring supplementary funding sources.

The projections in Figure 9 reveal that in the BAU scenario, existing policies and measures backed up by financial resources will not be sufficient to achieve the decarbonisation target, with the threshold estimated to be exceeded as early as 2027. Conversely, the NDC scenario, supported by supplementary policies and measures for which additional financing is required, will reach an emissions level of 6225 $ktCO_2eq$ in 2030, thereby reducing emissions by 42%[37] compared to 2016 levels and meet the decarbonisation

[37] The measures described in this document are part of a voluntary and conditional Nationally Determined Contribution (NDC). Apart from those approved at the government or parliamentary level through sectoral strategies, these measures are not commitments for which Kosovo assumes legal obligations and are not budgeted at the central level. Therefore, the goal of reducing emissions by 42% under the NDC depends on Kosovo's access to multilateral climate funds. If Kosovo is not included in multilateral climate funds and other international mechanisms, then it does not aim to reduce emissions beyond the level defined in sectoral strategies and consequently in the National Energy and Climate Plan (NECP). Within the NECP, a document that needs to be drafted because Kosovo has a legal obligation under the Energy Treaty, Kosovo aims to reduce

target. In addition, the trends observed in the NDC scenario demonstrate the potential to reach a climate-neutral economy by 2050. Compared to the BAU scenario, the NDC scenario projects that Kosovo could save 3959 $ktCO_2eq$ (or 39%) in various sectors by 2030. Figure 10 illustrates the emissions pathways in the NDC scenario, disaggregated by sector, and the amount of emissions avoided compared to the BAU scenario.

Figure 10: NDC Scenario: GHG emissions by sector and avoided vs. BAU Scenario



Source: MESPI

In order of importance, the NDC scenario projects that Kosovo could achieve significant emissions abatements in the electricity generation, AFOLU and transport sectors (vs. the BAU scenario, also compare Figure 11).

Emissions abatement in the energy sector is thanks to a wide-ranging set of policies and measures in the NDC scenario aimed at promoting energy efficiency measures in energy demand sectors such as the buildings sector (residential, public buildings and commercial) and the transport sector, as well as an ambitious expansion of clean energy technologies on the supply side. A more detailed overview of key policies and measures in the energy sector will be presented in a dedicated section in Chapter 3.5 as well as in Annex I.

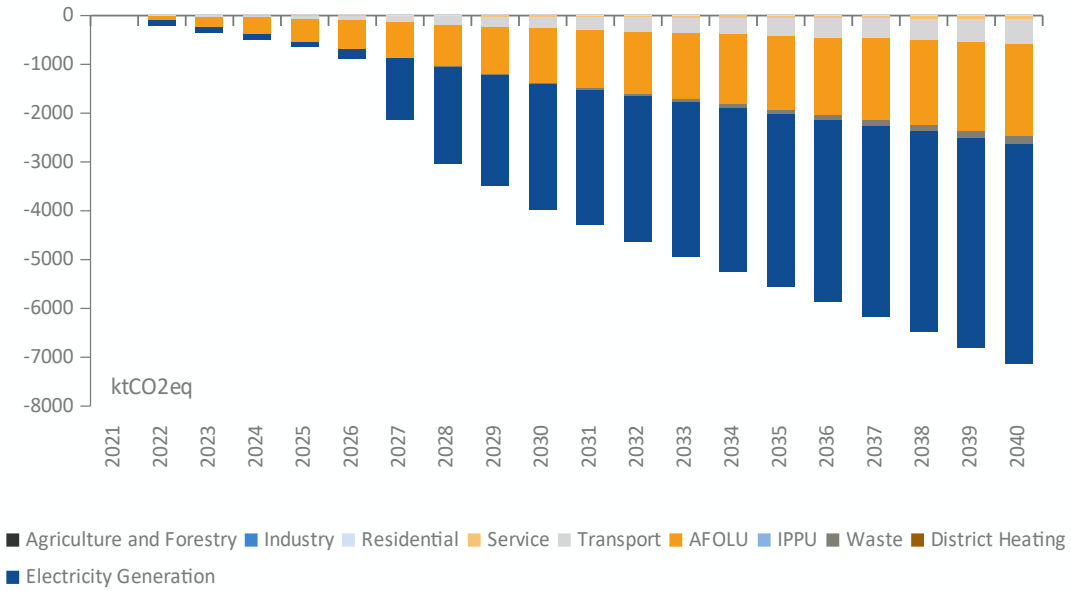
Additional policies and measures in the non-energy sector play an important role in reducing emissions in the NDC scenario, which lead to abatements in the agricultural sector as well as an increase in the sequestration potential of the forestry and other land use (FOLU) sector, including through policies relating to forest protection and enhancement as well as sustainable management of natural resources in agriculture.

annual greenhouse gas (GHG) emissions by 16.3% compared to 2016 levels, keeping emissions below 8.95 Mt CO2-eq.

Finally, a small emissions reduction (vs. the BAU scenario) is projected to be achieved in the waste sector thanks to the establishment of a network of integrated waste management facilities. Both sectoral reductions are presented in more detail in a dedicated section in Chapter 3.6. For the concrete policies and measures, see Annex I.

An overarching picture of the emissions abatement potential of the different sectors is illustrated in Figure 11. Overall, mitigation measures in the electricity demand and supply sector contribute 65% of total emissions reductions (vs. BAU) in 2030, 28% would be achieved in the AFOLU sector, 6% in the transport sector, and 1% in the waste sector, while the other sectors contribute a minor share.

Figure 11: Difference in GHG emissions by sector (direct), NDC vs. BAU scenario



Source: MESPI

3.5 GHG projections for the energy sector

3.5.1 Key projects under implementation

Kosovo's commitment to mitigating climate change in the energy sector is reflected in concrete measures that have already started to be implemented and are reflected in the emissions projections of the BAU scenario. The **first auction** for the installation of **100 MW solar PV** on public land has been successfully completed on March 29th, 2024, closing at EUR 48.88 per MWh. Once operational, the newly installed capacity will contribute substantially to mitigating greenhouse gas emissions from electricity generation in Kosovo. An auction for 75 MW of wind power capacity at a non-specified location is scheduled for late 2024, including a public-private partnership (PPP) component. A second solar PV auction for 200 MW on public land, as well as a second and third wind auction for 75 MW (non-specified location) and 180 MW (on public land), are expected for 2025.

An additional **100 MW solar PV project** owned by Kosovo Energy Corporation (KEK) is scheduled to launch a tender for an engineering, procurement, and construction (EPC) contract in the second quarter of 2025. The project includes a feasibility study for a possible extension of the ongoing project beyond 100 MW. This project is envisioned to contribute significantly to Kosovo's decarbonisation efforts and provide an alternative to

fossil-fuelled electricity generation, while fostering resilience to climate change by integrating renewable energy solutions. The investment is co-financed by KEK, the Western Balkans Investment Framework (WBIF), the European Investment Bank (EIB) and the Kreditanstalt für Wiederaufbau (KfW).

Furthermore, a tender for an EPC contract for a **50 MW solar district heating project in Pristina** is planned in the fourth quarter of 2024 as part of the Solar4Kosovo II project. The project includes solar collectors for thermal energy production, along with seasonal heat storage, and is expected to feed into the district heating systems of DH Termokos. This initiative positions Kosovo as the pioneering country in the region to adopt this technology for district heating and will be one of the largest solar district heating projects in Europe. The project is set to facilitate the addition of 38,000 new consumers to the district heating system in Pristina and will play a significant role in the decarbonization of the heating sector. The investment will be co-financed by the KfW and WBIF. In addition, an ongoing feasibility study by the WBIF explores possibilities for **rehabilitation and upgrading of existing district heat capacity** in Kosovo as well as the **construction of new capacities**, laying the foundation for future projects in this regard.

These renewable energy projects help reduce competition for natural resources and increase resilience to climate impacts. For example, the 100 MW solar PV project provides a sustainable power generation solution that reduces the pressure on fossil fuel resources. The 50 MW solar district heating project not only reduces the use of conventional heating fuels, but also incorporates seasonal heat storage to ensure a consistent and efficient energy supply.

Additionally, tenders for EPC contracts are also planned for a 45 MW (90 MWh) **Battery Energy Storage System (BESS)** in the fourth quarter of 2024 and an additional 125 MW (250 MWh) BESS project for the third quarter of 2025. The BESS investments aim to support Kosovo's energy security and transition to a cleaner energy future by providing frequency restoration reserves (aFRR, mFRR, black start capability), energy arbitrage, and other potential additional energy storage services (such as voltage support) and is supported by the Millenium Challenge Corporation (MCC). BESS will provide the flexibility necessary for Kosovo to enable the integration of additional renewable energy sources and improve the security of supply. All planned renewable energy auctions and tenders for EPC contracts by public institutions are summarised in the "Pipeline of Renewable Energy Investments in Kosovo 2023-2025" published by the Ministry of Economy with support from USAID.

In parallel to the planned investments in renewable energy, KEK plans a **partial phase-out of lignite-powered electricity generation** and a refurbishment of existing capacities to increase the reliability and reduce the environmental impact of the existing thermal power plants. Both units of the Kosovo B plant are planned to be refurbished in 2025/2026, together with an EU funded environmental upgrade project, which includes reduction measures for dust and NO_x, with SO_2 measures added in 2027. Additionally, one unit of Kosovo A is scheduled for refurbishment at the end of 2025, with a decision on whether to refurbish or phase out a second unit to be made by the end of 2024 the latest. The third operating Kosovo A unit will be permanently closed once the refurbishment of the other lignite unit(s) has been completed. The refurbished A unit(s) will operate in a strategic reserve mode from 2031 onwards, meaning these unit(s) would be available in the crucial higher demand heating season, or during extraordinary occasions such as

future energy market shocks. In doing so, the project integrates climate-related security risks into energy planning, as the operation of the rehabilitated units in strategic reserve mode ensures energy security in times of crisis and helps to prevent potential instability and conflict due to energy shortages. In addition, by transitioning to cleaner energy sources and improving existing capacity, the project mitigates transboundary impacts such as pollution and resource conflicts and promotes a more resilient and secure regional environment. In addition, the reduction of emissions following the rehabilitation and environmental upgrades, including greenhouse gas emissions containing PM2.5 and PM10 particles, will have a mitigating effect on the currently very high levels of air pollution in Kosovo. This will have a positive impact on health, especially for the local population living in the vicinity of the TPPs and for vulnerable groups such as children, thus reducing avoidable deaths and economic losses.

Furthermore, under the **Energy Support Package** supported by a EUR 75 million EU grant, the Government has introduced several measures to enhance energy efficiency and reduce GHG emissions with a focus on supporting vulnerable groups. Specifically, measure 3 of the Package allocates EUR 20 million for energy efficiency improvements in residential buildings, providing subsidies for thermal insulation of external walls, thermal insulation of the roof and replacement of external windows and doors. Measure 4, overseen by the Ministry of Economy, provides EUR 10 million for households to invest in energy-efficient appliances, efficient heating systems, water heating solar systems and PV panels. Lastly, micro, small, and medium enterprises (MSMEs) are incentivised to adopt energy-saving technologies with a dedicated EUR 5 million fund, promoting both energy efficiency and decarbonisation indirectly. Investments in behind-the-meter solar PV by households and businesses alone from these measures could reduce grid electricity demand by up to 32.5 GWh per year. The above measures, as they will provide energy efficiency savings, will contribute to Kosovo's decarbonisation mission to the extent that they are displacing electricity generation from lignite.

Last but not least, the Strategy for Industrial Development and Business Support 2030 and related Action Plan support the creation of **green industrial parks** in Kosovo, as well as the facilitation of a **circular and green economy**, including through a window for circular economy innovation within the Innovation Fund and a program for investment in green technology in the manufacturing industry.

While the above projects already under implementation demonstrate Kosovo's proactive actions to invest in renewable energy, energy efficiency, and other cross-sectoral decarbonisation measures, Kosovo will need additional resources to achieve its climate goals, as the next chapter outlines in more depth, to contribute more intensively to global efforts to mitigate climate change.

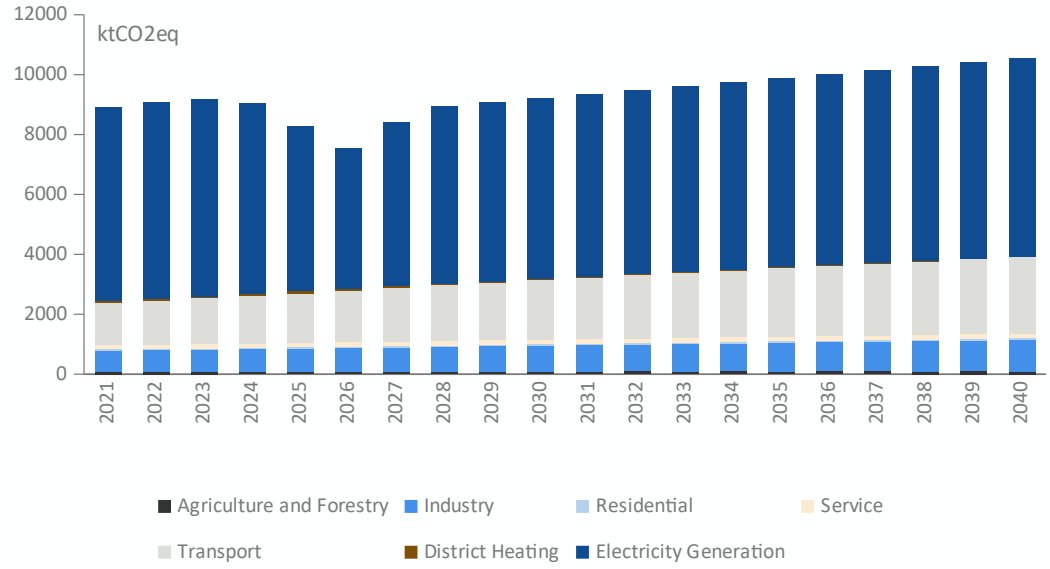
3.5.2 Current situation: sectoral projections & key measures planned

The historical emissions presented in Chapter 3.2 illustrate that the energy sector is by far the largest polluter in Kosovo. Consequently, most climate change mitigation efforts aim to reduce the GHG intensity of this sector. As the previous section highlights, several measures are underway to enhance energy efficiency, increase the share of renewable energy and promote decarbonisation in the energy sector, showcasing Kosovo's commitment to combating climate change.

Figure 12 depicts the projected trajectory of emissions in the energy sector under the BAU scenario from 2021 to 2040. The graph indicates that, despite an inflection during the 2024-2028 period which results from the measures already under implementation, a continuous increase will be observed in the following years. This is due to a growing final energy demand from the transport, residential, and industry sectors, without a continuation of the investments in renewable energy and energy efficiency in the BAU scenario after 2027. In the BAU scenario, both the targets for final and primary energy consumption will not be achieved by 2030: these values are expected to reach 1999 and 2905 ktoe respectively by that year.

This implies that Kosovo could jeopardise the positive effects from the measures already under implementation such as the ones planned in the "Pipeline of Renewable Energy Investments in Kosovo 2023-2025" and in the Energy Support Package in the Energy Support Package, if in the medium term no additional financial resources will be allocated to promote energy efficiency and decarbonisation of the energy system thereafter.

Figure 12: Energy-related emissions by sector (BAU scenario)



Source: MESPI

Overall, the development of energy sector-related emissions as projected in the BAU scenario would compromise Kosovo's ability to become climate-neutral by 2050.

In contrast to the BAU scenario, the NDC scenario assumes a continuation of investments into renewable energy beyond the timeline of the "Pipeline of Renewable Energy Investments in Kosovo 2023-2025" and in line with reaching the targets of the Energy Strategy and the NECP WAM scenario. Importantly, this includes the installation of 600 MW wind power (270 MW more than in the BAU scenario) and 700 MW solar PV (380 MW more than in the BAU scenario) until 2031, including 200 MW of prosumers. See Table 2 below on installed RES capacities for electricity generation by 2030.

An extension of the solar district heating project in Pristina from 50 MW to 70 MW is also foreseen in the NDC scenario. A longer-term pipeline of renewable energy auctions and/or

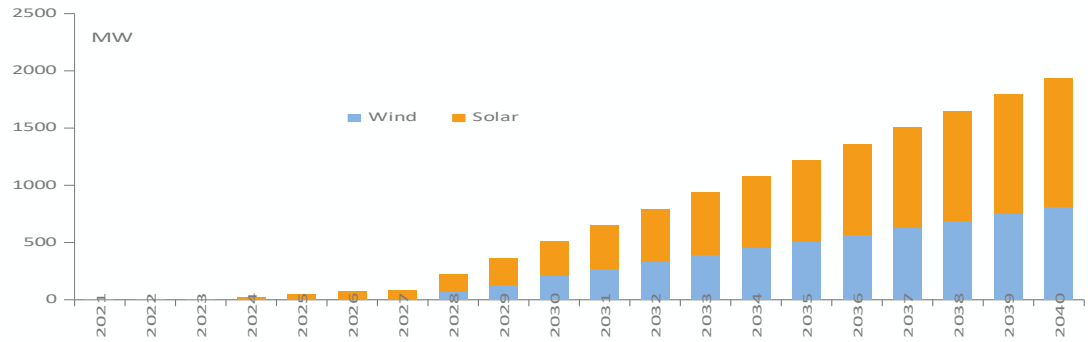
investments by publicly owned enterprises, supported with sufficient financial resources, will be required to reach these targets.

Table 2: RES installed capacity for electricity generation in 2030 by scenario (MW)

Wind	466	675
Solar PV	430	727
Hydro	128	132
Batteries	170	170

Source: MESPI

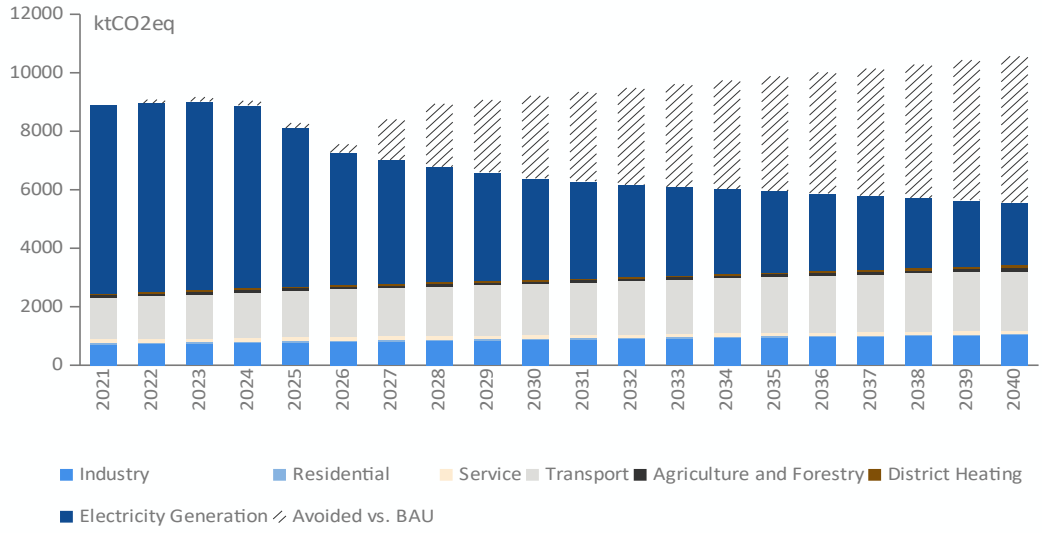
Figure 13: Additional solar and wind capacity in the electricity sector (NDC vs. BAU scenario)



Source: MESPI

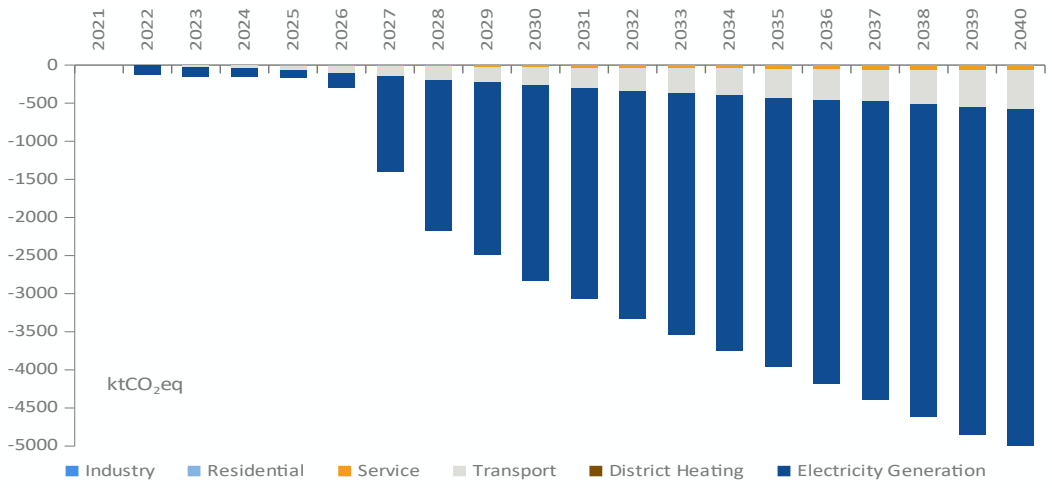
Together with additional policies reducing energy demand from the residential, service, and transport sectors, these policies would reduce emissions from the energy sector by 28% until 2030 vs. 2021, with significant additional emissions reductions beyond the BAU scenario from 2027 onwards (see Figures 14 and 15 below).

Figure 14: Energy-related emissions by sector (NDC Scenario) and avoided vs. BAU Scenario



Source: MESPI

Figure 15: Difference in energy-related emissions by sector (direct, NDC vs. BAU scenario)



Source: *MESPI*

Energy efficiency savings in this scenario are achieved thanks to the implementation of additional policies and measures, in line with the Energy Strategy and the Energy Efficiency Directive. Crucial policy measures are the renovation of residential buildings beyond the timeframe covered by the Energy Support Package, the renovation of commercial and public buildings, as well the installation of heat pumps and more efficient biomass stoves in the residential sector (in line with the NECP). Altogether, these policy measures will allow the decrease of Kosovo's energy consumption and therefore support decarbonisation in the country. A more detailed list of policies and measures is provided in Table 3.

Table 3: Key energy efficiency policies and measures in the residential and service sectors

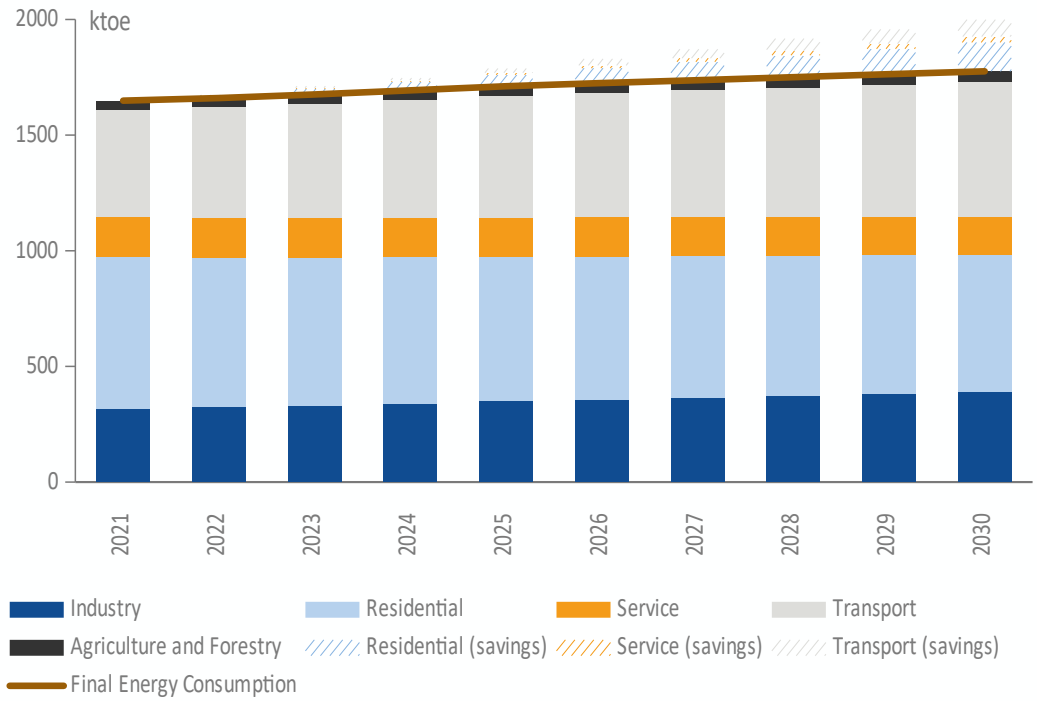
Renovation of residential buildings incl. installation of add. solar thermal	Energy Strategy (based on draft BRS), NECP	160
Introduction of heat pumps	NECP	60.4
More efficient biomass stoves	NECP	24.4
Renovation of commercial buildings	Energy Strategy (based on draft BRS)	22.9
NZEB in 0.3% of the building stock	NECP	10.5
Renovation of central government buildings	Energy Strategy (based on draft BRS)	5.6
Total		**283.8**

Source: MESPI

Additionally, for the transport sector, a higher penetration of alternative fuels for light duty vehicles (incl. battery-electric vehicles) in tandem with the installation of a distributed fast-charging infrastructure, as well as ambitious investments in rail infrastructure are the main driver of change compared to the BAU scenario.

Overall, additional policies and measures in the NDC scenario allow the achievement of the 2030 energy efficiency target. The NDC scenario projections indicate that Kosovo's final energy consumption would amount 1776 ktoe by 2030, with a primary energy consumption of 2300 ktoe. Altogether, compared to the BAU scenario, additional energy efficiency measures on the demand side will lead to an 11 % reduction in final energy demand (see Figure 16) and an 21 % reduction in primary energy consumption by 2030.

Figure 16: Final energy demand and energy savings by sector (NDC vs. BAU scenario)



Source: MESPI

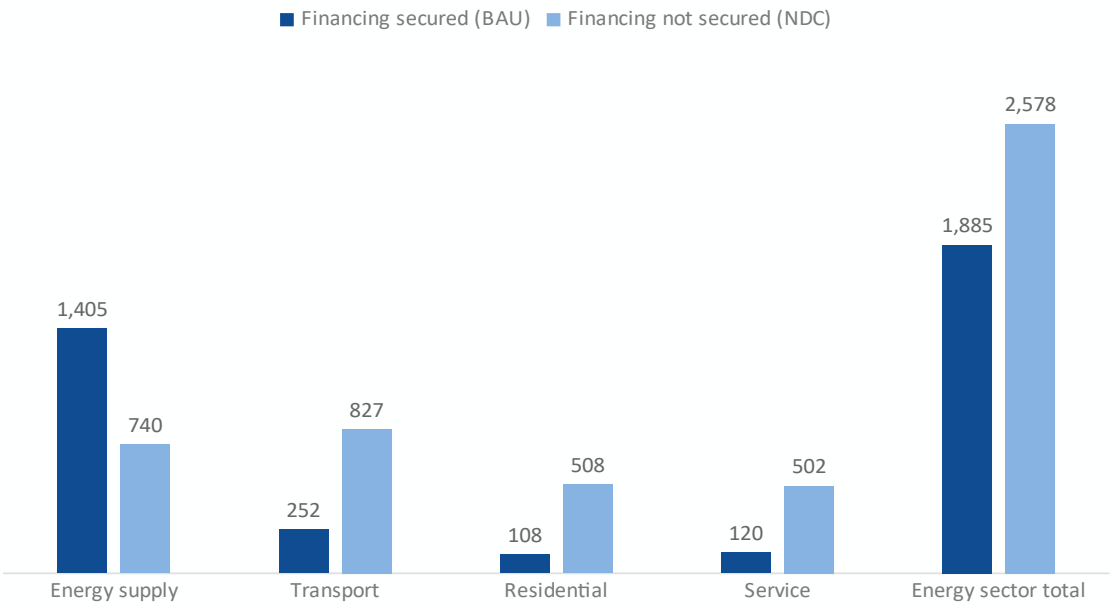
Additional financing will be required to mobilise investments into the additional renovation of buildings, installation of heat pumps and more efficient biomass stoves, alternatively fuelled vehicles, fast-charging infrastructure, and large-scale investments into rail infrastructure[38] to enable these savings and corresponding reductions in GHG emissions.

3.5.3 Financing needs

While a lot of financing for investments are already secured for the energy supply sector, it remains the sector with the second largest absolute additional financing needs. The largest additional financing needs exist in the transport sector, mostly for railway infrastructure investments. In addition, large financing needs exist for the residential and service sectors, mostly for energy efficient renovations of buildings, as well as investments in more efficient heating systems. The residential sector financing needs also include an estimated EUR 120 million for the implementation of new supporting schemes dedicated to vulnerable energy consumers.

[38] As well as other public transport, cycling and walking infrastructure. For a detailed list of measures, please see Annex I.

Figure 17: Financing needs by sub-sector; financing secured vs not secured (EUR mn)

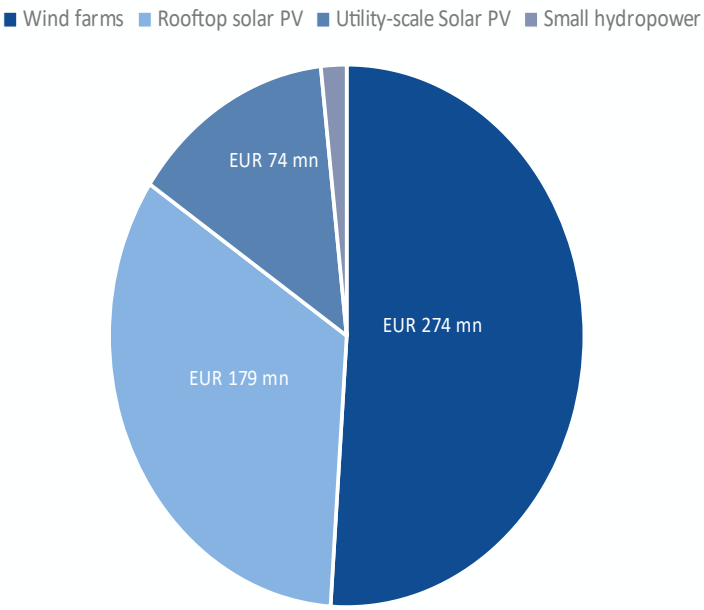


Source: MESPI

Zooming into the energy supply sector, an estimated EUR 570 mn in total capital investments until 2030 is required for renewable electricity generation capacities to reach the targets of the BAU scenario. In addition, EUR 610 mn until 2030 is needed to reach the more ambitious targets of the NDC scenario. Figure 18 below displays a detailed breakdown of this additional capital investment needed for renewable energy sources (RES).

It is clear to all stakeholders that not all of the up-front investment cost will need to be provided by public sources as private investors are entering the sector and invest in the construction of renewable electricity generation capacities. The amount of public support needed will depend on future auction volumes vs. share of public investments, investor appetite, financing conditions, future wholesale market prices for electricity and future technology costs. A part of the BAU investment needs is already secured, such as via the first solar PV auction and the secured financing for KEK's 100 MW solar PV project.

Figure 18: Additional capital investment needed in RES (for NDC scenario)



Source: MESPI; Note: in 2022-EUR

Additional investments are also needed in the electricity transmission and distribution grids to increase the capacity of renewable energy the network can handle, reduce network losses, and increase grid resilience. EUR 105 mn are foreseen to be spent for grid investments until 2027, with an additional EUR 63 mn needed until 2030 in the NDC scenario.

In addition to the investment needs in the electricity sector, the district heating sector requires additional investments, both for grid expansion (EUR 47 mn secured already, additional needs not quantified at the moment) and for the planned increase of the solar district heating project in Pristina from 50 MW to 70 MW foreseen in the NDC scenario. This extension is estimated to cost EUR 28 mn.

Additional financing is also needed in the energy demand sectors. About EUR 49 mn p.a. is needed for the renovation of residential buildings, EUR 79 mn p.a. for commercial buildings and EUR 10 mn p.a. for central government and other public buildings in the NDC scenario. The installation of heat pumps (EUR 6 mn p.a.) and more efficient biomass stoves (EUR 1 mn p.a.) also requires additional financial resources. The cost for the promotion of a higher share of alternatively fuelled vehicles (incl. battery-electric vehicles) and the roll-out of fast-charging infrastructure needs to be assessed in more depth to be reliably quantified, but it is clear that additional resources are needed for this purpose as well.

Overall, there is an additional financing need of approximately EUR 2.6 billion until 2030 to implement the energy sector policy measures of the NDC scenario. For a detailed breakdown of the financing needs per policy measure, refer to Annex I.

3.6 GHG projections for the non-energy sector

3.6.1 Key projects under implementation

Non-energy emissions, particularly from the AFOLU, waste management and IPPU sectors, are of crucial importance for Kosovo's climate mitigation strategy. Deforestation and agricultural activities release significant greenhouse gases such as carbon dioxide, methane and nitrous oxide. Sustainable practices in agriculture and waste management, including methane capture and recycling, offer effective ways to reduce emissions of these potent GHGs. Reducing emissions in these sectors is critical to meet the target of the Global Methane Pledge. Several sectoral strategies aim to pave the way for climate change mitigation measures, with the relevant policies and measures already under implementation and financial resources mobilised.

1. The **Policy and Strategy on Forestry Development** for 2022-2030 in Kosovo lays out a comprehensive framework through four strategic objectives aimed at enhancing and safeguarding Kosovo's forestry resources. The strategic objectives of the Forestry Strategy, which are summarized below, are translated into policies and measures in the NDC.

The first objective emphasizes **enhancing forest management** and administration to boost wood production and implement advanced monitoring systems for pest and disease risks. This initiative is crucial for maintaining productive, diverse, and resilient forests that contribute to carbon sequestration and climate change mitigation. The second objective centres on **protecting forest resources** by establishing a robust legal framework for better forest land administration and utilization. This includes consolidating forest lands and developing a forest fire prevention system. Identifying illegal logging for commercial purposes as one of the main drivers of forest degradation, the strategy places prevention at the heart of this objective, complementing stricter law enforcement with rural development, poverty eradication and social forestry programs.

Other specific objectives concern the prevention against forest fragmentation and forest fires. Thereby, this objective aims to preserve the health and biodiversity of forests, crucial for aiding in climate change adaptation and maintaining their carbon storage capacity. Safeguards against illegal logging are planned in tandem with measures to reduce the dependency on illegal firewood through the promotion of heat pumps and more efficient biomass stoves, with a special focus on programmes supporting households in energy poverty. The third objective promotes the **sustainable and multi-purpose use of forest resources**. It ensures the implementation of sustainable forest management criteria, regulates the use of non-wood forest products.

Table 4: Strategic objectives from the Forestry Strategy relevant for mitigation

Strategic objective 1: Enhancement of forest resources	1.2.: Forest management plans for all forests; 1.6.: Increase of forest area (3% by 2030 compared to 2020); 1.8. Forest improvement	Increase wood production through silviculture measures; identify and monitor forest pest and disease risks
Strategic objective 2: Protection of forest resources	2.1. Reduce illegal interventions is forests; 2.2. Consolidate fragmented forest lands; 2.5. Forest fire prevention	Improved administration and consolidation of forests, establishment of a forest fire prevention system
Strategic objective 3: Sustainable and multipurpose use of forestry resources	3.2. Sustainable Forest Management (SFM) Criteria/Indicators are defined/implemented; 3.3. NWFPs are used sustainably	NWFP inventory and capacity building, approving SFM criteria

These sustainable practices help maintain the long-term productivity and health of forests, enabling them to continue playing a vital role in carbon sequestration and providing sustainable livelihoods. These sustainable practices help maintain the long-term productivity and health of forests, enabling them to continue to play a vital role in carbon sequestration and providing sustainable livelihoods. They also help address climate change-related conflict dynamics and security risks by preventing resource-related conflicts through effective forest management and fire prevention systems. Reducing dependence on illegal fuelwood supports livelihoods and reduces conflict risks. In addition, efforts to integrate climate and security considerations are demonstrated by establishing robust legal frameworks and monitoring systems, integrating climate-related risks into forest management, and promoting disaster preparedness.

2. The policies embedded in the Kosovo's **Strategy for Agriculture and Rural Development 2022-2028** are designed not only to foster sustainable agricultural practices but also to significantly contribute to climate change mitigation.

Table 5: Strategic objectives from the Agriculture Strategy relevant for mitigation

Strategic objective 2: Sustainable management of natural resources (land, forests, water)	2.1. Contributing to mitigating and adaptation to climate change as well as renewable energy; 2.3. Biodiversity protection, enhanced ecosystem services, and conservation of habitats and landscapes	Extensive pasture management for high biodiversity lands in areas with proven biodiversity values, such as protected areas
Strategic objective 3: Supporting businesses in rural areas and enhancing employment and social infrastructure	3.2. Improving society's requirements for food and health, including safe, nutritious, and sustainable food, reducing food waste, and animal welfare	Subsidies for framers who follow the rules of organic farming

The measure focusing on **agri-environmental schemes for biodiversity protection** through extensive pasture management is a critical component of this strategy. By maintaining and managing high biodiversity lands, particularly in protected areas, this policy helps in sequestering carbon, a natural process where grasslands and pastures absorb CO_2 from the atmosphere.

Furthermore, the conservation of habitats and landscapes enhances the resilience of these ecosystems to climate change, supporting species adaptation and maintaining biodiversity, which are essential for ecological and socio-economic stability as well as carbon cycling.

Simultaneously, the **promotion of organic farming** under this strategy plays a direct role in reducing the agricultural sector's carbon footprint. Organic farming practices significantly lower carbon emissions by avoiding chemical fertilizers and pesticides; healthier soils have a higher organic matter content and better structure, which increases their ability to store carbon. By increasing the resilience of agricultural land and its long-term availability for food production, these measures also address climate-related security risks including food security.

3. The **Integrated Waste Management Strategy 2024-2035** and Action Plan 2024-2026 for Kosovo outlines a comprehensive framework through four strategic objectives to address current shortfalls and constraints in the waste management sector.

The first objective focuses on introducing integrated waste management services and infrastructure. This includes providing solid waste collection services to waste generators, establishing waste recovery and disposal facilities for municipal waste, and developing appropriate services and infrastructure for industrial waste, construction and demolition waste, and hazardous waste.

The second objective aims to improve the regulatory, planning, and institutional framework for waste and resource management by updating relevant legal frameworks, allocating human resources, and establishing procedures.

The third objective to enhance implementation, enforcement, and financing capacities in the waste management sector by establishing permitting and reporting systems and developing mechanisms to increase investment and attract private sector involvement.

And lastly, the fourth objective aims to initiate Kosovo's transition towards a circular economy by maximizing the utilization of resources from the waste management sector through resource efficiency, reuse and recycling targets, and awareness programs. By maximizing resource productivity, this transition also contributes to resilience and regional stability. The strategy aims to drive significant improvements in the waste management and recycling sector. The Action Plan, covering the period 2024-2026, incorporates the provisions of central-level strategic planning documents.

Table 6: Strategic objectives from the Integrated Waste Management Strategy relevant for mitigation

Strategic objective 1: Integrated Waste Management Services and Infrastructure	1.1.: Extending municipal waste collection; 1.2. System of waste recovery and disposal installation for municipal waste to ensure that 100% of MSW is managed in controlled facilities by 2030	Develop feasibility studies and documentation for waste transfer, recovery and disposal infrastructure in line with inter-municipal waste management plans
Strategic objective 2: Framework conditions	2.1. Regulatory framework, 2.2. Institutional setup and capacities	Development and adoption of municipal regulations for management of municipal waste
Strategic objective 3: Implementation, enforcement and financing	3.1. Permitting, enforcement and reporting, 3.2. Cost recovery, 3.3. Private sector engagement	Modernise licensing and permitting system for WM operations, Guidelines on procurement and private sector involvement in WM
Strategic objective 4: Circular economy	4.2. Increase reuse, recycling and recovery rates; 4.3. awareness and education	Develop and implement necessary regulations and schemes for packaging and packaging waste based on EPR

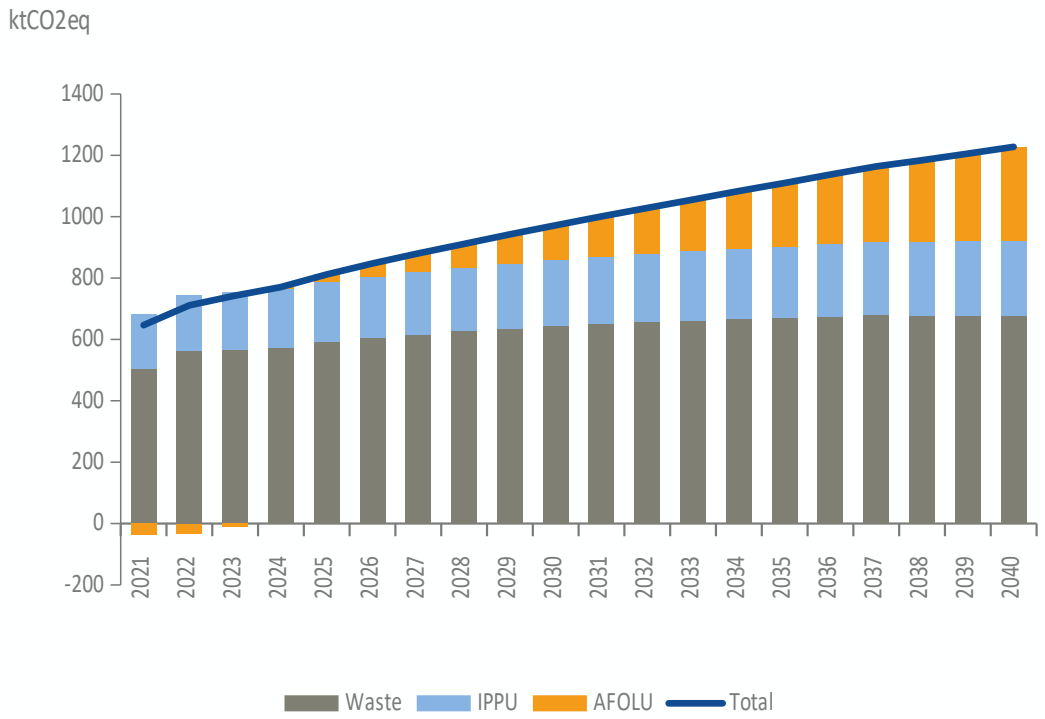
The strategy aims to increase the countrywide share of municipal solid waste (MSW) managed in controlled facilities from the baseline of 90.2% in 2021 (all in sanitary landfills) to 100% by 2030, including a recovery rate of 60% and a recycling rate of 55% for all packaging waste. This is planned to be achieved, inter alia, through increasing the percentage of total population with access to municipal waste collection services from 90% in 2021 to 97% by 2025 and to 99% by 2026.

The policy measure on controlled management of solid waste is a key component in this regard. It targets the **enhancement of solid waste management** through the establishment of a network of integrated waste management facilities in the catchment areas of Pristina, Mitrovice, Peja, Prizren and Gjilan leading to an increased rate of household waste collection, separate collection and recycling of different types of waste, a higher percentage of solid waste treated, and a lower percentage of waste disposed of in solid waste disposal sites (landfills).

3.6.2 Current situation: sectoral projections & key measures planned

Projections under the BAU scenario highlight the substantial impact that the AFOLU, waste and IPPU sectors could have in the context of Kosovo's decarbonization efforts. Figure 19 depicts the evolution of Kosovo's non-energy sector emissions by 2030.

Figure 19: Non-energy-related emissions by sector (BAU scenario)

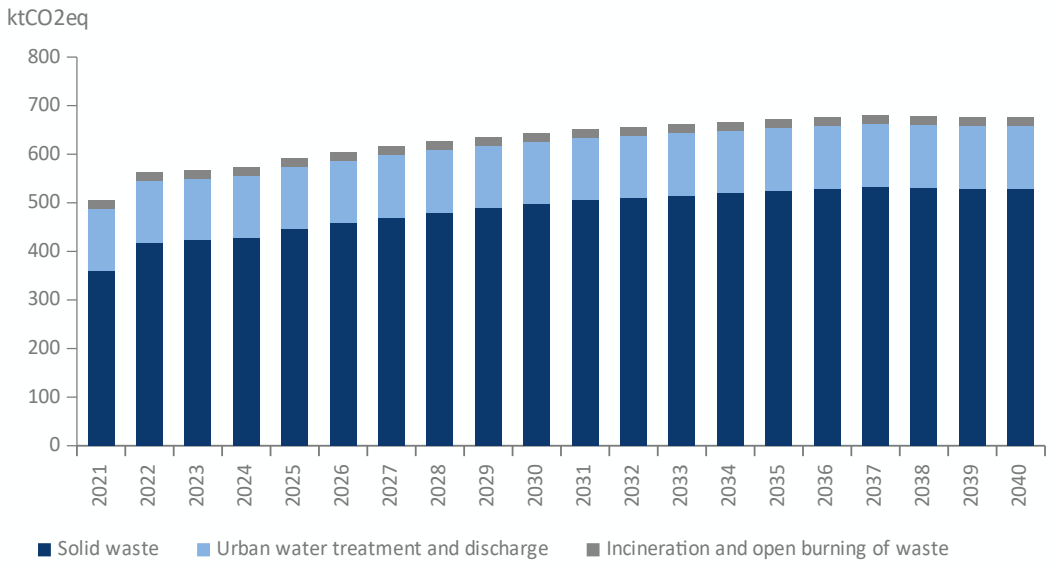


Source: MESPI

The figure projects increasing emissions trends from all the sectors. The **waste** sector is projected to become the largest source of emissions throughout the timeframe, increasing its total level of emissions to 644 $ktCO_2eq$ in 2030 and to 676 $ktCO_2eq$ in 2040. This is attributable to increasing levels of waste generation per capita, estimated to increase from 273 kg per person per year in 2021 to 347 kg per person by 2030, compounded by the legacy emissions accumulated over past decades due to landfilling. This is the case unless the Integrated Waste Management Strategy begins implementation in accordance with its investment schedule, which during the drafting of this document is being impacted by EU measures pausing investments in the sector.

Figure 20 depicts the evolution of the waste emissions in the BAU scenario in the 2021-2040 timeframe.

Figure 20: GHG emissions from the waste sector by subsector (BAU scenario)



Source: MESPI

The aforementioned drivers will lead to an aggregate increase in emissions of 498 $ktCO_2eq$ in 2030 for the solid waste sector, whilst emissions from urban water treatment and discharge, incineration and open burning of waste, are projecting to vary according to demographic change.

A rise in emissions is expected also in the **IPPU sector**, whose emissions levels are projected to grow driven by increasing industrial productivity levels to 215 $ktCO_2eq$ in 2030 and to 246.4 $ktCO_2eq$ in 2040.

The **AFOLU sector** is a net negative emitter in the 2021-2023 timeframe[39]: According to the estimations, emissions from the agricultural sector are projected at 750 $ktCO_2eq$ in 2021, while the FOLU sector is estimated to absorb 787 $ktCO_2eq$. However, the carbon sequestration capacity of the forestry and other land use FOLU sector will remain underutilized due to the disruption in policy and implementation measures starting in 2024. This will be exacerbated by rising emissions from soil management, fertilizer usage, livestock expansion, and the burning of crop residues within the agricultural sector. As a result, emissions in this AFOLU sector are foreseen to increase to 113 $ktCO_2eq$ in 2030 and to 305 $ktCO_2eq$ by 2040[40].

Table 7 presents policies and measures that are quantified in the BAU scenario and positively impact its GHG balance.

Table 7: Implemented non-energy sector measures in the BAU scenario

[39] The discrepancy between the AFOLU emission values from the historical data and the projections is mainly due to the addition of negative emissions from forestry and other land use sectors, which were not estimated in past years.

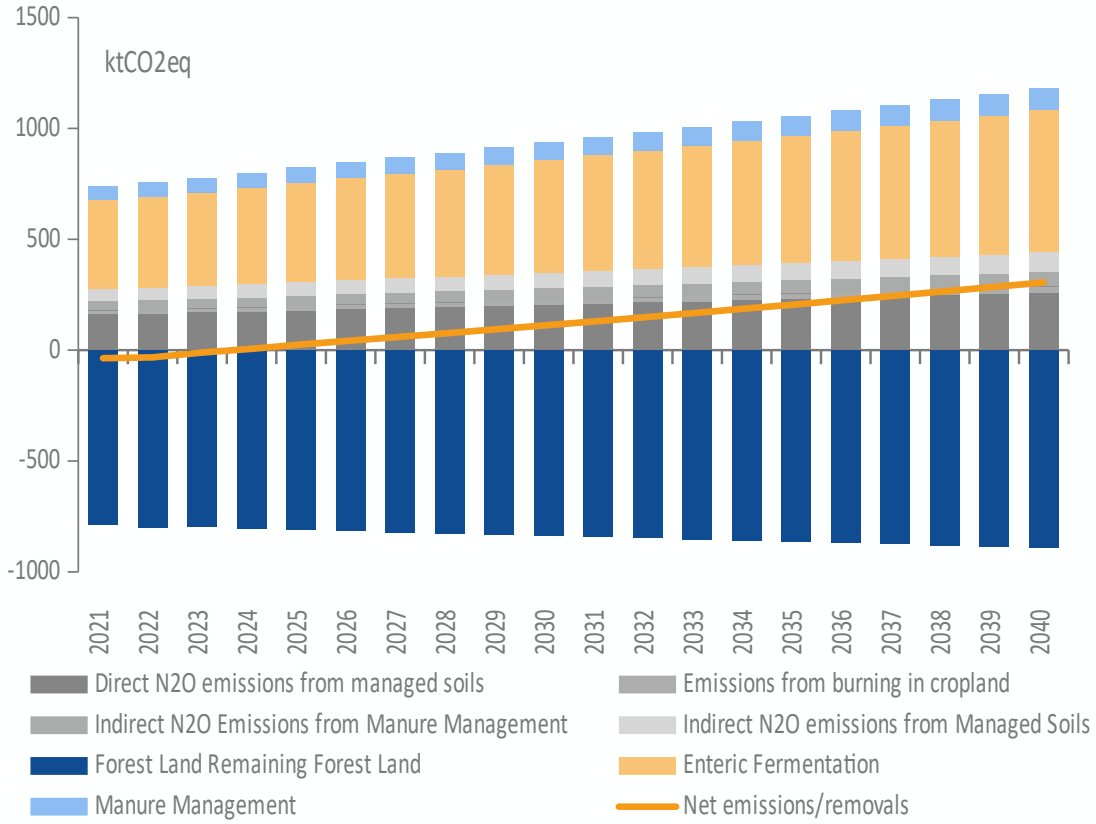
[40] For more details for the modelling approach underlying the results for the AFOLU sector, please also refer to: https://www.german-economic-team.com/en/newsletter/kosovos-afolu-sector-large-potential-for-emission-reduction/.

Policy Measure	Assumed period of implementation	Mobilized resources (EUR mn)
Enhancement of forest resources	until 2024	1.39 (2024)
Sustainable and multipurpose use of forest resources	2024-2030	1.5
Agri-environmental schemes for biodiversity protection	2024-2030	4.45
Promotion of organic farming	until 2024	0.4 (2024)
Controlled management of solid waste	2024-2030	69

Source: Forestry strategy, Strategy for Agriculture and Rural Development (2022-2028), draft NECP, Integrated Waste Management Strategy (2024-2035) and Action Plan (2024-2026)

Figure 21 provides a fine-grained overview on the development for the emissions of the AFOLU sector in the BAU scenario.

Figure 21: GHG emissions and removals in the AFOLU sector by subsector (BAU Scenario)

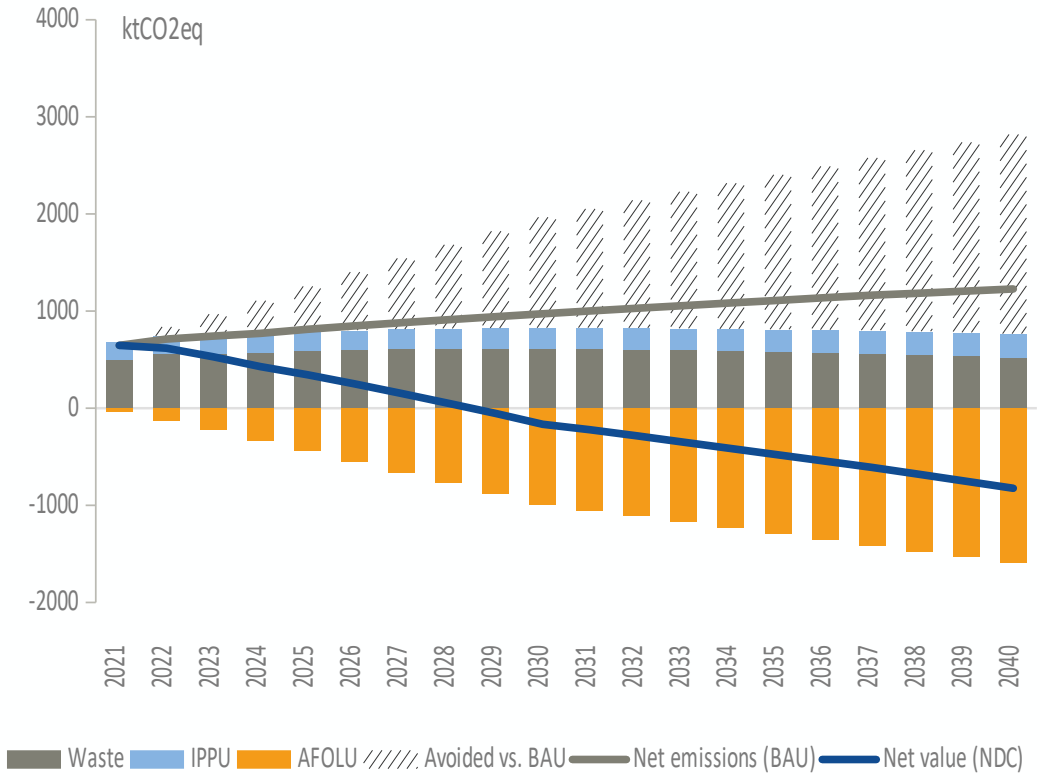


Source: MESPI

By observing the chart, it is possible to note that, whilst the forestry sector (Forestry Land Remaining Forest Land) is projected to be an important carbon sink throughout the 2021-2040 timeframe, its potential is improved only indirectly by the reduction of national biomass consumption (on average 0.6% per year). Additionally, emissions from all other sources are projected to increase due to increased production levels in the agricultural sector.

In contrast, in the NDC scenario, it is assumed that the policies and measures envisaged, which are described in more detail in the sectoral sections, will be implemented even after their current financial budget horizon. These additional policies and measures are projected to lead to substantial reductions of emissions in the non-energy sector. Driven by the increase in carbon sequestration capability of the AFOLU sector, by more low emissions practices in the agricultural sector and by better waste management methods, the non-energy sector in the NDC scenario is projected to become an overall net negative emitting sector by 2029. By 2030, the non-energy sector in the NDC scenario is forecasted to absorb 166 $ktCO_2eq$.

Figure 22: Non-energy emissions by sector (NDC scenario) and avoided vs. BAU scenario

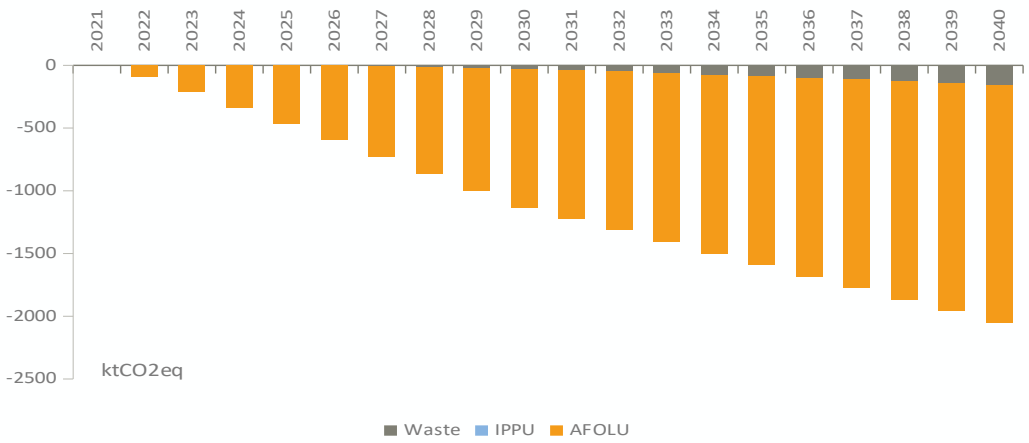


Source: MESPI

As Figure 23 below suggests, policies and measures in the NDC scenario lead to substantial emissions abatements in the AFOLU sector (both in the FOLU and agricultural sectors), as

well as some additional abatement in the waste sector as explained in more detail in the following sections.

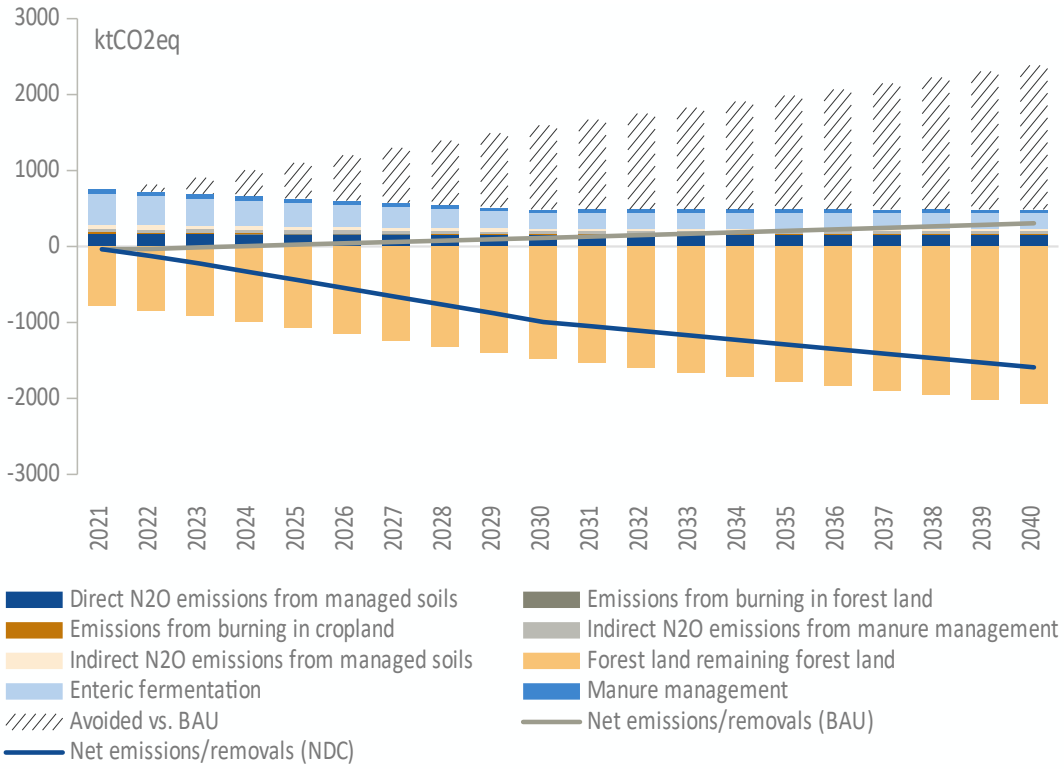
Figure 23: Difference in non-energy-related emissions by sector (NDC vs. BAU scenario)



Source: MESPI

The AFOLU sector makes a major contribution to reducing emissions. This sector is expected to absorb an additional 1107 $ktCO_2eq$ by 2030 in the NDC scenario (vs. BAU scenario) amounting to 97% of all additional avoided emissions in the non-energy sector. Figure 24 shows a fine-grained development of emissions by sector in the NDC scenario and illustrates the amount of avoided emissions compared to the BAU scenario. While a significant reduction in emissions from manure management and enteric fermentation is achieved in the NDC scenario, the carbon sink potential of the FOLU sector is increased thanks to the continued implementation of sustainable practices.

Figure 24: AFOLU emissions/removals by subsector (NDC scenario) and avoided vs. BAU



Source: MESPI

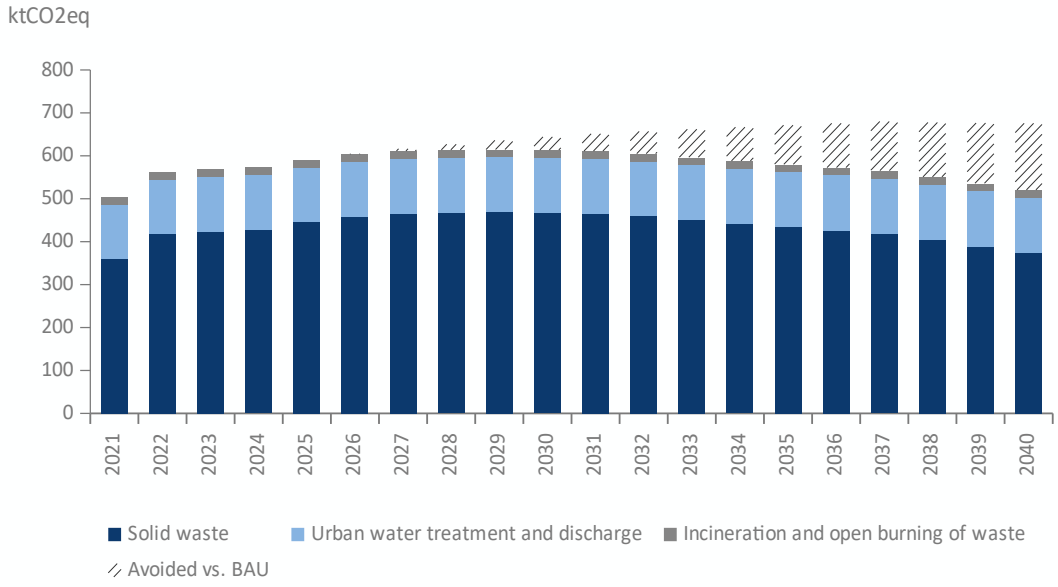
Savings in GHG emissions in the NDC scenario in the AFOLU sector are to be attributed to a policy mix in both the non-energy and as well in the energy sectors. Figure 24 illustrates the breakdown of AFOLU emissions reductions by sub-sector. On the energy side, the replacement biomass stoves with more efficient ones and the integration of heat pumps in the residential sector will significantly reduce carbon emissions. In the NDC scenario, it is estimated that these changes will lead to a reduction in wood extraction for heating purposes, thereby boosting the net primary productivity of forest biomass. Consequently, it is projected that forest land will absorb an additional 646 $ktCO_2eq$ in 2030 (vs. BAU).

From the non-energy side, the reduction in livestock, and additional measures to improve manure management in the NDC scenario, is expected to decrease methane and nitrous dioxide emissions from enteric fermentation and manure management by 307 $ktCO_2eq$ and 29 $ktCO_2eq$, respectively (vs. BAU). Other measures addressing aggregated sources and non-CO_2 emissions in the agricultural sector, such as the promotion of organic farming practices limiting fertilizers, are also projected to substantially reduce greenhouse gas emissions by 2030. To mitigate risks to rural livelihoods and food security while reducing livestock numbers, additional measures such as income diversification, community engagement, and access to markets are important to ensure a balanced transition.

On the other hand, the policy mix envisaged for the waste sector in the NDC scenario is expected to abate 30 $ktCO_2eq$ in 2030, relative to the BAU scenario. The abatement is driven by the establishment of a network of integrated waste management facilities leading to an increased rate of household waste collection, separate collection and recycling of different types of waste, a higher percentage of solid waste treated, and a lower percentage of waste disposed of in solid waste disposal sites. In absolute terms, the NDC scenario still implies an increase in waste sector emissions in 2030 (vs. 2021) due to increasing levels of waste generation per capita, estimated to increase from 273 kg per

person per year in 2021 to 347 kg per person by 2030, compounded by the legacy emissions accumulated over past decades due to landfilling. Due to the time lag between waste disposal and emissions, the abatement policies and measures in the NDC scenario will only lead to significant absolute reductions in waste sector emissions after 2030 (see Figure 25).

Figure 25: Waste emissions by subsector (NDC scenario) and avoided vs. BAU scenario



Source: MESPI

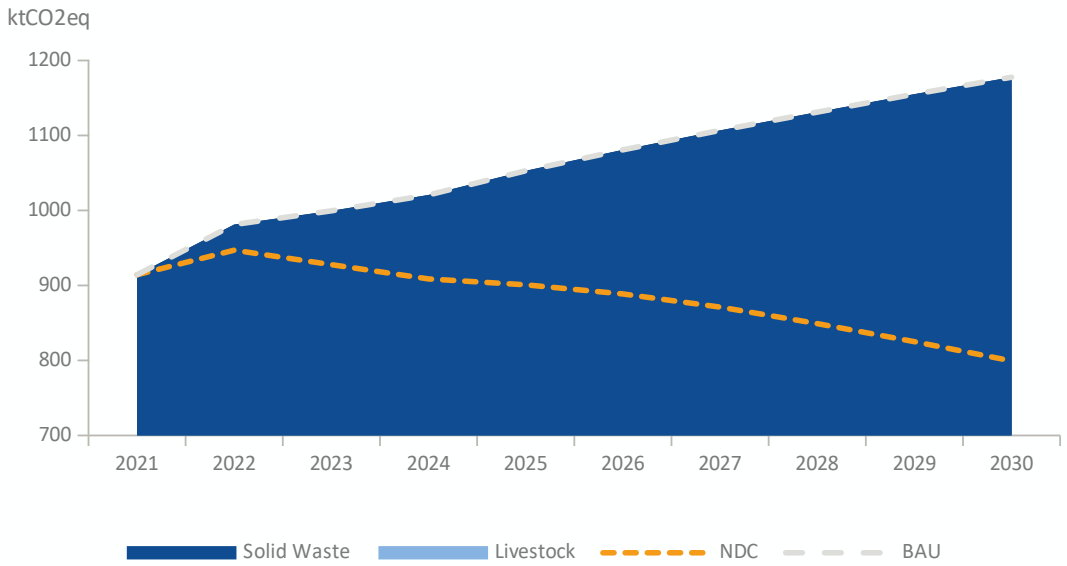
As previously noted, the non-energy sector plays a key role in mitigating hazardous greenhouse gases such as methane and nitrous oxide. In fact, in 2021, 98% of methane and 90% of nitrous oxide emissions originated from this sector. Therefore, policy intervention to reduce emissions in these sectors is critical to achieving key mitigation commitments such as the Global Methane Pledge. Figure 26 shows the difference in methane emissions between the BAU and NDC scenarios and the additional abatement by sector until 2030. The graph illustrates that methane emissions in Kosovo will continue to increase by 29% until 2030 (vs. 2021) if no additional policies and measures are implemented in the non-energy sector.

On the other hand, the NDC scenario implies a methane emissions reduction of -13% from 2021 to 2030, making a meaningful contribution to the Global Methane Pledge's collective effort to reduce global methane emissions by at least 30% from 2020 levels by 2030.[41] The

[41] This is a global, not a national reduction target. Due to data availability, 2021 was used as the base year for Kosovo instead of 2020. Due to the absence of domestic natural gas extraction, transmission or distribution infrastructure (where quick methane emissions abatement is usually easier) and the importance of the waste sector for Kosovo's methane emissions, where significant emissions reductions can only be achieved over a longer time horizon due to the time lag between waste disposal and emissions, a much larger abatement of methane emissions until 2030 than what is modelled in the NDC scenario is difficult to achieve for Kosovo. Note that industrial waste emissions and fugitive methane emissions from lignite mining are currently unquantified due to a lack of data. These sectors could potentially contribute additional reductions in methane emissions and will be included in the next update of Kosovo's voluntary NDC if additional data becomes

methane emissions abatement in the NDC scenario by 2030 is achieved through the measures described in the AFOLU and waste sectors introduced earlier in this section, which lead to sectoral abatement of 346 $ktCO_2eq$ and 30 $ktCO_2eq$ (vs. BAU), respectively.

Figure 26: Methane emissions NDC vs. BAU scenario and abatement by sector



Source: MESPI

3.6.3 Financing needs

To implement policies and measures planned in Kosovo's environmental and agricultural strategies, a series of investments across various policy areas are required (see Figure 27). For the enhancement of forest resources, an allocation of EUR 1.39 mn is currently planned to increase forested areas by 2024, with further additional needs of about EUR 3.68 mn until 2030. The protection of forest resources against forest fires through preventive measures is estimated to cost an additional EUR 9.3 mn until 2030. Sustainable and multipurpose management of forest resources will see an investment of around EUR 1.5 mn until 2030. Energy sector policies reducing the demand for illegal firewood extraction from forests, including the promotion of more energy efficient biomass stoves and the replacement of biomass stoves with heat pumps (see Chapter 3.5), also contribute to the reduction of AFOLU emissions in the NDC scenario.

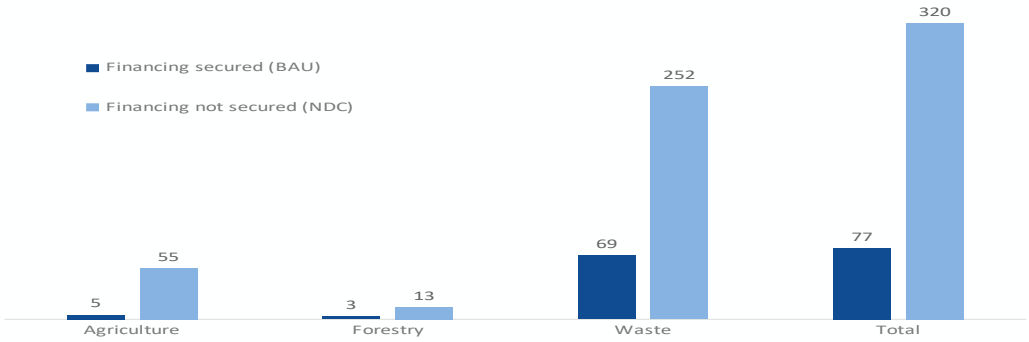
Additionally, agri-environmental schemes aimed at protecting biodiversity are planned with EUR 4.45 mn, while the promotion of organic farming has unfunded needs of approximately EUR 1.1 mn until 2030. Furthermore, investments in the sustainable management of natural resources (land, forests and water) in agriculture will require additional resources of about EUR 36 mn until 2030, with additional financing needs for improved manure management (methods for storage, preparation, and application) amounting to EUR 18.2 mn until 2030.

available.

Finally, in the management of municipal solid waste, approximately EUR 69 mn are secured to introduce a MSW collection and sorting facility for the catchment area of Pristina. An additional EUR 252 mn is needed to include a recycling facility for the same catchment area and establish similar integrated waste management facilities, including collection, sorting, recycling and controlled landfilling for the catchment areas of Mitrovice, Peja, Prizren and Gjilan.[42]

In total, there is an additional financing need of approximately EUR 320 million until 2030 to implement the non-energy measures of the NDC scenario for those measures with quantified financing needs (see Figure 27). For a detailed breakdown of the financing needs per policy measure, please refer to Annex I.

Figure 27: Non-energy sector financing needs by sub-sector, financing secured vs. not secured (EUR mn)



Source: MESPI

4. Adaptation

Key takeaways:

1. Kosovo is already exposed to a number of **climate hazards** that are projected to increase in severity over the coming years due to climate change (mainly **floods, storms, droughts, heatwaves** and **wildfires**).

2. These climate hazards are already causing **severe human and economic harm,** particularly to **women and marginalised groups**.

3. To systematically build resilience to the impacts of climate change, a number of **adaptation measures** are already included in many sectoral strategies, and a dedicated **Adaptation Strategy** is under preparation.

Given its geographic characteristics (see section 4.1.), Kosovo is already faced with the consequences of climate change, which take various forms and affect the different

[42] Based on Integrated Waste Management Strategy (2024-2035) and Action Plan (2024-2026).

geographical regions and sectors in different ways (see section 4.2.). Thus, targeted adaptation measures are needed (see section 4.3.).

To this end, this voluntary NDC focuses on two key domains that are already, and will continue to be, heavily affected by climate change impacts: the agriculture, forestry and other land use (AFOLU) sector and the domain of population and settlements. At the same time, these two focus domains are key for the livelihood and the economy of the country, making efficient adaptation measures in these domains pivotal.

4.1 Geographic background

Kosovo is a landlocked country situated in Southeastern Europe. It shares borders with Serbia, Montenegro, Albania and North Macedonia. The country is divided in two primary plains: the Dukagjini Plain to the west and the Kosovo Plain to the east. These plains, each with its distinct topography and climatic influences, contribute to Kosovo's unique environment (see map in Figure 28).

Figure 28: Raised relief map of Kosovo

Source: © Adobe Stock - pbardocz

The topographical variations in its altitude differentials, range from the low point of 265 meters above sea level at "Drin" on the Albanian border to the highest peak of Gjeravica, rising to 2,656 meters in the southern part of the country.

The climate is influenced by continental air masses, resulting in harsh winters with temperatures varying between -10 °C and -26 °C. The Dukagjini Plain experiences milder winters due to air masses coming from the Adriatic Sea, with temperatures fluctuating between 0.5 °C and 22.8 °C. Both plains are characterized by hot summers, with temperatures ranging from 20 °C to 37 °C.

The average annual precipitation ranges from around 600 up to 1,300 mm; mountain areas in the west and south tend to receive higher precipitation compared to lower-lying areas. Kosovo's terrain is predominantly lower lying (80% of the terrain lies below 1,000 meters), indicating that the majority of terrain experiences low precipitation. Kosovo's hydrological geography is shaped by its river systems, which are pivotal in managing the flow of water through the region. The Drini, Ibri, Morava e Binçës, and Lepenci rivers are most important for human activities and agriculture.

Figure 29: The Drin River Basin

Source: own display, adapted from Bodenbender et al. 2018.

In terms of water sources, Kosovo is highly reliant on endogenous water sources, sourced for example from lakes. Kosovo has about 1,600 m3 per capita of renewable fresh water available per year.[43] This classification places the country as severely "water-stressed" more than its regional counterparts. In addition, Kosovo is one of the least developed countries in the region in terms of water resources infrastructure and storage capacity, which increases Kosovo's vulnerability to the adverse effects of climate change. This could also increase the risk of socio-economic instability and social tensions among vulnerable communities over access to scarce water resources.

The Gazivoda Lake, fed by the Iber River, serves as the sole external source of water inflow into Kosovo. The external renewable water resources amount to a 0.3 billion cubic meters (BCM) per year, constituting a mere 10% of the nation's total water reserves.[44] Internally, Kosovo has renewable water resources totalling 3.3 billion BCM annually. Moreover, the long-term average annual precipitation, measured at 768 mm/year or 8.38

[43] Review of the State Water Strategy 2023-2027 and the Action Plan 2023-2025

[44] Review of the State Water Strategy 2023-2027 and the Action Plan 2023-2025

BCM/year, further underlines Kosovo's potential hydrological richness and emphasizes the need for sustainable water resource management practices to support its development. Such figures highlight Kosovo's self-sufficiency in water controlling and show the importance of preserving and efficiently utilizing its internal water reservoirs.[45]

4.2 Introduction of the focus sectors

While climate change impacts are already affecting, and can be expected to, heavily affect every socio-economic sector in Kosovo, this voluntary NDC focuses on two domains in terms of climate risks and adaptation: Firstly, on the agriculture, forestry and other land use sector (AFOLU) and secondly, on the domain of population and settlements. More specifically, on the latter, the focus is on infrastructure and the built environment, but also livelihoods and health. The rationale behind the choice of these two sectors is two-fold: Firstly, these two domains are of critical importance for the future development of Kosovo, acting as pre-requisites for the development of the economy and quality of life in the country. This will become evident in the following two subsections (4.2.1. and 4.2.2.) in which the two domains and their importance are introduced in more depth. Secondly, the impacts of climate change are already visible to a great extent in these two domains, which are at risk of being impacted by several different types of climate hazards. This is outlined in more detail in subsections 4.3.2.1. and 4.3.2.2. Building systematic resilience through the introduction of targeted adaptation measures is thus especially important in these two focus domains.

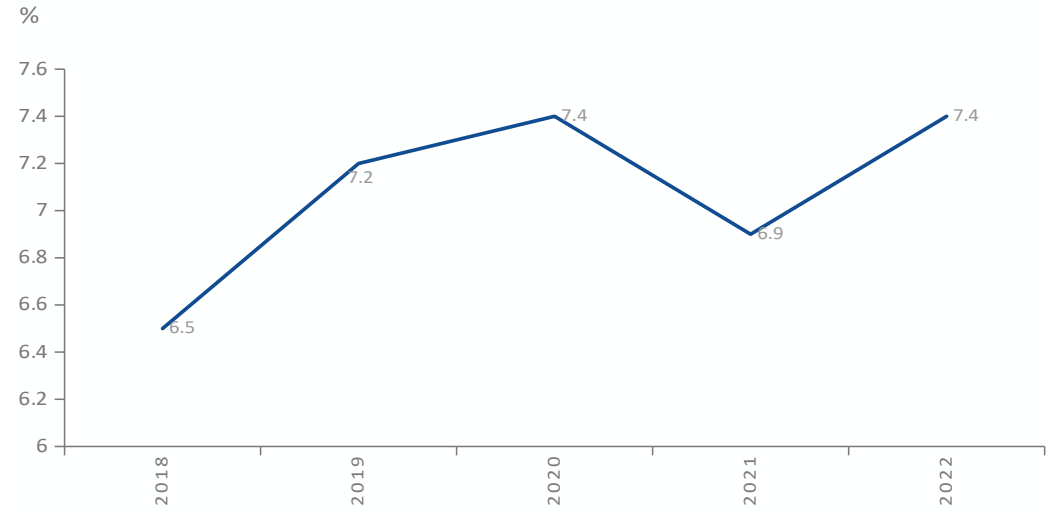
4.2.1 The AFOLU sector

Agriculture

Agriculture is an important sector in emerging market economies like Kosovo. Over the last decade, the average contribution of the agriculture, forestry, hunting, and fishing sector was estimated to be 11.4%. In 2022, the contribution of agriculture, hunting, forestry, and fishing to GDP was 7.4%.

[45] Kosovo Irrigation Master Plan/KIMP (source: Aquastat, 2017, World Bank database, Kosova Water Strategy, 2018).

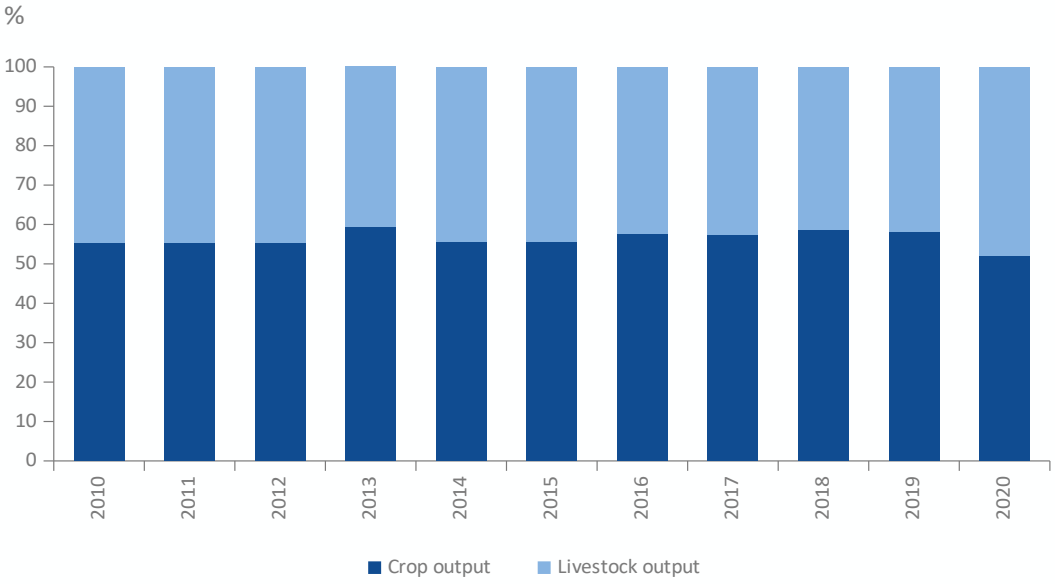
Figure 30: Contribution of the agricultural sector to total GDP (2018-2022)



Source: KAS, 2018-2023.

The contribution of crop output to the total agricultural output has been increasing in the last five years. A different trend has been observed for livestock output where decreases and increases occur from one year to another. In 2020, the contribution of crop output to the total agricultural output was 65%. Forage plants are the main contributors to the total crop output (25%), followed by cereals (24%) and vegetables (23%).

Figure 31: The share of crop and livestock to total agricultural output



Source: KAS, 2010-2021.

According to the Labour Force Survey 2022, the agriculture and forestry sector contributes by 2.2% to total employment, with a significant difference between males (2.7%) and

females (0.9%). However, the population dependent on agriculture is estimated to be much higher given the large share of informal employment in this sector[46].

Kosovo does not have a system of land monitoring in place, and consequently the country lacks validated data on land cover. The most up-to-date data from satellite imagery is from 2018. According to this data, 57% are forests and semi-natural areas, and 38% are agricultural areas. During the last decade, it has been observed that urbanization (buildings, infrastructure for housing, commerce, privatization, and industry) has altered the use of best arable land into industrial one, and this is particularly concentrated around the capital city of Prishtina. The abandonment of land is occurring mainly in marginal areas with limited access to infrastructure and markets, and unclear land tenure rights. Most of the pastures are state property and used as communal land by livestock herders. Jointly, pastures and meadows used for cutting grass to feed cattle cover an area of 241,000 ha in 2021[47].

The territorial area is small, but the climatic conditions and the depth of active soil strata make Kosovo rich in terms of quality and quantity suitable for the cultivation of a wide variety of crops. In 2021, the total Utilized Agricultural Area (UAA) was 420,327 ha, out of which 188,375 ha was arable land (44.8 %), belonging to 103,723 agricultural holdings. The majority of the UAA is used to produce cereals (30%), followed by fodder (9%), vegetables (3%), trees (2.4%), and vineyards (0.8%). The rest (51.7%) is covered by meadows, pastures, and common land.

Productivity in agriculture remains low if compared to the regional and EU countries; lower yields are particularly observed in cereals like wheat (4.03 t/ha), and maize (4.29 t/ha)[48]. It has been observed that in 2021 compared to the previous year, yields in t/ha for all types of cereals fall by min -2.8% (maize) to max -6.6 (oat). The self-sufficiency rate for wheat decreased by around 4%, however, this difference is only for two last year 2020-2021 and no clear trend has been observed in other previous years. The trend is clearer for vegetables, where a decrease in yields has been observed in almost all types of vegetables in the last five years. A decrease in vegetable yields can be attributed to both natural and human induced. Changes in temperatures and extreme weather events in particular floods might have had an impact on reduced yields. Additional factors like labour shortages for planting, cultivating, and harvesting might have led to reduced vegetable yields. Similar negative trends in terms of yields achieved per ha have been observed for fruits, particularly for berries. The only significant positive increase in yields has been observed in table grapes from 6.9 t/ha in 2020 to 7.9 ha in 2021. While the yields in wine grapes had a slight decrease by -5.0%.

According to the Green Report 2020[49], over 66,000 farmers were engaged in livestock activities. During the past decade, the sector has been characterized by growth driven by significant government and donor support (reflected in more investments) as well as growing local market demand for livestock, especially dairy products. Despite the growth and improvements, the sector still faces many challenges, mainly related to low productivity and poor infrastructure. While globally livestock is a major contributor to

[46] https://www.riinvestinstitute.org/uploads/files/2016/October/17/BUSINESS_INFORMALITY_5mm_bleed_no_inside_ENG_FINALV_31396438573147669 3005.pdf.

[47] Kosovo Agency of Statistics, accessed in April 2023.

[48] Kosovo Agency of Statistics, accessed in April 2023.

[49] https://www.mbpzhr-ks.net/repository/docs/Green_Report_2020r.pdf.

climate change (GHG emissions), in the local context (Kosovo), livestock challenges are predominantly associated with pollution of the air and the local waterways of surrounding communities, including water efficiency usage. The cattle stock in 2021 decreased by 861 heads compared to 2020 (260,528 heads). A similar trend has followed the self-sufficiency rate with beef, which constantly decreased from 61.1 % in 2017 to 43.9% in 2021. The quantity of milk produced has shown small variations from one year to another; in 2021 the quantity of milk produced was 278,746 t, covering almost 80% of the domestic demand. The sheep and goats stock in 2021 was 241,393 heads (out of which 87.6% is sheep), constituting 43.8% of the total number of animals. The decrease in 2021 in the sheep stock is negligible (0.1%).

Assessing farming, the agricultural landscape is very different from the one in most of the European Union Member States. One important characteristic of the agricultural sector is the overwhelming predominance of small-scale farming with a low level of market integration. In 2020, the average size of the agricultural holdings was 1.7 ha, including over 60% of holdings with a size of up to five hectares. Holdings with utilized agriculture area between two and five hectares are the most common – 35 percent of the total number of holdings. Thus, small farms/farm households are the prevailing producers here which mean that their productivity and sustainability are central to the performance of the overall agriculture as well as for rural economic growth. According to the FADN data 2019[50], 28% of the farms belong to field crops, followed by mixed farm type (crops and livestock) 27%, grazing livestock 21%, perennial crops (7%), and others (mixed crops and mixed livestock). There is no data on farms owned by females; however, if we take into consideration the number of applicants and beneficiaries for direct payments, we see that only 5% are female farmers. This shows that efforts should be made to address gender disparities through specific policies, programs, and initiatives that allow female farmers to have better access to resources and equal opportunities as male farmers.

Irrigation in Kosovo's agriculture sector is organized into two main categories: formal irrigation within large schemes managed by three Public Irrigation Companies, and informal irrigation within small schemes managed privately or by Water Users Associations. Of the total irrigated areas, surface irrigation accounts for 61%, sprinkler irrigation for 31.4%, and drip irrigation for just 7.5%.[51]

Large-scale irrigation is managed by three public enterprises under the Ministry of Economy:

- Ibër Lepenci J.S.C - sprinkler irrigation (irrigated area 1,881 ha)
- Radoniqi-Dukagjini - sprinkler and surface irrigation (5,100 ha)
- Drin - surface irrigation (1,442).

There is no detailed data available on irrigation surfaces by region and crop type. However, according to the 2014 Agriculture Census, 5.5% of the total utilized agricultural land, equating to 22,888 hectares, was irrigated. The primary irrigated crops were grain and green corn (6,236 hectares), followed by meadows and pastures (5,547 hectares), and vegetables (3,826 hectares).

[50] https://agridata.ec.europa.eu/extensions/FADNPublicDatabase/FADNPublicDatabase.html.

[51] MAFRD (2023). Green Report. https://www.mbpzhr-ks.net/repository/docs/Green_Report_2023.pdf.

To improve water management and reduce losses, the World Bank and Kosovo Government are modernizing the Radoniqi-Dukagjini and Iber-Lepenci irrigation schemes. This includes infrastructure rehabilitation, a Decision Support System, metering valves, and Supervisory Control and Data Acquisition (SCADA) in Radoniqi, and canal rehabilitation with SCADA in Iber-Lepenci.

Kosovo's irrigation development aims to provide essential water access to rural areas, transitioning to commercial agriculture and combating climate change. The Kosovo Irrigation Master Plan targets 136,000 ha for development, securing water for 107,000 ha. Priority projects span 72,000 ha, with an estimated CAPEX of EUR 591 million.

Forestry

According to the latest forest inventory from 2012[52], 45% of Kosovo's territory is covered by forest. The rate of forest cover in Kosovo is significantly higher than the world average (31%). The majority (62%) is state forest, of which 12% is placed in the protected zones National Parks[53]. State-owned forests experience regular wildfires often facilitated by hot and dry weather for long periods. The Law on Agriculture Land No. 02/L-26 (amended in 2022) defines the use, protection, regulation, and leasing of agricultural land, to preserve and protect the agricultural potential permanently, being based on the principles of sustainable development. Although there is no gender-disaggregated data on forest ownership, FAO assessments found that men owned approximately 98 percent of forests[54].

4.2.2 Population and settlements

According to the latest population census, conducted in 2011, Kosovo possesses a population of 1.8 million people with a dense concentration of 162.70 inhabitants per km^2. In this regard, it should be emphasized that on April 5th, 2024, Kosovo's government began its first nationwide census since 2011. This census will provide updated data on population demographics, housing, and other socioeconomic characteristics. This data is essential to comprehend population scattering and resources within Kosovo's regions and settlements. Moreover, the updated data is decisive for the identification of vulnerable populations and communities, as well as for effective resource allocation and climate adaptation planning.

Kosovo has the youngest population in Europe. Yet, from 2020 to 2023, its average age increased by 1.20 years, ascending from 30.50 to 31.70 years, an indication of demographic shift towards aging. The fertility rate declined from 1.66 children per woman in 2016 to 1.51 in 2023, showing a decreasing trend within a relatively short timeframe. Over 90% of children complete upper secondary education.

The total number of settlements is 1,469, with the majority of the citizens (63%) concentrated in Gjakova, Peja, Prizren, Podujeva, and Lipjan. Areas with the highest population density, such as Fushë Kosova, Prishtina, Ferizaj, Prizren, Peja, and Gjilan are the settlements that have economic, social, and cultural opportunities, but the same time need robust infrastructure e.g. water supply, sanitation, housing, transportation,

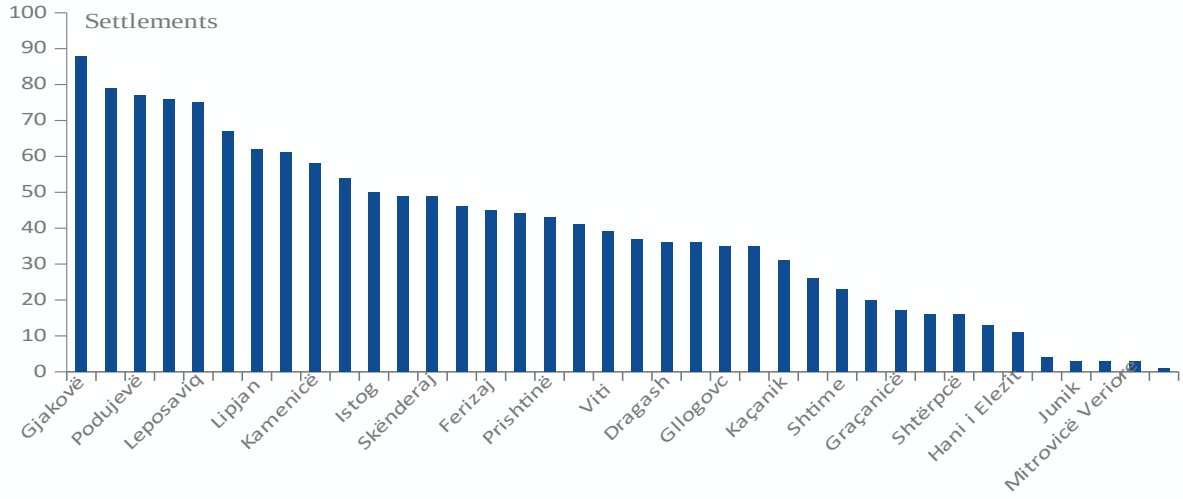
[52] https://nfg.no/wp-content/uploads/2019/01/Kosovo-National-Forest-Inventory-2012.pdf.

[53] https://www.mbpzhr-ks.net/repository/docs/Kosovo__Green_Report_2022.pdf.

[54] FAO 2017. https://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/1037616/.

healthcare. High population density puts a higher pressure (pollution, deforestation, and demand for energy) on natural resources and the environment.

Figure 32: Concentration of settlements per municipality



Source: Kosovo Agency of Statistics (2023)

Kosovo has excellent road infrastructure, featuring a widespread network linking major cities. A length of 330 km highway to Albania and North Macedonia, plays a pivotal role in the connectivity of the country. In addition to economic growth, this robust connectivity fosters regional integration and strengthens Kosovo's strategic importance in the region.

Kosovo has approximately 350,000 households and 412,000 apartments, with an average of 13 m² per resident. Kosovo is one of Europe's leaders in home ownership, with 97% of residents owning their residences. This reflects remarkable self-sufficiency in housing, contributing to a stable residential landscape and sustainability. However, according to a survey conducted by the FAO in 2022, only 12 percent of houses were owned by women. The Law on Property and Other Real Things (2009) provides equal rights for both women and men to own and inherit property. However, significant gender disparities exist in actual ownership. Men own 79 percent of land in Kosovo[55]. Only 17 percent of women in Kosovo own immovable property, including land[56]. According to the last Agriculture Census (2014), men owned 95.1 percent of agricultural land. There are a total of 1,116 schools, indicating an extensive educational institution network dedicated to fostering knowledge and learning across various communities. In 2020, higher education was offered by 9 public institutions and 22 private institutions. Among the public ones, six are universities, one is a University of Applied Sciences, one is a faculty, and one is an Academy.

Kosovo possesses seven regional hospitals, more than 200 public primary healthcare centres, and over 2000 licensed private health institutions. The widespread healthcare infrastructure ensures access to primary medical services of inhabitants across all municipalities and settlements and fosters community well-being and healthcare quality nationwide. Across all municipalities in Kosovo, there are a total of 40 centres for social

[55] Kosovo Cadastral Agency 2022.

[56] USAID 2018. https://2017-2021.state.gov/womens-property-rights-in-kosovo%E2%80%8A-%E2%80%8Aclaiming-what-is-granted-by-law/.

work that provide social services at the municipal level, while the number of families under the social schemes is 25,755. Even though Kosovo has the youngest population in Europe, the total number of youth centres is only 14.[57] Youth centres provide a safe and supervised environment for young people including programs and activities aimed at developing various activities. There are a total of 4 elderly care homes within the country, offering services to the needs of seniors. It is estimated that around 62% of the population lives in rural areas. Despite the positive growth rate of GDP (5.2% in 2022 compared to the previous year), Kosovo is still encountering common challenges of transition economies like poverty, unemployment, income inequality, and migration. The real economic growth is mainly driven by service activities (34.7%), wholesale and retail trade (18.8%), transportation (14.4%), manufacturing (10.6%) and construction (8.8%).

According to a World Bank and Kosovo Agency of Statistics (KAS) report[58], it is estimated that 17.6 % of Kosovo's population lives below the poverty line, with 5.2 % of the population living below the extreme poverty line, where nearly two-thirds of poor and three-fourth of extremely poor people live in rural areas. Women-headed households are more likely to be poor than men-headed households. In 2017, 18.9 percent of women in Kosovo lived in poverty compared to 17.2 percent of men.[59] This is also reflected in disparities when it comes to business ownership. According to the Kosovo Business Registration Agency, of the total number of active businesses only 18% are owned by women.

Of the annual household income, 43% is spent on food, thus exposing rural households to food nutrition security risks adding to this high dependency on remittances and agri-food trade deficits. A high unemployment rate and a lack of quality jobs have contributed to poverty and income insecurity. The unemployment rate remains high (12.6% in 2022), being higher for females at 16.5% compared to males at 11.0%. Trade, manufacturing, construction, and education sectors employ more than half of employed people.

4.3 Climate change risks and vulnerability

As the global economy struggles to curb GHG emissions, climate change continues to advance. Globally, a temperature increase of 1.2°C has already been observed. The IPCC (2023) forecasts a best case of reaching at least 1.5°C of global warming in the near term in considered scenarios and modelled pathways. These developments are connected with various types of climate hazards (see section 4.3.2.), which are already felt in Kosovo, and which are projected to worsen following climate projections for the country (see section 4.3.1.). The hazards, impacts and associated vulnerability of climate change are especially felt in the two focus domains, the AFOLU sector and the domain of population and settlements (sections 4.3.2.1 and 4.3.2.2).

[57] State Strategy for Youth 2024-2032.

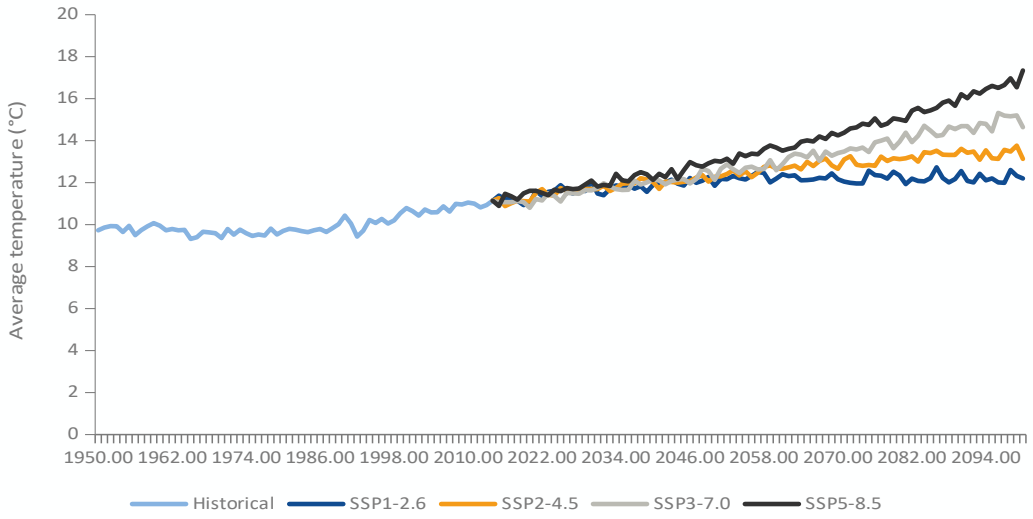
[58] World Bank and KAS 2019. https://documents1.worldbank.org/curated/en/210201560762490515/pdf/Consumption-Poverty-in-the-Republic-of-Kosovo.pdf.

[59] Embassy of Sweden. 2017. *Multidimensional Poverty Analysis 2017*.

4.3.1 Climate projections

Already today, there are significant changes in terms of both the water balance and land surface temperatures in Kosovo[60]. Even in a future where global average temperatures only slightly exceed the Paris Agreement's goals (see Figure 30, SSP 1-2.6), average mean surface temperatures in Kosovo are likely to suffer an increase of two degrees as compared to last century's levels. A current worst-case scenario estimates an average temperature increase of circa 6.5 °C (Figure 30, SSP 5-8.5). By the end of the century, this temperature increase would bring along several adverse effects to the region events such as appearance of hot days in higher altitudes, increase of 20-30 hot days in lower altitudes, 2-5 more heatwaves during a year with a prolonged duration of 5 to 15 days. In addition to an expected increase in temperatures, precipitation patterns are being influenced by climate change too. The median precipitation level in Kosovo already decreased by circa 100 mm since 1951[61].

Figure 33: Projected average mean surface temperature in Kosovo (reference period 1995 – 2014)

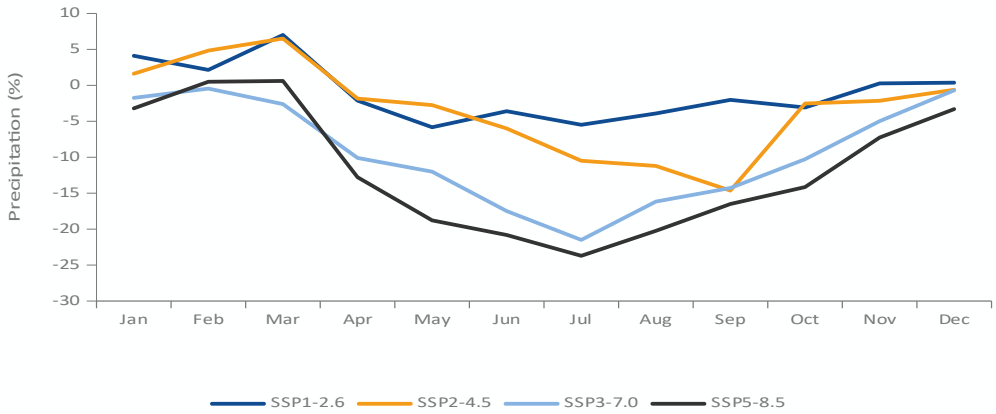


Source: World Bank. Climate Change Knowledge Portal

Figure 34: Projected precipitation percentage change anomaly for 2080-2099 in Kosovo (reference period 1950-2014)

[60] Sanchez et al. 2023: https://www.researchgate.net/publication/371829293_AGRO-TOURISM_IMPACT_ANALYSIS_OF_CLIMATE_CHANGE_USING_GOOGLE_EARTH_ENGINE_IN_THE_RAHOVEC_WINE_REGION_OF_KOSOVO

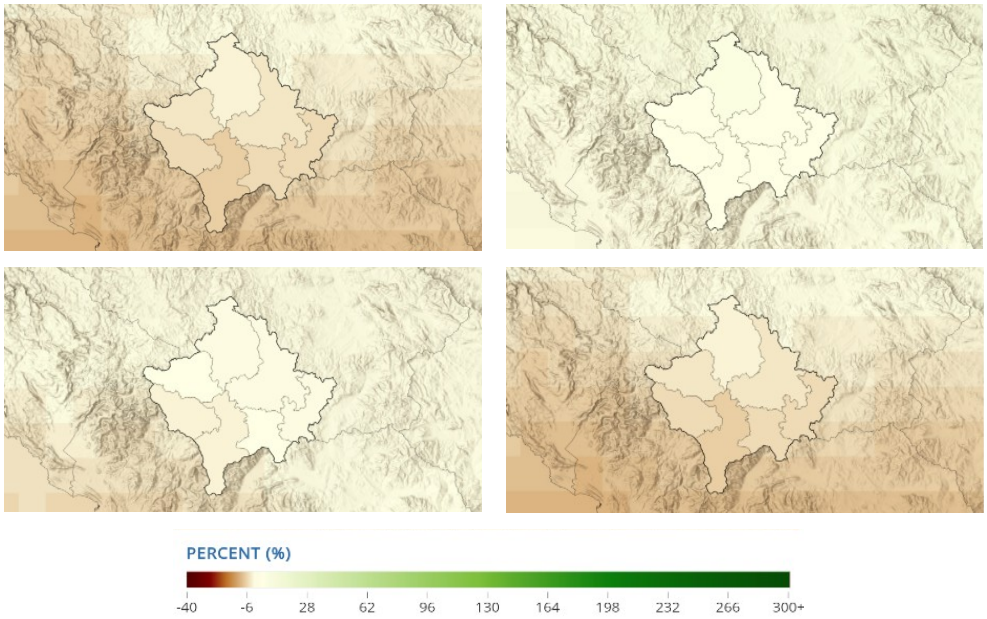
[61] World Bank Climate Change Knowledge Portal. https://climateknowledgeportal.worldbank.org/.



Source: World Bank. Climate Change Knowledge Portal

According to the World Bank's Climate Change Knowledge Portal, in the future, the time of the year that is ought to experience the most severe changes in precipitation patters is between June and September. The estimated drop in rainfall levels ranges between -6% and -23% by the end of the century across scenarios (see Figure 34). Southern Kosovar regions are more likely to be impacted by these changes. Figure 35 displays the geographical distribution of changes in precipitation levels from 2020 (upper left) through 2100 (bottom right) in WB's SSP 3-7.0 scenario.

Figure 35: Geographical change in distribution of precipitation in Kosovo (2021-2100)



Source: World Bank. Climate Change Knowledge Portal

4.3.2 Climate change hazards, impacts and vulnerability

Kosovo is highly prone to a wide variety of natural hazards - including floods, landslides, droughts, earthquakes, and wildfires. A globally changing climate will increase the

frequency and intensity of some of these events. The IMCCS expert group[62] (2022) projected climate risks in the Western Balkans, disaggregating its results into seven categories (coastal flooding, riverine flooding, tropical storms, landslides, droughts, heatwaves and wildfires). Out of these, Kosovo was found to be at risk of fives of these hazard types:

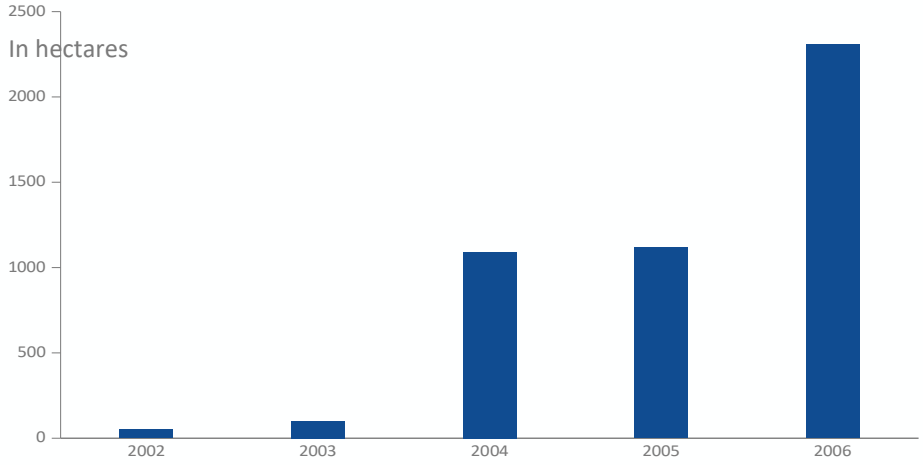
1. Riverine flooding
2. Tropical storms
3. Droughts
4. Heatwaves
5. Wildfires

The economy-wide impacts of these climate hazards are estimated to be significant, with damages from floods, droughts and heatwaves estimated to result in a 4% reduction in Kosovo's 2050 GDP[63]. While this number is rather low when compared to estimates for the other WB6-countries, it still shows the significant threat of climate hazards for Kosovo's future economic development.

These five hazard types and the specific vulnerabilities and damage potential associated with them are elaborated below, also including specific assessments of risks for the two focus domains (AFOLU as well as population and settlements).

Floods: About 491 km of rivers in Kosovo are at risk of flooding with higher risks particularly in the Drin river basin ("Drini"), which covers 40% of the country's territory. In this river basin only, the recurring flood events often affect over 1.000 hectares of land each year.

Figure 36: Area in hectares affected by floods in the Drin river basin (2002-2006)



Source: MESPI

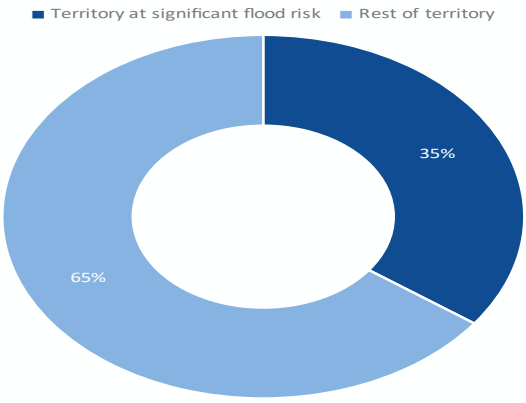
The number of flooding events is constantly increasing in the last two decades with an average number of 18 cases per year. Overall, it is estimated that 65% of the total

[62] https://imccs.org/climate-security-snapshot-the-balkans/.

[63] World Bank 2024. https://openknowledge.worldbank.org/entities/publication/ab6bfceb-9501-4587-a67a-b783dfa1ca6b.

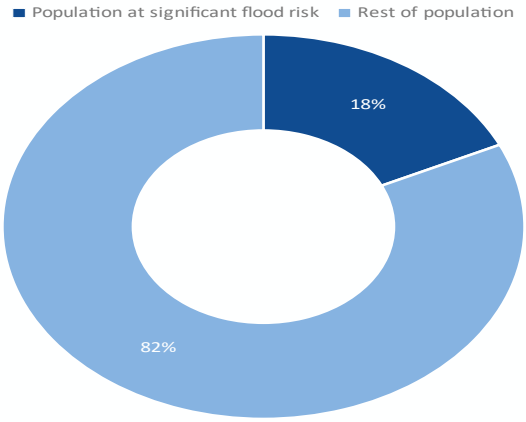
territory of Kosovo, comprising 82% of the population, is at risk of flooding, concentrated mainly in the north-eastern part of the country.

Figure 37: Share of territory at significant flood risk



Source: MESPI

Figure 38: Share of population at significant flood risk



Source: MESPI

A comprehensive Preliminary Flood Risk Assessment for the Drin River basin examined 834 cadastral zones covering 7,056 km². Among these, 123 km² face flood risks, affecting 341,244 residents across 57,784 households. In addition, 32 cultural landmarks, 57 protected areas, and 538 economically vital zones are vulnerable.[64] The assessment identifies 398 areas with potential significant flood threats, including 108 at extreme risk, 95 at very high risk, and 195 at high risk. Between 2003 and 2022, flood damages covered 9,895.50 hectares, flooding 1,278 residential and commercial structures, amounting to an estimated value of 28.9 million Euros. Given Kosovo's economic situation and its size, this data shows that floods have had profound impacts on both land and property. This dual vulnerability stresses the urgent need of well-developed adaptation strategies and

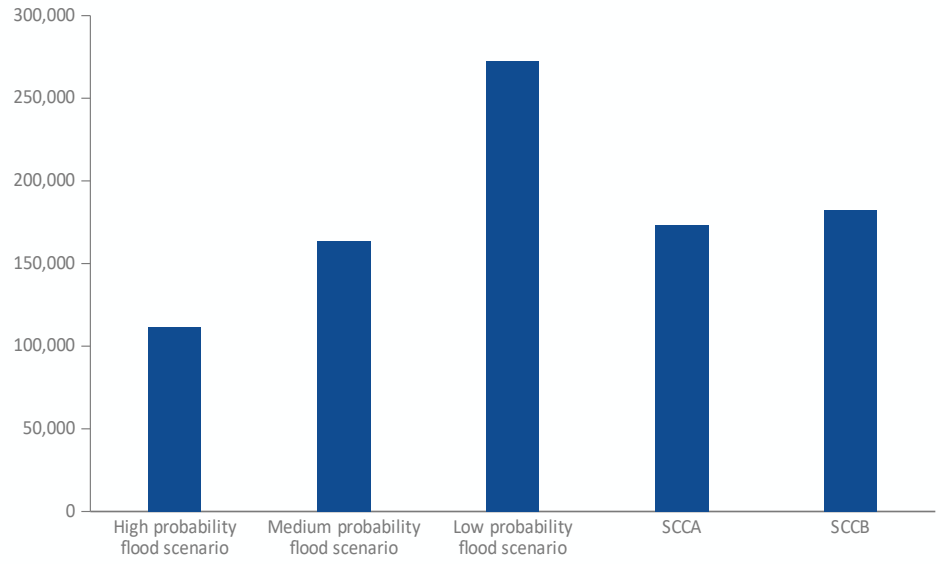
[64] Preliminary Flood Risk Assessment for the Drin/Drim – Buna/Bojana River Basin, 2018.

community resilience initiatives to protect lives and infrastructure from the damages of flood.

This conclusion is further emphasised by an ongoing analysis on flood risks across all river basins in Kosovo. With the goal of providing a comprehensive evaluation of floods risks in the country and establishing a framework for future flood risk assessment, this analysis commissioned by the EIB and implemented by the WBIF Technical Assistance–Infrastructure Project Facility 11 - COWI|IPF is developing comprehensive flood hazard and risk maps for Kosovo.

Preliminary results across different flood and climate change scenarios underline the vulnerability of Kosovo to flood hazards which is further amplified by climate change. As the graph below shows, the number of people across the country affected by different flood scenarios range from 112,000 to 273,000, depending on the type of flood scenario (low to high probability) and climate change scenario (RCP 4.5 vs RCP 8.5[65]) considered. Results regarding affected economic values are similarly alarming, ranging from 4.2 bn EUR to 14.6 bn EUR.

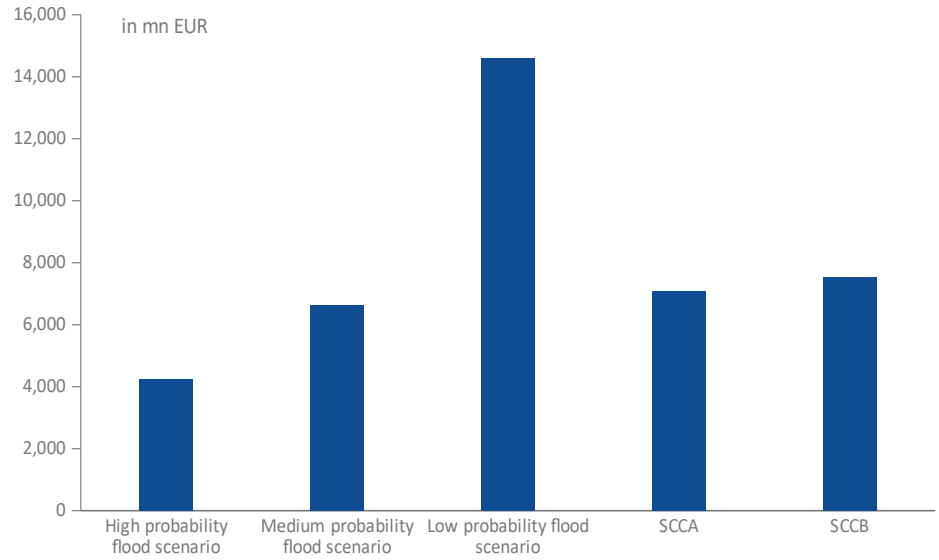
Figure 39: Size of population affected by different flood scenarios (number of people)



Source: Preliminary results - Flood risks maps and flood hazard maps for all river basins in Kosovo, EIB - Western Balkans Investment Framework Technical Assistance, 2024.

Figure 40: Affected economic values (million EUR) in different flood risk scenarios.

[65] For assessing the impact of climate change on flood risks in Kosovo, two climate change scenarios are considered in the analysis – the Scenario Climate Change A (SCCA) and B (SCCB), based on the greenhouse gas concentration scenarios RCP scenarios 4.5 and 8.5., respectively.



Source: Flood risks maps and flood hazard maps for all river basins in Kosovo, EIB - Western Balkans Investment Framework Technical Assistance, 2024.

Storms: Kosovo is a landlocked country with no coastline, making it, unlike some of the other countries in the wider region, principally less susceptible to the risk of tropical storms. However, hailstorms and heavy rain occurrences still pose a major risk for Kosovo, especially when the AFOLU sector is concerned (see section 4.3.2.1)

Droughts: Kosovo's susceptibility to summer droughts has been increasing in recent years. This situation stems from its reliance on limited water inflows, mainly from the Iber River, and a lack of adequate storage capacity. Throughout the past two decades, Kosovo has encountered repeated drought episodes, particularly in 1993, 2000, 2007, 2008, and 2014. The droughts experienced in 2007 had a particularly severe impact, resulting in the drying up of numerous rivers, including the renowned Mirusha Waterfalls.[66] Between 2009 and 2017, droughts, with their devastating effects in particular on agriculture, have led to economic losses of over 50 million euros, mainly attributable to crop failures. For instance, during the summer of 2022 alone, record droughts heavily affected agricultural production through crop failures, affecting more than 10% of Kosovo's territory[67].

Heatwaves: The increased occurrence of heatwaves is a key climate hazard to which Kosovo is becoming increasingly vulnerable following the predicted increases in temperatures. Since the 1960s, the country and region have seen increasing temperatures with the greatest warming taking place in the summer. This also includes an increase in the frequency and severity of heatwaves[68]. For instance, 2017 saw a series of heatwaves in Kosovo and the wider region, featuring record temperatures over 40°C (EU Commission 2017). In the near future, the occurrence of heatwaves is predicted to increase further with 2-5 more heatwaves during a year with a prolonged duration of 5 to 15 days.

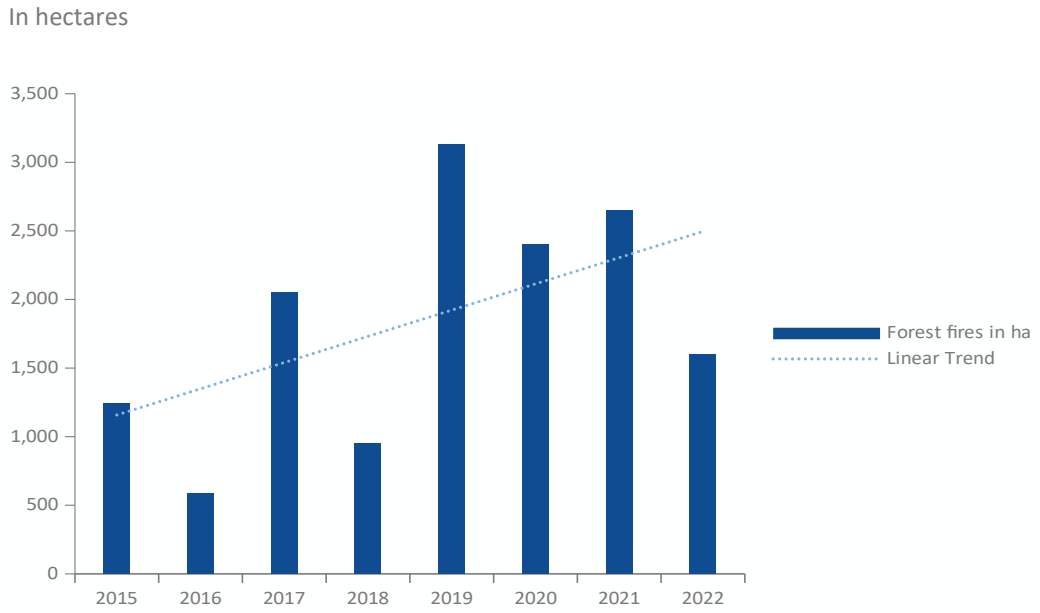
[66] USAID, 2017.

[67] EEA 2023. https://www.eea.europa.eu/en/analysis/indicators/drought-impact-on-ecosystems-in-europe?activeAccordion=546a7c35-9188-4d23-94ee-005d97c26f2b.

[68] USAID, 2017.

Wildfires: The acceleration of temperatures has led to a notable rise in forest fire occurrences and impacted areas. According to the reported data, from 2015 to 2022, a continuous increase in both the frequency of incidents and the expanses affected by these fires has been observed. Most of the forest fires incidents (65%) occurred in state-owned forests.

Figure 41: Forest areas affected by fire, 2015-2022



Source: Green Report 2014-2023.

4.3.2.1 Risks for the AFOLU sector

The main challenges posed by climate change in the agriculture sector in the region will entail extreme disturbance of phenology dynamics, increased risk of late spring frost in the near future, decrease in yield mass and quality toward the end of the century, gradual decrease of climate suitability in present varieties, increased risk for livestock due to rising temperatures, probable degradation of pastures, and increased erosion and degradation due to anomalies in precipitation patterns[69].

According to Sanchez et al.[70], the vulnerability of the viticulture sector in Kosovo is especially high, due to significant changes in water balances and land surface temperatures. Within the crop sector, the most sensitive crops to climate change are considered apples, plums, grapes, raspberries, blackberries, peppers, walnuts, cherries, sour cherries, pears, beans, and maize. These agricultural crops are highly sensitive to climate change impacts, including spring frosts, extremely high temperatures, excessive rainfall, and hailstorms.

[69] World Bank 2018.

[70] https://www.researchgate.net/publication/371829293_AGRO-TOURISM_IMPACT_ANALYSIS_OF_CLIMATE_CHANGE_USING_GOOGLE_EARTH_ENGINE_IN_THE_RAHOVEC_WINE_REGION_OF_KOSOVO.

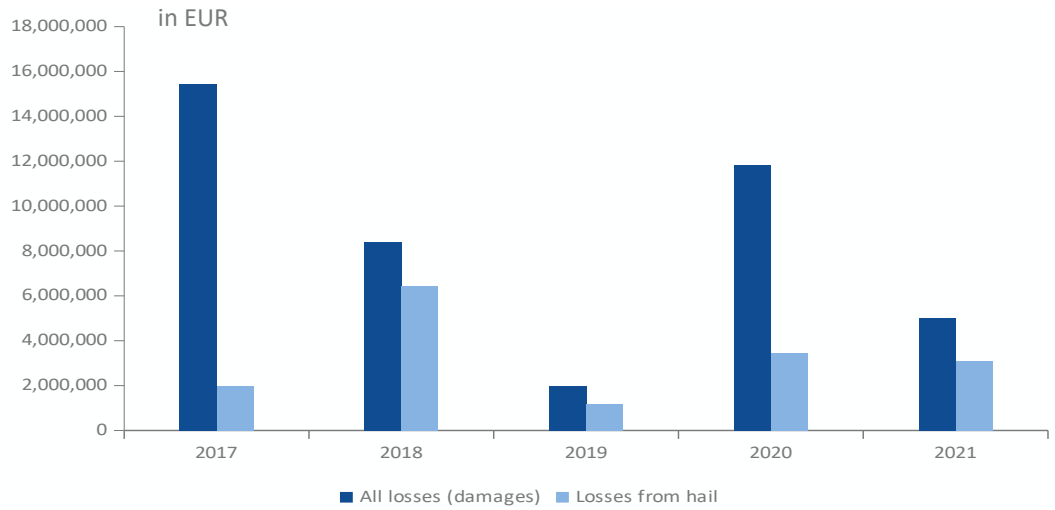
To address these risks, measures taken include the introduction of new grapevine varieties resistant to spring frosts and fungal diseases. However, Kosovo is not yet using crop modelling with CropWat, CropSys, or Aquacrop as a tool for decreasing these vulnerabilities. For example, AquaCrop modeling is a valuable tool for understanding water use efficiency and crop productivity.[71] Despite its usefulness in formulating adaptation policies in the AFOLU sector by allowing the simulation of the impact of different irrigation and water management strategies on crop yield and water use efficiency, there are no data showing the use of Aquacrop modeling to optimize irrigation practices and increase crop productivity. This may be due to resource constraints as well as capacity and data limitations.

In the forestry sector, there is a high risk of widespread forest degradation linked to the surge in fire frequency and spreading. Increased mortality derived from flash floods and faster weather change than migration, leading to widespread disappearance of present varieties is also expected.[72]

Many of these risks are already materializing in the present. For instance, the occurrence of spring frosts in 2016 and 2017, caused considerable damage, leading to a financial loss of around 23 million euros, indicating the high vulnerability of agricultural sectors to unpredictable weather conditions.

An additional climate factor posing significant challenges to agricultural production, in particular to grape and fruit growers, affecting both quantity and quality of production and imposing financial burdens is related to hailstorms. Between 2013 and 2023, approximately 1,179 hectares of vineyards underwent hailstorm damage. In 2020, the economic losses of this damage amounted to 3.4 million euros.

Figure 42: Damages reported by farmers in the period 2017-2021



Source: Evidence from the work of the Commission for the review of claims for compensation of damages.

[71] SWG (2023). *Crop adaptation to climate change*.

[72] World Bank 2018.

In rural areas, for example, 940 farmers lost productive assets, livestock and crops to flooding in January 2023. At the same time, the record droughts during summer 2022 heavily affected agricultural production through crop failures, affecting more than 10% of Kosovo's territory[73]. As the vast majority of farming households in rural communities are subsistence farmers, this loss of livelihood poses a direct threat to food security and further deterioration of socio-economic status. Recurrent droughts, increased water stress and flooding, and a lack of adaptive capacity in the agricultural sector could exacerbate these threats, increasing the risk of conflict and social tensions among the population over access and use of natural resources.

4.3.2.2 Risks for population/settlements

The allocation of water resources in Kosovo is unbalanced, with the majority (89%) being sourced from surface water such as rivers, lakes, and reservoirs. This dependency on surface water makes Kosovo vulnerable to high fluctuations in seasonal water availability and potential impacts of climate change. For instance, decrease or absence of snow in high altitude regions will negatively impact spring river discharge and regeneration of soil water reservoirs. Frequent hydrological droughts will affect summer river discharge[74].

The remaining 11% of water is drained from underground waters, which serve during periods of low surface water levels. Despite the larger share of water usage dedicated to household consumption (178 MCM/Year) and agriculture (140 MCM/year), the pressure on water resources is aggravated by inefficient water use and outdated infrastructure[75].

As a result of these dependencies, water resources for the region's population are projected to decrease as a result of changing patterns in the hydrological cycle. Given the lack of adaptation capacity in the water sector to cope with climate shocks, increased water stress could increase the risk of social tensions over access and use of water resources and disrupt socio-economic stability.

Human health will also suffer significant stress due to the changing climate. Events like an increase in the frequency and severity of heat waves, reduction in the quality of drinking water compounded by overall scarcity, and higher likelihood of spread of vector-borne diseases, will pose considerable sanitary challenges. Land transport infrastructure is expected to see higher risk levels derived from increased frequency and intensity of floods, extreme temperatures, and landslides[76].

Changes in this regard are already becoming palpable. February 2014 marked the driest month ever recorded in Kosovo, characterized by minimal snowfall and rainfall that led to the depletion of reservoirs. As a result, in 2014, the state water supply company in

[73] EEA 2023. https://www.eea.europa.eu/en/analysis/indicators/drought-impact-on-ecosystems-in-europe?activeAccordion=546a7c35-9188-4d23-94ee-005d97c26f2b.

[74] World Bank 2018. Kosovo Water Security Outlook. https://documents1.worldbank.org/curated/en/496071548849630510/Water-Security-Outlook-for-Kosovo.pdf.

[75] Hydrometeorological institute, Water in Kosovo. https://balwois.com/wp-content/uploads/old_proc/ffp-4o-237.pdf.

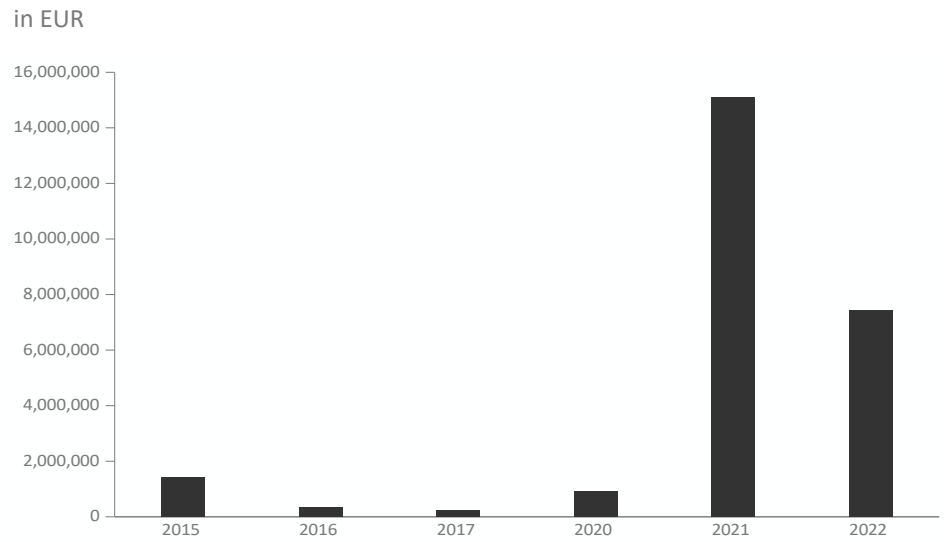
[76] *Ibid.*

Pristina, Kosovo's capital, was compelled to implement water rationing measures due to the acute shortage[77].

In January 2023, Kosovo experienced severe flooding. Urban and rural zones were affected by a rapid increase in water levels in a short period of time, which resulted in significant damage. More than 2656 households were affected, of which 785 suffered devastating impacts. Some 21,500 people in eleven municipalities of the country were affected, most reported to be already highly vulnerable households with low income. About 2,272 people were temporarily displaced, most in of them in Skenderaj. About 46% of households experienced flooding of 30-40 cm and more than 30% experienced flooding of 80-160 cm. The total damage to the household items was estimated to be 3.75 million Euros with an average of 5,102 Euros per household.

A similar picture emerges when looking at flood damages over time. In the period 2015-2022, aggregated flood damages amounted to over 25 million Euros, emphasising the profound destructive impact of climate hazards and need to build resilience.

Figure 43: Damages from floods in Kosovo (2015 – 2022)



Source: MESPI

Important measures to spur resilience are the implementation of an early warning system, development of long-range weather forecasts system and data dissemination among relevant stakeholders, exchange of knowledge and expertise on a regional level, and increase in quality of risk assessment[78]. In addition, there is a need to address the climate crisis through integrated policy and program solutions that not only build resilience to climate risks, but also contribute to strengthening social cohesion, especially among socially poor and vulnerable communities (see following subchapter).

[77] USAID 2017 as cited in World Bank 2018.

[78] World Bank 2018. Kosovo Water Security Outlook. https://documents1.worldbank.org/curated/en/496071548849630510/Water-Security-Outlook-for-Kosovo.pdf.

4.4 Adverse impacts on women, children and marginalised groups

Climate change exacerbates existing inequalities, disproportionately affecting women, children and marginalised groups. Existing inequalities in Kosovo are often related to limited access to resources: about 80% of land is owned by men, and limited access to credit leads to fewer economic opportunities for women. Disparities in education further exacerbate these inequalities: Evidence suggests that children living in rural areas and from marginalised groups have unequal access to pre-school education due to their distance from these institutions and insufficient funding. Only 14% of children in Kosovo attend early childhood education[79]. By further disrupting access to education and other basic services, climate hazards such as floods and storms further increase educational inequalities and thus inequalities in access to resources, especially for children.

These inequalities are also visible in the focus domains analysed in this NDC. For example, despite their significant contribution to the agricultural labour force (49%), women own only 4.9% of agricultural land and even less forest land (2%)[80]. This disparity perpetuates a cycle of economic marginalisation and vulnerability. As the impacts of climate change are projected to intensify, these inequalities are likely to worsen, as women, children and marginalised communities are at greater risk of climate-related disasters and disruptions, especially those dependent on agriculture. For instance, as climate change disrupts food production and availability, women farmers face increased vulnerability due to their significant presence in the agricultural labour force. Children, who require more food and water per unit of body weight, are also particularly vulnerable to disruptions in food production and related food insecurity.

Investment in Kosovo's public health system is modest compared to the needs of the sector. The actual health system is far from a satisfactory level, mainly due to budgetary constraints and poor management. In Kosovo, women are the main caregivers, making them more vulnerable to the health risks associated with climate change, such as increased frequency and intensity of heat waves and vector-borne diseases.[81] These health risks associated with climate change are also passed on to children, with exposure to heat during pregnancy linked to adverse birth outcomes such as preterm birth, low birth weight or even stillbirth. Children's unique vulnerability to heatwaves also puts them at greater risk of asthma, allergies, cardiovascular illness, and respiratory problems[82].

Air pollution is the largest environmental health risk for children in the Western Balkans, including Kosovo[83]. Scientific evidence shows that particulate matters PM2.5 and PM10 have lasting and negative effects on children's health and development, from

[79] UNICEF MICS 2020. https://www.unicef.org/kosovoprogramme/topics/multiple-indicator-cluster-survey.

[80] FAO 2017. https://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/1037616/.

[81] UN WOMEN 2023 https://www.unwomen.org/sites/default/files/2023-11/working-paper-the-climate-care-nexus-en.pdf.

[82] Beat the Heat, UNICEF Europe and Central Asia https://www.unicef.org/eca/reports/beat-heat

[83] IHME 2021 Global Burden of Disease

neurodevelopmental damage and neurodegenerative disease to chronic obstructive pulmonary disease, and cardiovascular disease[84].

Natural disasters caused by climate change, such as floods, can lead to the displacement of people. For example, in January 2023, floods in Kosovo displaced many families, including the Roma community in Roma Mahalla/Mahala whose homes were rendered almost uninhabitable. Women, children and marginalised groups may be disproportionately affected by displacement and face increased risks of discrimination in new resettlement areas. In this regard, women, children and other marginalised groups may face challenges in accessing health care, education and employment opportunities in these new environments. In addition, marginalised groups often lack adequate representation in decision-making processes, further marginalising them.

The Ministry of Environment will ensure that marginalized groups, which are particularly vulnerable to the impacts of climate change and natural disasters, are included in:

The development of educational and awareness-raising activities, both within and outside the curriculum, on responding to natural disasters (e.g., fires, earthquakes, accidental pollution) and climate-related events, also including psychological support after disasters.

Improving preparedness for natural disasters related to climate change, in cooperation with other institutions, by strengthening access to emergency services for intervention and evacuation, as well as ensuring the availability of first aid kits in homes and educational institutions.

Ongoing information and awareness campaigns, as well as the creation of groups (Eco Clubs, Green Clubs) in schools that work for the environment (educational and informational campaigns, clean-up activities, greening, etc.) on climate change.

Public information (including youth) based on clear indicators showing the progress in solving environmental issues and the implementation of climate change mitigation and adaptation measures.

Kosovo's legal structure for gender equality is generally in line with international norms and policies. However, laws and strategies specific to sectors such as agriculture, rural development and climate change do not adequately incorporate a gender perspective or take adequate measures to address gender-specific needs. In addition, subordinate legislation needs to better define responsibilities and processes to ensure that Gender Equality Impact Assessments (GEIAs) are carried out as required by law and that officials collect and monitor gender data more effectively. According to the recommendation, all future policies and legislation will be subject to a Gender Equality Impact Assessment (GEIA). To date, environmental policies and legislation have not fully incorporated gender impact assessments or focused on promoting gender equality[85]. An exception in this regard is the current development of the draft NECP for which a Gender Impact Assessment has been carried out.

[84] UNICEF 2023 Breathless beginnings https://www.unicef.org/eca/media/30816/file/Breathless%20beginnings.pdf

[85] USAID and Kosovo Women's Network 2016. https://womensnetwork.org/wp-content/uploads/2018/10/20161108211545508.pdf.

Although gender and vulnerability analyses can help identify and address the specific needs of women, children and marginalised groups in relation to environmental adaptation, the availability of such analysis is very limited. The impacts of climate change on ecosystems and livelihoods vary across settlements and seasons but are more severe for marginalised groups such as rural women, particularly those dependent on agriculture.

Standing differences, for instance, between women and men or children and adults show that adaptation measures must be tailored to women and marginalised groups to ensure equity and resilience in the face of environmental challenges. Inclusive decision-making processes ensure that their voices are heard and integrated into policies and climate adaptation plans. For women involved in the agricultural sector, the development and provision of training programmes in climate-resilient agricultural practices and disaster preparedness is critical to their resilience.

Climate change disproportionately affects women and girls, particularly in accessing sexual and reproductive health (SRH) services during climate-related disasters. Gender-responsive adaptation policies should ensure the availability of SRH services, including mobile clinics (for the most affected areas), emergency contraception, and maternal health support, to mitigate the impacts of climate-induced displacement and disasters.

In general, improving access to health services and sanitation, particularly for women, children and marginalised groups, and design and implementing climate and shock responsive social protection programmes tailored to their needs providing a reliavble safety net in the event of climate-related disasters. Finally, awareness raising and advocacy for policies and programmes that address the specific needs of women, children and marginalised groups are needed to mobilise support for gender-responsive adaptation at all levels (local, regional and national). Overall, enhancing access to healthcare and sanitation—especially for women, children, and marginalized groups—while designing and implementing social protection programs tailored to their needs is crucial. These programs should be flexible enough to adapt to crises and shocks, providing a reliable safety net in the face of climate-related disasters.

4.5 Adaptation: Key strategic documents and targets

According to the IMCCS[86], with a score of 22 out of 100 (0 best – 100 worst), Kosovo faces the lowest disaster risk of all the countries in the region. However, it is also the least prepared to cope with the adverse effects of climate change. Kosovo's resilience to climate change scored 36.5 out of 100, being well below the regional average (52.0) and only half as well rate as Slovenia (67.6). To improve this situation, Kosovo is already taking steps to enhance its climate resilience.

Kosovo's adaptation efforts to this end are embedded in its general climate change agenda. Kosovo is signatory of the Sofia Declaration on the Green Agenda as part of the 'Berlin Process'. This will serve as important bedrock to foster changes and progress of the country towards the overarching goal of addressing climate change. As Kosovo is aspiring towards EU accession, the legislative framework is largely approximated with acquis communautaire.

The legislative framework for policy action in the area of climate change adaptation is set in the Climate Change Law, approved by the Government in 2024. The law reflects a strong commitment to combat climate change and foster climate adaptation across various sectors. To this end, the law foresees the development of Kosovo's first Strategy on Climate Adaptation. The strategy will span a time horizon of ten years and will include an Action Plan for the implementation of foreseen policies and measures over three years. The work on the development of strategy is planned to start in September 2024. Preparatory work for the strategy development is already underway, including sectoral vulnerability assessments and the preparation of flood and drought risk maps which will serve as an evidence basis for the strategy.

While Kosovo does not yet have a dedicated strategic document related to climate change adaptation pending the development of the Adaptation strategy, policy targets and measures related to adaptation can be found across strategical documents. These are collected and summarized in Table 8 below.

Most importantly, the **Climate Change Strategy 2019-2028** and associated Action Plan sets out the policies and measures for adaption to climate change, acknowledging the increased exposure of Kosovo to climate hazards (especially droughts, floods, heatwaves and wildfires) and the already felt increased climate variability.

To this end, the strategy foresees three strategic objectives specifically related to climate adaptation:

1. Development of mechanisms and improving current disaster risk mitigation measures, in the sectors of economic importance that are particularly vulnerable to climate change.
2. To increase capacities of adaptation of natural systems.
3. To increase capacities of central and local stakeholders, to integrate climate change issues and adaptation to development processes.

[86] "The World Climate and Security Report 2022: Climate Security Snapshot - The Balkans. https://imccs.org/climate-security-snapshot-the-balkans/.

To achieve these adaptation objectives, measures are suggested across eight focus sectors, namely:

- Flood protection
- Drought, low flow and water scarcity
- Forest and biodiversity management
- Public health
- Information management and exchange
- Capacity building, training and awareness raising
- Finances, cost recovery and risk management
- Cooperation structures

In addition, adaptation is touched upon in several sectoral strategic documents, such as the following:

Agriculture: The second strategic objective of the **Strategy for Agriculture and Rural Development 2022-2028** focuses on the sustainable management of natural resources, encompassing land, forests, and water. Specific goals of this strategic objective target climate adaptation, alongside promoting renewable energy sources, emphasizing the promotion of sustainable practices in land, water, and air management and aiming for efficiency, resilience and long-term food security. Priorities are also related to biodiversity protection, enhancement of ecosystem services, and the conservation of habitats and landscapes. Jointly, these specific objectives form an inclusive strategic policy to address environmental challenges while fostering resilience and sustainability. By achieving targeted specific objectives, the agriculture sector aims to work towards a future through wisely managed natural resources and the creation of ecological integrity for upcoming generations.

Target values of the strategy include the following: 1) Compared to 2019 (baseline 6%), by 2024, agricultural GHG emissions will be reduced to below 6%, and less than 5% by 2027. 2) Gross nutrient balance by 2028 is the EU average 44kg/N/ha; 3) Achieve the EU average (93%) of ammonia emissions from agriculture (livestock sector) by 2028; 4) Increase of ha from 0 as baseline to 100 ha by 2024, according to the agro-environmental schemes for the protection of biodiversity and to 500 ha by 2028, according to the agro – environmental schemes for the protection of biodiversity. Maintenance of high natural biodiversity of pastures; 5) By 2028, reach the EU average (33%) of agriculture with High Nature value; 6) Decrease utilized agricultural area with very strong soil erosion from water (7% in 2029) to –5% by 2028.

Forestry: The **Forestry Development Strategy 2022-2030** draws on an inclusive approach to sustainably strengthening the forestry sector's role in environmental conservation and its contribution to socio-economic development through improved forest management plans ensure legal logging, prevent illegal activities, and recognize socio-economic and environmental values in forests. Thereby, the targets and measures outlined in the strategy also foster the ability of Kosovo's forests to serve as a source of resilience for the population, providing valuable resources and protection services.

To this end, the strategy aims to protect Kosovo's forests against biotic and abiotic factors and emphasizes sustainable practices and the use of forest resources, including timber and non-timber products. Additionally, it underlines the imperative of advancing capacities in forest management while adopting digitalization in forestry data collection and dissemination. The forestry strategy target values comprise: 1) Increase of forest area by 3% in 2030 (481,000 ha baseline); Increase of timber volume 5 000,000 m3 in 2024 to 15 000,000 m3 in 2030. 2); Reduction of illegal logging by 70% by 2030 (baseline 0.9 million m3); 3) Implementation of a long-term forest management plan 85% by 2023 (baseline 40%); 4) Improvement of institutional and technical capacity in the forestry sector (increased number of experts in forestry sector; 5) Digitization of forest data and transparency by 100% in 2030 (baseline 0%).

For the implementation of these policies, various institutional setups exist across different levels at national and local level responsible to manage, mitigate, and adapt to climate change impacts. At the national level, the Ministry of Environment, Spatial Planning and Infrastructure is responsible for the monitoring of the implementation of the Climate Change Strategy and the development of the Adaptation Strategy. The Ministry of Agriculture Forestry and Rural Development is responsible for implementing strategies and programs related to agriculture and forestry sector.

Table 8: Strategic objectives and targets on climate change adaptation

Strategic document	Strategic objective related to adaptation	Specific objectives	Description
Climate Change Strategy (2019 – 2028)	Development of mechanisms and improving current disaster risk mitigation measures, in the sectors of economic importance that are particularly vulnerable to climate change	Establishing mechanisms to reduce risk from disasters, for sectors that are vulnerable to climate change	By 2027: Reduction of uncontrolled settlements by 50% compared to 2010 Reduction of construction in endangered areas by 50% compared to 2010 Reducing flood threats by 60% compared to 2010
	To increase capacities of adaptation of natural systems	Improving the water balance through landscape improvement measures	Afforestation and reforestation of degraded areas around riverbanks by 90% compared to 2018
		Create better microclimatic conditions and more resistant landscapes to enable migratory species in more favorable habitats	Creating three corridors through tree planting
	Capacity building of central and local stakeholders, stakeholders and stakeholders to integrate climate change issues and adaptation to development processes	Capacity building for production of information, information use and communication	Realizing six trainings on risk assessment and management
		Development of awareness programs on climate change	Realization of two round tables, a forum and publication of a leaflet
		Avoiding potential climate impacts on health	Strengthening health systems as the most priority challenge of adapting to climate change

Strategic document	Strategic objective related to adaptation	Specific objectives	Description
Strategy for Agriculture and Rural Development (2022 – 2028)	Sustainable management of natural resources (land, forests, and water)	Contributing to mitigating and adapting to climate changes as well as renewable energy	By 2028: Decrease share of emissions from agriculture to below 6%
		Promoting sustainable and efficient land, water, and air management	Approximate EU average gross nutrient balance of 44 kg/N/ha
			Decrease share of the UAA with very strong soil erosion from water
			Decrease ammonia emissions from agriculture to EU average (93% of agricultural sources)
		Biodiversity protection, enhanced ecosystem services, and conservation of habitats and landscapes	500 ha of agricultural land are managed according to the agro – environmental schemes for the protection of biodiversity
Policy and Strategy on Forestry Development in Kosovo (2022-2030)	Enhancement of forest resources	Entire public forest area is administered with management plans	By 2030: 100% of forested covered by long-term management plans
		Forest area is increased	Increase in the forest area by 3% (baseline: 481 000 ha)
		Forests are improved through silviculture measures	12,000 ha area of even aged and mixed forest achieved through silviculture treatment (baseline: 400 ha)
	Protection of forest resources	Illegal interventions in forests are reduced	Reduction of illegal logging by 70% in 2030
		Consolidate fragmented forest lands	Increase of consolidated forest areas by 30%, baseline value 0
		Forest fire prevention measures are taken	Reduction the forest areas endangered by fires, by 80%, baseline value 26,000 ha
	Sustainable and multipurpose use of forest resources	Increase of regular logging	Increase of legal annual logging by 70%, baseline value < 20% (2021)
		Sustainable Forest Management (SFM)	Management of forests according to

Strategic document	Strategic objective related to adaptation	Specific objectives	Description
		criteria and indicators are defined and implemented	European sustainable management criteria and indicators by 100%, baseline value 0% (2021).
		Ecotourism is sustainably developed	Sustainable development of ecotourism by 80%, baseline value 0%.

4.6 Adaptation: Policies and measures

Building on the key strategic documents and targets in the area of climate adaptation introduced above, the following section outlines concrete policies and measures. To this end, this section touches upon both existing measures that are already under implementation in Kosovo (section 4.6.1.) and avenues for future measures (section 4.6.2.) that **could potentially be considered in the development of the adaptation strategy**. **Therefore, the following measures are not committed but only present potential for inclusion in the upcoming adaptation strategy which will be drafted in accordance with the results from the climate vulnerability assessment and the Climate Landscape Analysis for Children.**

4.6.1 Existing measures

The current **Climate Change Strategy 2019-2028** and associated Action Plan foresee numerous measures towards adaptation to climate change, formulated along the three objectives outlined above. The following summarizes the key adaptation measures outlined in the strategy. Given that the Action Plan only spans the period 2019-2021, up-to-date information on financing needs is not available.

Under the objective "development of mechanisms and improving current disaster risk mitigation measures", the following measures are foreseen:

Table 9: Policy measures under the objective improving disaster risk mitigation

Restriction of settlements/ construction in hazardous areas	Applying strict regulations to stop further construction and establishment of new settlements in high-risk zones.
Promotion of ecological construction	Promoting ecological constructions, vertical gardening and green roofs through campaigns.
Regulation of Sitnica river bed	Regulation of the riverbed to reduce flood threats to the maximum extent possible
Field planning	Field planning aimed at improving the water balance through e.g. altering land use patterns and restoring natural habitats
Study on climate incentives	Develop a study on possible climate incentives - in the form of taxes and tariffs, taking into account international practices and local economic circumstances

Under the objective "To increase capacities of adaptation of natural systems", the following measures are foreseen:

Table 10: Policy measures under the objective increasing the adaptation of natural systems

Planting trees/reforestation around riverbanks	Landscape enhancement measures like afforestation and reforestation along deteriorated riverbanks zones or regulating riverbeds stabilizes the soil in the riverbeds, thereby ensuring that rivers can handle increased water flow. This reduces the likelihood of flooding.

Creating corridors	Creating corridors through planting trees, thereby changing microclimatic conditions and softening heatwaves.

Under the objective "To increase capacities of central and local stakeholders, to integrate climate change issues and adaptation to development processes", the following measures are foreseen:

Table 11: Policy measures under the objective increasing capacities of central and local stakeholders

Training for SIG for mapping vulnerable areas/risk assessment and management	Data collection and utilization are vital for informed decision-making. Under this measure, professionals will be equipped with GIS skills for mapping vulnerable areas and conducting risk assessments.
Modernization of the hydrometeorological sector	Further developing the hydro methodological sector and its ability to accurately forecast weather-related events and issue early warnings for disasters.
Awareness programmes	Through the organization of workshops/seminars, individuals will be able to gain a deeper understanding of the climate change impacts on health indicators, vector-borne diseases, biodiversity loss, and the urgency to reduce these effects. Simultaneously, water conservation campaigns are planned, including preparational materials like informative leaflets and dissemination of information through multimedia channels.
Public health programmes	Increasing the involvement of the health sector (medical professionals, policymakers, and health workers) in extensive awareness-raising campaigns and capacity building through educational programs, workshops, and collaborative platforms to effectively tackle not only epidemics caused by climate change but also a wider range of health challenges caused by climate. These include respiratory diseases due to worsening air quality, heat-related illnesses, malnutrition from food insecurity, mental health stressors caused by displacement, and disruptions in sexual and reproductive health services.
Establishing a warning system for heat waves	Developing a warning system which will allow responsible authorities to effectively warn communities to avoid outdoor activities, hydration, and seeking shelters, particularly for vulnerable populations. This warning system will enable communities (individuals, health professionals, meteorologists) to effectively collaborate/communicate and to knowledgeably use strategies that minimize heat-related illnesses and enhance public safety during elevated temperatures.

Within the **Strategy for Agriculture and Rural Development 2022-2028**, additional measures for climate change adaptation are foreseen, contributing to the strategy's strategic objectives regarding sustainable management of natural resources (land, forests, and water). This includes the implementation of sustainable agricultural and environmental practices, agro – environmental schemes for the protection of biodiversity and subsidizing organic farming (see below).

Importantly, these measures promote important co-benefits between mitigation and adaptation. This concerns, for example, sustainable agricultural and environmental practice foreseen in the strategy, such as not burning carbon dioxide-emitting

incinerators. Another example is the use of practices that build soil carbon, such as no-till farming. Both reduce greenhouse gas emissions and improve soil health, making it more resilient to the effects of climate change. At the same time, mitigation and adaptation can be mutually reinforcing. For example, investment in solar or wind energy, as incentivised by the farmer subsidy scheme shown in Table 12, could have a negative impact on local ecosystems and thus adaptation benefits, depending on siting decisions.

Table 12: Adaptation Policies in the Strategy for Agriculture and Rural Development

Title	Agri environment and climate schemes (local breeds, organic farming, extensive grassland management)
Timeframe	2022-2028
Legal basis and planning documents	Law No. 03/L-098 ON AGRICULTURE AND RURAL DEVELOPMENT. Strategy for Agriculture and Rural Development 2022-2028. Action Plan of SARD 2022-2028.
Main Objective	**Strategic Objective 2:** Sustainable management of natural resources (land, forests, and water). **Specific objective 2.1:** Support in mitigation and in adaptation with climatic changes, like use of renewable energy.
Results to be achieved	GHG emissions from agriculture 6% in 2019, target value in 2024 <6% and <5% 2028. Maintaining a low level of GS emissions from agriculture.
Measures to be implemented	1. Introduce good agricultural and environmental practices aimed at improving carbon sequestration (for example, not burning incinerators). 2. Prioritize grants for farmers with investments in renewable energy. 3. Afforestation of opening areas. 4. Preparing of management plans
Budget (source of budgeting)	Planned budget: 570,000 Euros in 2022; 570,000 Euros in 2023; 570,000 Euros in 2024. Source: 1. Budget of Kosovo KP: 40400 – PM40400/DSHKT:17. 2. Budget KP:40700 –PM. 3&4. Budget KP 40300-KP
Implementing Entity	MAFRD & ADA

Title	Agri-environmental schemes for biodiversity protection.
Timeframe	2022-2028
Legal basis and planning documents	Law No. 03/L-098 ON AGRICULTURE AND RURAL DEVELOPMENT. Strategy for Agriculture and Rural Development 2022-2028. Action Plan of SARD 2022-2028.
Main Objective	**Strategic Objective 2:** Sustainable management of natural resources (land, forests, and water). **Specific Objective 2.3:** Biodiversity protection, improvement of ecosystem services and conservation of habitats and landscapes / nature.
Results to be achieved	By 2024, 100 ha according to the agro – environmental schemes for the protection of biodiversity. By 2028, 500 ha according to the agro – environmental schemes for the protection of biodiversity. Maintenance of high natural biodiversity of pastures.
Measures to be implemented	1. Extensive pasture management for high biodiversity lands in areas with proven biodiversity values, such as protected areas. 2.

	Preparation of guidelines for farmers and pasture users for the use and management of value-added pastures.
Budget (source of budgeting)	500,000 Euros. Source: 1. Donors and 2. Budget KP: 40400-PM.
Implementing Entity	MAFRD/Advisory services

Title	Organic farming
Timeframe	2022-2028
Legal basis and planning documents	Law No. 03/L-098 ON AGRICULTURE AND RURAL DEVELOPMENT. Strategy for Agriculture and Rural Development 2022-2028. Action Plan of SARD 2022-2028.
Main Objective	**Strategic Objective 3 -** Development of businesses in rural areas and increase of employment and social infrastructure. **Specific Objective 3.2:** Improve societal requirements for food and health, including safe, nutritious and sustainable food, reduction of food waste, and animal welfare.
Results to be achieved	21 farmers will receive funding each year for the adaption of organic farming practices.
Measures to be implemented	Organic farming -subsidizing / compensating for farmers who follow the rules of organic farming, as their production is usually lower against the ban on chemical fertilizers and pesticides.
Budget (source of budgeting)	400,000 Euros (time frame 2022-24). Source: Budget KP: 40100-SB.
Implementing Entity	MAFRD/Advisory services

The **Forestry Development Strategy 2022-2030** foresees the enhancement of the legal framework and law enforcement in the forestry sector as key steps towards climate adaptation. Strengthened regulations and their effective implementation are expected to restrict deforestation commence sustainable practices of forest management and improve forest resilience. Preparation of long-term forest management plans including sustainable practices of forest harvest, afforestation, and fire prevention.

Establishing a specialized Task Force committed to safeguarding the legality of timber sourcing is considered to be very important measure for forestry protection and thus climate resilience. With this, and other undertaken measures reduction of illegal logging is expected to drop **by 70% in 2030.**

Table 13: Adaptation Policies in the Forest Development Strategy

Title	Enhancement of forest resources
Timeframe	2022-2030
Legal basis and planning documents	Forestry Strategy 2022-2030.
Main Objective	Specific objective 1.2: Entire public forest area is administered with management plans; 1.6: Forest area is increased; 1.8: Improve of forests through silviculture measures.
Results to be achieved	1. Increase of forest area by 1% in 2024 and 3% in 2030, from

	the baseline value of 481 000 ha of forests. 2. Increase of timber volume by 5,000,000 m3 in 2024 and 15,000,000 m3 in 2030, from the baseline value of 42 000 000 m3. 3. Forested areas covered by long –term management by 90% in 2024 and 100% in 2030. The baseline value is 82%. 4. Forest areas covered by multi-purpose integrated forest management 10,000 ha in 2024 (2 pilot sites) and 20,000 ha by 2030 (5 pilot sites), baseline value 0. 5. Area of even aged and mixed forest achieved through silviculture treatment by 1400 ha in 2024 and 12,000 ha by 2030, baseline value 400 ha. 6. Area in ha of converted forests from coppice forests to high forests and support of the future trees by 600 ha in 2024 and 3000 ha by 2030, baseline value 0.
Measures to be implemented	Alignment of the forestry sector legislation with the EU Acquis. Forested areas covered by long –term management plans. Forest areas covered by multi-purpose integrated forest management plans in five pilot sites. Forest and forest land area inventoried. Regulation of titled holders and owners of public forests and their registration in the cadastre. Identification and registration of usurpations of forests and forest lands, as well as legal property disputes. Registration of forest lands by function. Increase (expansion) of forest areas.
Budget (source of budgeting)	Planned budget in 2024 is 1.5 Mil. Euros. Source: Budget of Kosovo and Donors.
Implementing Entity	MAFRD, KFA, MPMS, PPP, Donors.

Title	Protection of forest resources
Timeframe	2022-2030
Legal basis and planning documents	Forestry Strategy 2022-2030.
Main Objective	Specific objective 2.1.: Illegal interventions in forests are reduced; Specific objective 2.2.: Consolidate fragmented forest lands; Specific objective 2.5.: Forest fire prevention measures are taken
Results to be achieved	1. Reduction of illegal logging by 30% in 2024 and 70% in 2030, baseline value 0.9 million m3. 2. Increase of consolidated forest areas by 10% in 2024 and 30% in 2030, baseline value 0. 3. Reduction of the forest areas endangered by fires, by 50% in 2024 and 80% in 2030, baseline value 26,000 ha.
Measures to be implemented	Protection of forest resources through reduction of illegal logging, consolidation of forest lands, protection and monitoring of forests health, forest biodiversity conservation, and protection of forests from fires.
Budget (source of budgeting)	Planned budget in 2024 is 239,730.00 Euros. Source: Budget of Kosovo and Donors.
Implementing Entity	MAFRD, KFA, MESTI, JICA, Donors.

Title	Sustainable and multipurpose use of forest resources
Timeframe	2022-2030
Legal basis and planning documents	Forestry Strategy 2022-2030.
Main Objective	3.1.: Increase of regular logging; 3.2. Sustainable Forest Management (SFM) criteria and indicators are defined and implemented; 3.4.: Ecotourism is sustainably developed
Results to be achieved	1. Implementation of long-term management plans by 60% in 2024 and 85% in 2030, baseline value 40%. 2. Increase of legal annual logging by 50% in 2024 and 70% in 2030, baseline value < 20% in 2021. 3. Management of forests according to European sustainable management criteria and indicators by 20% in 2024 and 100% in 2030, baseline value 0%. 4. Sustainable development of ecotourism by 30% in 2024 and 80% in 2030, baseline value 0%.
Measures to be implemented	Simplify technical and administrative procedures for forest use; Regulate the issue of long-term logging permits; Define national sustainable forest management criteria and indicators; Capacity building of NWFP collectors and operators; Define potential areas for ecotourism, digitize and mark ecotourism paths.
Budget (source of budgeting)	Planned budget in 2024 is 450,000.00 Euros. Source: Budget of Kosovo and Donors.
Implementing Entity	MAFRD, KFA, MESTI, Donors.

The forest inventory will provide updated data that is essential for the development of successful adaptation strategies towards climate change. Assessment of species distribution, carbon storage, and ecosystem health via the forest inventory allows the development and implementation of targeted conservation and sustainable forest management practices.

The establishment of a forest land cadastre will serve as the cornerstone that thoroughly maps forest resources, their ecological characteristics and facilitates efficient and effective management of forests, including strategies against deforestation and wildfires. Forest land cadastre will enable the identification of the most vulnerable areas and accelerate forest biodiversity conservation efforts. Furthermore, it is expected to improve forest governance through the enhancement of transparency and accountability among responsible authorities and other stakeholders. Maintain and upgrade existing forest information system for better performance and its functionality. With this measure consolidation of forest lands will increase by **30% in 2030.**

The establishment of a system for the prevention and protection of forests from fires will serve as an early detection mechanism of forest fires and controlled burns including investments in firefighting infrastructure. With this measure, police makers aim to decrease endangered areas of forest by **80% in 2030.**

None of the public and private universities in Kosovo offer study programs in forestry. Hence, developing a forestry education curriculum is planned as a measure of creating future foresters with skills to manage forest resources sustainably and ensure resilient forests to climate change.

4.6.2 Avenues for future measures

While the Climate Change strategy and the sectoral strategies already make clear in which direction Kosovo is working to foster resilience and adapt to the impacts of climate change that are already being felt in the country, the Adaptation Strategy, which is currently under development will further strengthen this approach by suggesting additional measures.

Based on the two focus domains identified in this NDC, the development of the Adaptation Strategy could benefit from building upon both regional and international best practice measures in these two domains.

For the **AFOLU sector**, this includes, for instance, promoting the cultivation of a diverse range of crops, including heat-tolerant and drought-resistant varieties, to improve resilience against weather extremes. In addition, efficient irrigation techniques like drip irrigation can increase the efficiency of the use of scarce resources like water, preventing water scarcity (IAMO 2022). In that regard, harnessing rainwater and other alternative water sources can capture and store rainwater during dry periods and be one of the ways to fight droughts and water scarcity. Finally, integrating trees into agricultural systems (agroforestry) and using windbreaks protects crops from heat, strong winds and alleviate soil erosions, thereby boosting resilience.

In the domain of **population and settlements**, supplementing existing policy measures relating to an early heat warning system or green urban infrastructure with information systems like a heat hotline for elderly, SOP on heatwaves for schools or considering blue-green infrastructure options pose avenues for further developing the existing adaptation approach. The latter is also emphasised by the preliminary results of the aforementioned analysis conducted for the development of flood risk maps for Kosovo. Other recommendations derived from this assessment include the need to integrate flood hazard and risk maps into spatial planning and to provide floodplains to reduce pressure on existing flood protection systems.

Finally, developing robust instruments and indicators for monitoring the impact of climate change across the country based on improved data collection (including disaggregated data) will allow for generating evidence of the negative impact of climate hazards on economic indicators, thereby strengthening the economic case for adaptation measures. Such a data basis would also allow for targeted and systematic communication, awareness raising and capacity building on climate change impacts and adaptation needs in Kosovo.

5. Means of implementation

For successfully implementing the policy ambitions outlined in this NDC and thereby unlocking the policy potential outlined for significantly reducing GHG emissions, increasing the share of renewables and systematically building climate resilient in an inclusive manner, several enabling factors need to be ensured.

These include, firstly, institutional aspects, encompassing the necessary legislative arrangements, partnerships, and institutional capacity (chapter 5.1). Secondly, having access to the necessary and latest technology is key for fostering low carbon development and building resilience (chapter 5.2). Thirdly, implementing the policies and measures outlined in this voluntary NDC requires significant financial resources and thus accessing new sources of finance (chapter 5.3). Finally, systematic monitoring and reporting of the implementation of the measures put forward in this voluntary NDC will be key to ensure continuous progress within the timelines foreseen (chapter 5.4).

5.1 Institutional aspects

Committed to decarbonization and active participation in the global climate dialogue, Kosovo recently adopted the Climate Change Law, which, among other things, defines the legal basis for the development of this voluntary NDC. The Law also provides the institutional framework for a national greenhouse gas emissions reporting system for the development of GHG inventories and lays the foundation for the development of an Adaptation Strategy. The drafting of the secondary legislation is currently underway.

Kosovo established the National Council for Climate Change in January 2022. The Council has been involved in initiating the development of the voluntary NDC and is responsible for monitoring the implementation of the NDC. The Council monitors all strategic documents and action plans for climate change, in accordance with commitments under the Green Agenda for the Western Balkans and UNFCCC's regulations and standards. The Council consists of a number of Ministers and is chaired by the Ministry of Environment, Spatial Planning and Infrastructure. Article 6 of the Law on Climate Change sets all responsibilities of the Council. Within the Council, a Secretariat is already functioning. The Secretariat of the National Council for Climate Change, composed of representatives of line Ministries, is performing professional, administrative, and advisory work for the Council.

Knowledge and capacities relating to climate mitigation and adaptation are available within the public administration, the academic sector, civil society and the expert community. However, increasing and especially distributing the capacities needed for the efficient development and implementation of the policies set out in this voluntary NDC will be key to prevent bottlenecks relating to human capacities at the responsible institutions.

This also concerns the availability of data, which is key for effectively monitoring the policy ambitions set out in this NDC, ranging from the GHG to the forest inventory. While Kosovo is already collecting climate and environmental data in the context of such inventories and also reports data to the European Environmental Agency, both of which are publicly

accessible, issues with the coverage and regularity of data reported remain. Enabling institutions and staff to make this data available at a regular basis will thus be essential.

5.2 Technology transfers

Research and innovation as well as technology transfers are key to identifying and realizing the most effective policy measures relating to both mitigation and adaptation, making use of the most up to date possibilities.

In the context of mitigation, this, among other things, is relevant to the integration of renewable energy sources into the power system, which will require modernising and upgrading the electricity network and the installation of new power generating capacity. In addition, implementing energy efficiency measures requires using the most up-to-date materials and technologies. In the non-energy sector, the waste sector is an important example for the key role of technology, allowing for proper waste management as an important avenue for emissions reductions in this sector.

In the context of adaptation and climate risks, technology is key to improving the efficiency of resource use, for instance, by introducing new technologies in the water sector (e.g. drip irrigation) and livestock. Adapting the built environment by ensuring climate proof residential and productive infrastructure as well as health (and other social) facilities will also require accessing new technologies.

To pave the way for research and innovation in this regard, Kosovo's National Science Program 2023-28 defines natural resources, energy, environment and climate change as a priority area. To this end, research activities are foreseen in the following areas:

- Efficient use of natural resources
- Decarbonisation
- Continuous monitoring of the environment
- New materials for advanced energy, robotic, and sensor systems
- Environmental sustainability of industrial and transport systems

In this regard, Kosovo can also rely on its young and tech-savvy population and innovation ecosystem to further develop digital solutions in the areas of both mitigation and adaptation.

In addition to developing own innovative solutions, Kosovo is also actively welcoming technology transfer and cooperation with other countries, especially when it comes to innovation in the energy sector. This will be key for finding pathways to exit from coal-based electricity generation and reaching carbon neutrality by 2050 while at the same time ensuring security of supply.

5.3 Financing needs

Kosovo is demonstrating significant dedication in contributing to regional and global efforts in combatting climate change, promoting sustainable energy systems and fostering climate adaptation across sectors. These efforts culminate in the development of this voluntary NDC, detailing Kosovo's ambitions and the specific measures the country is planning to implement in this regard.

However, when it comes to the implementation of these plans, limited access to climate finance poses a key challenge for Kosovo, unlike the situation faced by other countries in the region. Given Kosovo's status in the UN and its non-membership in the UNFCCC, Kosovo has no access to UNFCCC-related funding opportunities for financing measures relating to climate change. This includes the following funds:

- Global Environment Facility (GEF)
- Green Climate Fund
- The Special Climate Change Fund
- Adaptation Fund

While not being able to rely on these key sources of climate financing, Kosovo is actively seeking alternative ways to realize the ambitions outlined in the NDC. The measures included in the Business-as-Usual (BAU) scenario are all already backed up with financing, with a significant share of these resources being committed from the public budget. For instance, the implementation programme of the Climate Change Strategy for 2019-2021 allocated 2.9 million EUR for climate policy.

In addition to allocating public funds, Kosovo is actively seeking financial support from the international community to realize its climate ambitions. Many of the key sectoral mitigation projects presented above are already supported by donors (see section 2.4 as well as sections 3.5.3. and 3.6.3.), including for instance the planned battery storage and solar district heating as key projects for the decarbonization of the energy sector.

Despite these efforts, a large share of the climate finance needed for realizing the mitigation and adaptation potential of Kosovo is not yet met. From the around 4.9 billion EUR required for mitigation measures to realize the GHG reduction potential of the NDC scenario (up to 42%[87] by 2030 compared to 2016)[88] approximately 2.9 billion EUR are

[87] The measures described in this document are part of a voluntary and conditional Nationally Determined Contribution (NDC). Apart from those approved at the government or parliamentary level through sectoral strategies, these measures are not commitments for which Kosovo assumes legal obligations and are not budgeted at the central level. Therefore, the goal of reducing emissions by 42% under the NDC depends on Kosovo's access to multilateral climate funds. If Kosovo is not included in multilateral climate funds and other international mechanisms, then it does not aim to reduce emissions beyond the level defined in sectoral strategies and consequently in the National Energy and Climate Plan (NECP). Within the NECP, a document that needs to be drafted because Kosovo has a legal obligation under the Energy Treaty, Kosovo aims to reduce annual greenhouse gas (GHG) emissions by 16.3% compared to 2016 levels, keeping emissions below 8.95 Mt CO2-eq.

[88] See chapters 3.5.3. and 3.6.3.

currently not backed up by financial commitments from the public budget or other sources. For adaptation, additional unmet financing needs of 2.8 bn EUR are estimated[89].

Table 14: Financing needs for reaching Kosovo's mitigation potential

Financing needs for mitigation policies to realize NDC reduction potential	EUR 4.9 bn
Of which uncovered	**EUR 2.9 bn**

To meet these financing needs and realizing its potential to contributing to the global fight against climate change, Kosovo is actively seeking alternative financing and support opportunities, amongst others by outlining concrete potential measures that could be implemented with additional support in this voluntary NDC.

Part of these efforts include the active participation in international climate conferences like to COP to present Kosovo's ambitions and specific situation to potential new partners. Aside from the political level, co-financing of projects with the private sector might include interesting avenues to generate the resources needed for realizing Kosovo's ambitions outlined in this voluntary NDC.

5.4 Monitoring and reporting

In order to monitor the implementation progress of the policy and measures outlined in this NDC, an official Working Group will be established by the Ministry of Environment, Infrastructure and Spatial Planning. This progress monitoring will serve to ensure that the outlined mitigation and adaptation ambitions are reached, conditional on the financial means available. It thereby shows the commitment of Kosovo towards these climate policy ambitions, especially given the fact that the country is under no official obligations to develop an NDC and to engage in regular reporting and monitoring activities.

As outlined in Article 18 of the Climate Change Law, the NDC will also be subject to regular reviews and updates, foreseen every five years. These reviews will also serve to adapt the conditional mitigation and adaptation ambitions outlined in this NDC to Kosovo's current conditions, especially in terms of access to financial means for implementation. Thereby, it is ensured that the ambitions and concrete measures contained in the NDC are up to date and reflect the current situation in the country. In addition, regular revision will ensure the congruency of the NDC with updates in key strategic and legislative documents, also including the NECP.

[89] World Bank, Country Climate and Development Report, 2024.

6. Outlook

This voluntary NDC is the first step towards determining Kosovo's national contributions to the global climate change agenda. As such, it provides a snapshot of Kosovo's mitigation and adaptation ambitions and policy plans which will be subject to further refinement based on e.g. the development of the Adaptation Strategy or the Low Emissions Development Strategy.

Nevertheless, this voluntary NDC already provides a clear picture of the path marked out by Kosovo's strategic and legislative documents in the climate space: As the modelling results presented in this NDC show, emissions reductions of up to 42%[90] until 2030, compared to 2016 levels, are possible based on the existing and additional mitigation policies and measures if Kosovo obtains access to climate finance. For adaptation, important steps have been taken by anchoring adaptation measures in both sectoral strategies for the agriculture and forestry sector and in the Climate Change strategy, acknowledging the threat that climate hazards already pose for Kosovo's population and economy and corresponding need to foster resilience.

However, successfully implementing the policies and measures that would allow for reaching these ambitions depends on several factors: most critically access to climate finance. Given Kosovo's specific situation when it comes to accessing many of the most important international climate finance funds, identifying new sources of climate finance that can cover the investment needs required for Kosovo's ambitious climate policy agenda will be a key next step.

To this end, this voluntary NDC will help in making both the ambitions and the concrete plans of Kosovo more transparent. As becomes evident, Kosovo's ambitions are well aligned not only with national legislation and strategies, but also with regional ambitions as formulated for instance in the Green Agenda for the Western Balkans and thus in the EU Green Deal. Going beyond this, this NDC showcases Kosovo's ambitions to also align with global efforts in the fight against climate change, presenting high emissions reduction ambitions despite currently not being part of global emissions accounting. Also, in terms of climate change adaptation, it becomes evident that Kosovo is already concretely affected by a wide range climate change impacts and thus faced with the urgent need to take targeted adaptation measures for building resilience. In taking the ambitions presented in this NDC further and taking part in the global climate agenda, new partnerships and cooperation will be key.

[90] The measures described in this document are part of a voluntary and conditional Nationally Determined Contribution (NDC). Apart from those approved at the government or parliamentary level through sectoral strategies, these measures are not commitments for which Kosovo assumes legal obligations and are not budgeted at the central level. Therefore, the goal of reducing emissions by 42% under the NDC depends on Kosovo's access to multilateral climate funds. If Kosovo is not included in multilateral climate funds and other international mechanisms, then it does not aim to reduce emissions beyond the level defined in sectoral strategies and consequently in the National Energy and Climate Plan (NECP). Within the NECP, a document that needs to be drafted because Kosovo has a legal obligation under the Energy Treaty, Kosovo aims to reduce annual greenhouse gas (GHG) emissions by 16.3% compared to 2016 levels, keeping emissions below 8.95 Mt CO2-eq.

7. Annex I: Overview of mitigation measures

Nr.	Sector	Policy Measure	Description	Assumed period of implement-tation	Scenario (BAU/NDC)	Quantitative effects	Investment amount (EUR)	Source of finance	Additional financing required for NDC (yes/no)	Priority
PAM 1	Energy supply	Phasing out one unit of coal TPP Kosovo A	Permanent closure of one of the units of Kosovo A, with a net installed capacity of 116 MW, once the refurbishment of the other lignite unit(s) has been completed in TPP Kosovo A, with an objective for decarbonization and promoting renewable energy.	2027-2031 (see PAM 41)	BAU	Permanent closure of 116 MW lignite capacity	n/a	n/a	Yes	High
PAM 2	Waste	Controlled management of solid waste	Increasing the percentage of municipal solid waste (MSW) collected and managed in controlled facilities via establishing a network of integrated waste management facilities.	2024-2030	BAU, extended in NDC	100% of MSW managed in controlled facilities by 2030, with 9% (BAU) / 31% (NDC) of it re-cycled/composted	69 mn (BAU) 320.7 mn (NDC)	Budget of Kosovo and Donors	Yes (251.7 mn)	High
PAM 3	AFOLU	Enhancement of forest resources	Enhancement of Kosovo's forests with management plans and implementation of silviculture measures. Improved forest management will translate into an increase in the capacity of forests to sequester carbon dioxide.	2024-2030	BAU, extended in NDC	Increase in forest area by 3% in 2030 (NDC). Biomass Increment by 2030: 3.22 m^3/ha (BAU) to 3.54 m^3/ha (NDC)	1.39 mn (BAU) 5.07 mn (NDC)	Budget of Kosovo and Donors	Yes (3.68 mn)	High
PAM 4	AFOLU	Protection of forest resources	Protecting forests from the increasing occurrence of forest fires through measures for decreasing the area affected by forest fires.	2024-2030	NDC	Reduction of area affected by forest fires from 2653 ha (baseline) to 1000 ha.	9.3 mn	Budget of Kosovo and Donors	Yes (9.3 mn)	High
PAM 5	AFOLU	Sustainable and multipurpose use of forest resources	Simplification of technical and administrative procedures for forest use; Regulation of the long-term logging permits issuing; Definition of national sustainable forest management criteria and indicators; Capacity building of NWFP collectors and operators; Defining potential areas for ecotourism and digitalizing and marking ecotourism paths.	2024-2030	BAU	n/a	1.5 mn	Budget of Kosovo and Donors	No	High

Nr.	Sector	Policy Measure	Description	Assumed period of implement-tation	Scenario (BAU/NDC)	Quantitative effects	Investment amount (EUR)	Source of finance	Additional financing required for NDC (yes/no)	Priority
PAM 6	AFOLU	Sustainable management of natural resources (land, forests, and water) in agriculture	Sustainably managing natural resources by introducing good agricultural and environmental practices to reduce GHG emissions from agriculture.	2024-2030	NDC	Reduction of crop fires by 50% by 2030 Increase of mineral fertilizer use from 43.66 kg N/ha to 150 kg N/ha by 2030. 20% less crop residues by 2030 10% less livestock by 2030 25% less CH4 by 2030	Until 2030: 25 mn for increase of mineral fertilizer use 4.51 mn for reduction of crop residues/reduction of crop fires 6.6 mn for reduction of CH4	Farmers, Budget of Kosovo: Support for Loans and agricultural extension services.	Yes (36.11 mn)	Low
PAM 7	AFOLU	Improved manure management (methods for storage, preparation, and application)	Advise farmers and purchase the appropriate technology (e.g. climate-friendly storage of manure) to decrease GHG emissions from agriculture.	2024-2030	NDC	20% higher share of daily spread MMS and 20% higher share of anaerobic lagoons	2.6 mn p.a.	Farmers, Budget of Kosovo: Grants for investments in physical assets of agricultural holdings. Prioritization of grants for farmers with investments in fertilizer depots for manure management.	Yes (2.6 mn p.a.)	Medium
PAM 8	AFOLU	Agri-environmental schemes for biodiversity protection	This measure focuses on actions like extensive pasture management for high biodiversity lands in areas with proven biodiversity values, such as protected areas, as well as the preparation of guidelines for farmers and pasture users to use and manage value-added pastures.	2024-2030	BAU	n/a	4.45 mn	Annual /part of the budget for Measure 1 (Grants for investments in physical assets of agricultural holdings). Source: Budget KP: 40700-SB.	No	High

Nr.	Sector	Policy Measure	Description	Assumed period of implement-tation	Scenario (BAU/NDC)	Quantitative effects	Investment amount (EUR)	Source of finance	Additional financing required for NDC (yes/no)	Priority
PAM 9	AFOLU	Promotion of organic farming	This measure envisages an introduction of subsidies/compensation for farmers who follow the rules of organic farming to improve societal requirements for food and health, including safe, nutritious, and sustainable food, reduction of food waste, and animal welfare.	2024-2030	BAU	n/a	1.5 mn	Budget of the Ministry of Agriculture, Forestry and Rural Development	No	High
PAM 10	Energy supply	Promotion of renewable energy in the electricity sector	This measure will contribute to increasing the production from domestic energy sources and the share of RES while decreasing GHG emissions, local pollution, and primary energy consumption.	2024-2027 (BAU) 2024-2031 (NDC)	BAU, extended in NDC	BAU: 1030 MW total installed RES capacity in 2031 NDC: 1700 MW total installed RES capacity in 2031.	BAU until 2027: 551 mn (excl. prosumers) 571 mn (incl. prosumers, PAM 16) NDC until 2030: 1007 mn (excl. prosumers) 1181 mn (incl. prosumers, PAM 16)	Private investors, Budget of Kosovo (providing feed-in tariff / feed-in premium), KEK, donors	Yes (456 mn excl.prosumers, 610 mn incl. prosumers, PAM 16)	High
PAM 11	Energy supply	Deployment of 100 MW PV project at KEK's facilities	The project involves the construction of a solar photovoltaic plant with an installed capacity of up to 100 MW in an area formerly utilized as an ash dump for the Kosovo A power plant. The project includes a feasibility study for a possible extension of the ongoing project beyond 100 MW.	2024-2027	BAU	152 GWh electricity generation p.a.; 138.544 tCO_2 emissions reduction p.a.	104 mn (included in PAM 10)	10 mn KEK contribution; 29 mn KfW loan; 32 mn WBIF GA grant; 33 mn EIB loan	No	High
PAM 12	Energy supply	Study for 200 MW Solar Photovoltaic Plant at KEK's facilities	The aim of this measure is to conduct a study assessing the feasibility of integrating an additional 200 MW of solar PV generation capacity at KEK's facilities, based on an assessment of the potential for utilisation of KEK areas for power generation and other industrial purposes financed by the World Bank. The findings of the study will help guide the decision-making process for the next steps in the project's development and implementation plan.	2024-2027	NDC	Feasibility study developed	0.5 mn	Donors	Yes (0.5 mn)	Medium

Nr.	Sector	Policy Measure	Description	Assumed period of	Scenario (BAU/NDC)	Quantitative effects	Investment amount (EUR)	Source of finance	Additional financing required for NDC	Priority

				implement-tation					(yes/no)	
PAM 13	Energy supply	Power purchase agreements	The feed-in tariff scheme will be replaced with a feed-in premium scheme for new projects which will be granted with competitive auctions (see PaM 14). The Regulator shall approve the Power Purchase Agreements upon consultation with third parties. The ERO may instruct the Market Operator at any moment before signing the Power Purchase Agreements so it can make the changes in the draft models as it deems necessary.	2024-2027	BAU	incl. in PAM 10	included in PAM 10	n/a	included in PAM 10	High
PAM 14	Energy supply	Competitive auctions for feed-in premiums	Within the framework of a Feed-in premium (FIP) scheme, the electricity produced from RES is sold on the electricity spot market, and the RES producers receive a premium on top of the market price of their electricity production. FIP can either be fixed or sliding. The Sliding FIP is calculated continuously, considering the difference between the market prices and a predefined reference price (maximum strike price). Finally, FIP can be differentiated according to various RES technologies, sizes, and locations.	2024-2027 (until 2031 for NDC scenario)	BAU, extended in NDC	At least 100 MW new solar PV capacity by 2026. Around 150 MW new wind capacities by 2030.	included in PAM 10	Solar auction: private investment Wind auction: private investment; up to 80 mn capital co-investment by the Government of Kosovo.	included in PAM 10	High
PAM 15	Energy supply	Certificates of Origin for RES	The Energy Strategy recognizes the need for establishing a system for renewable energy certification (at the national and regional level) that will ensure an electronic issuing, transferring, and cancelling of Guarantees of Origin. Therefore, the ERO Rule will be updated to establish an electronic mechanism for issuing Certificates of Origin.	2025-2026	BAU	n/a	0.5 mn	EU funds	No	Medium

Nr.	Sector	Policy Measure	Description	Assumed period of	Scenario (BAU/NDC)	Quantitative effects	Investment amount (EUR)	Source of finance	Additional financing required for NDC	Priority

				implement-tation					(yes/no)	
PAM 16	Energy supply	Self-consumption scheme	The Energy Community Secretariat has published guidelines for a more sustainable implementation of RES support schemes. ERO has approved the Rule on Prosumers on Renewable Sources, which supports customers who that wish to generate electricity at their own premises based on renewable technology for their own use. Based on the rule in force, all consumers are entitled to build production capacity based on the capacity allowed by DSO	2024-2027 (until 2031 for NDC scenario)	BAU, extended in NDC	BAU: 20 MW by 2030. NDC: 175 MW by 2030.	20 mn (BAU) 174 mn (NDC) also see PAM 10	Energy Support Package (EU support funds), Budget of Kosovo and private investors	Yes (154 mn) also see PAM 10	High
PAM 17	Energy supply	Renewable energy communities	Renewable Energy Communities are initiatives that promote local, sustainable energy generation and consumption. These communities harness the power of renewable resources, such as solar, wind or other to meet their energy needs. Typically, renewable energy communities encourage inclusive community participation, allowing residents to collectively invest in and benefit from renewable energy projects.	2024-2025	BAU	Law on Electricity, Law on the Promotion of the Use of Renewable Energy Sources, and all relevant by-laws adopted	n/a	n/a	n/a	Medium
PAM 18	Energy supply	Solar district heating	The project to use solar collectors for thermal energy production combined with seasonal heat storage (Solar4Kosovo II) has been initiated in the context of efforts to address the district heating system expansion and environmental issues of DH Termokos – Pristina. This project maps Kosovo as the first country in the region to use this kind of technology in district heating systems and will enable the connection of 38,000 new consumers. An increase of capacities from 50 MW to 70 MW is proposed for the NDC scenario.	2024-2028	BAU, extended in NDC	BAU: 50 MW_{th} / NDC: 70 MW_{th} installed capacity, ca. 200 GWh_{th} (BAU) / 280 GWh_{th} (NDC) annual generation	60 mn (BAU) 84 mn (NDC)	Termokos Prishtina, donors	Yes (24 mn)	High

Nr.	Sector	Policy Measure	Description	Assumed period of implement-tation	Scenario (BAU/NDC)	Quantitative effects	Investment amount (EUR)	Source of finance	Additional financing required for NDC (yes/no)	Priority

PAM 19	Residential	Renovation of residential buildings	The measure considers retrofitting the existing residential buildings, initiated by the owners and/or supported by commercial banks and funds, including the Kosovo Energy Efficiency Fund (KEEF). The buildings' retrofitting includes insulation of external walls, basements, attics, thermal insulation of the roofs, replacement of external windows and doors, etc. The measure will provide issuing of certificates for energy performance of buildings as a prerequisite for putting the reconstructions into operation.	2024-2030	BAU, extended in NDC	Yearly additional final energy savings: 3.25 ktoe p.a. (BAU) 4.26 ktoe p.a. (NDC)	12.49 mn p.a. (BAU) 48.65 mn p.a. (NDC) Includes public and private investments	Private investments, Budget of Kosovo and donors via KEEF	Yes (36.16 mn p.a.)	High
PAM 20	Service	Renovation of commercial buildings	The measure considers retrofitting existing commercial buildings, initiated by the owners and/or supported by commercial banks and funds, including KEEF. The buildings' retrofitting includes insulation of external walls, basements, attics, thermal insulation of the roofs, replacement of external windows and doors, etc. The measure will provide issuing of certificates for energy performance of buildings, as a prerequisite for putting the reconstructions into operation.	2024-2030	BAU, extended in NDC	Yearly additional final energy savings: 0.52 ktoe p.a. (BAU) 2.5 ktoe p.a. (NDC)	7.15 mn p.a. (BAU) 78.97 mn p.a. (NDC) Includes public and private investments	Private investments, Budget of Kosovo and donors via KEEF	Yes (71.82 mn p.a.)	High
PAM 21	Residential	Installation of solar thermal collectors in the residential sector	The aim of the measure is the reduction of energy costs and improvement of the efficiency of the system for hot water preparation through replacing electric heaters with solar thermal collectors. The lower investment cost for installing solar thermal collectors can reduce consumer bills for hot water. These systems also provide energy savings and can satisfy at least 50% of the demand annually, depending on the hot water needs. Furthermore, solar thermal collectors can be combined with electricity and district heating systems.	2024-2030	NDC	Yearly additional final energy savings: 0.32 ktoe p.a.	3.74 mn p.a.	Private investments, Budget of Kosovo and donors via KEEF and other mechanisms	Yes (3.74 mn p.a.)	Medium

Nr.	Sector	Policy Measure	Description	Assumed period of implement-tation	Scenario (BAU/NDC)	Quantitative effects	Investment amount (EUR)	Source of finance	Additional financing required for NDC (yes/no)	Priority
PAM 22	Residential	Nearly Zero Energy Buildings	Law on EPB requires that all new buildings achieve near-zero energy consumption standards by December 31, 2030, and that	2024-2030	NDC	Yearly additional final energy savings:	n/a	Private investments, Budget of	Yes	High

			government-owned buildings meet these standards by December 31, 2028. The NZEB Plan will define NZEBs, set targets based on building categories, including specific energy use indicators, and will outline policies and measures to achieve these goals, such as renewable energy requirements. This plan will be updated every three years and submitted to the Energy Community Secretariat to support sustainable building practices in Kosovo.			1.2 ktoe final energy savings p.a.		Kosovo and donors via KEEF		
PAM 23	Residential/ Service	Energy certification of buildings	Energy performance certification of buildings will be mandatory for buildings that are sold or leased and when a building is constructed, renovated or reconstructed. The Regulation aims at determining the procedures for Energy Performance Certification of Buildings by considering the methodology of calculation, energy assessor, certification, monitoring and implementation. Certification procedure according to the regulation should meet the requirements for the general framework for the energy certification of the building.	2024-2030	BAU, extended in NDC	Additional final energy savings of 0.24 ktoe p.a.	0.26 mn (BAU in 2025) 0.26 mn p.a. (NDC after 2025)	n/a	Yes	Medium
PAM 24	Residential/ Service	Inspection of heating, cooling and ventilation systems	Article 17 of the new Law on Energy Performance of Buildings in Kosovo establishes mandatory inspections for heating and air conditioning systems to assess their condition and efficiency. Building owners are required to commission regular inspections for heating systems with boilers or combined heating and ventilation systems exceeding 70 kW of installed capacity, as well as air-conditioning systems with an effective output of over 70 kW.	2024-2030	BAU	12 months after adoption of the new Law on EPB, the new Regulation will be in place	0.6 mn (until 2030)	n/a	No	Medium

Nr.	Sector	Policy Measure	Description	Assumed period of implement-tation	Scenario (BAU/NDC)	Quantitative effects	Investment amount (EUR)	Source of finance	Additional financing required for NDC (yes/no)	Priority
PAM 25	Residential/ Service	Energy Service Companies (ESCO)	The Energy Service Companies (ESCO) are one of the mechanisms through which the implementation of energy efficiency projects in Kosovo can be increased.	2024-2030	NDC	Yearly additional final energy savings: 0.04 ktoe p.a.	n/a	n/a	Yes	Medium

PAM 26	Energy supply/ Residential/ Service	Improvement and expansion of district heating systems of "Termokos" Prishtina and DH Gjakova	Improvement of the district heating systems of Pristina and Gjakova will increase the efficiency of the systems and will allow a lot of households and commercial buildings to make a fuel switch for heating, from electricity and biomass to DH. This will increase the overall efficiency of the energy system. The aim is also to increase the number of consumers connected to both DH systems.	2024-2030	BAU	27265 (Termokos) connected consumers in 2025, and 38240 (Termokos) in 2031 (together DH Termokos and DH Gjakova).	47 mn (promoting and expanding existing DH systems in Kosovo)	Donors and the respective municipalities.	No	High
PAM 27	Service	Renovation of central government buildings	According to Article 11 (1) of the draft Law on EE the Government of the Republic of Kosovo, through the Ministry responsible for Construction, is mandated to demonstrate exemplary role by annually refurbishing 3% of the total useful area of heated and/or cooled buildings owned and occupied by central government institutions, ensuring compliance with minimum energy performance requirements set by the Law on Energy Performance of Buildings.	2024-2030	BAU, extended in NDC	Yearly additional final energy savings: 0.19 ktoe p.a. (BAU) 0.36 ktoe p.a. (NDC)	4.36 mn p.a. (BAU) 5.04 mn p.a. (NDC)	Budget of Kosovo and donors via KEEF (pending secondary legislation)	Yes (0.68 mn p.a.)	High
PAM 28	Service	Renovation of public buildings	Continue supporting the retrofitting of the remaining public buildings at the local level through the Energy Efficiency Fund.	2024-2030	BAU	Yearly additional final energy savings: 0.313 ktoe p.a.	4.86 mn p.a.	Respective municipalities and donors via KEEF (pending secondary legislation)	No	High
PAM 29	Service	Green public procurement	The public sector has a responsibility to lead by example and promote sustainable practices. Green public procurement can help demonstrate the commitment of public sector organizations to sustainability and can inspire other organizations to follow suit.	2024-2030	BAU	n/a	n/a	Budget of Kosovo	Yes	Low
Nr.	**Sector**	**Policy Measure**	**Description**	**Assumed period of implement-tation**	**Scenario (BAU/NDC)**	**Quantitative effects**	**Investment amount (EUR)**	**Source of finance**	**Additional financing required for NDC (yes/no)**	**Priority**
PAM 30	Service	Energy audit and management systems	Article 12 of the draft Law on Energy Efficiency stipulates that enterprises categorized as the first category must conduct comprehensive energy audits every four years using certified energy management or environmental systems.	2024-2030	BAU	n/a	0.35 mn to implement a training programme	Budget of the Ministry of Economy	Yes	Low

			These audits aim to identify energy-saving opportunities and recommend efficiency measures based on updated and measurable energy consumption data.							
PAM 31	Residential	Campaign for energy efficiency	Help consumers to save money on their energy bills through energy efficiency consumer information programs by providing information on how to use energy more efficiently so consumers can reduce their energy consumption and hence are able to save money on their utility bills. Overall, energy efficiency consumer information programs are a critical tool for promoting sustainable energy use and reducing energy costs, emissions, and other negative environmental impacts.	2024 (extended until 2030 in NDC scenario)	BAU, extended in NDC	n/a	0.17 mn (BAU) 0.335 mn (NDC)	n/a	Yes (0.165 mn)	High
PAM 32	Residential	Increased use of efficient technologies in the residential sector	More efficient heating technologies will contribute to energy savings, reduce outdoor and indoor air pollution, increase share of RES and better living comfort and improve health, more specifically of pregnant women, infants and children under five. This measure will enable the replacement of the inefficient biomass stoves (with efficiency of around 50%) and individual electric heaters with more efficient technologies like heat pumps (with efficiency of 250%) or efficient biomass stoves (with efficiency of 85%).	2024-2030	NDC	Cumulative final energy savings by 2030: ~85 ktoe	Heat pumps: 5.65 mn p.a. Efficient biomass stoves: 1 mn p.a.	n/a	Yes (6.65 mn p.a.)	High

Nr.	Sector	Policy Measure	Description	Assumed period of implement-tation	Scenario (BAU/NDC)	Quantitative effects	Investment amount (EUR)	Source of finance	Additional financing required for NDC (yes/no)	Priority
PAM 33	Transport	Increase the use of railway through modernisation and rehabilitation of railway lines	Rail transport is more efficient than road transport as it uses less energy per passenger or ton than road transport. However, at the moment, that is not the case in Kosovo. The number of passengers and tons have been	2024-2030	BAU, extended in NDC	Increase the number of passengers in rail transport to 400 thousand by 2026	BAU: 252 mn (40 mn loan EBRD, 80 mn loan EIB, 130 mn grant WBIF, 2 mn from MESPI)	Budget of Kosovo and donors	Yes (574.6 mn) (note: additional financing needed for the Kosovo – Albania line, for	High

			reduced significantly in the last ten years, while the energy consumption is almost at the same level. Increasing the number of passengers and tonnes will increase energy efficiency, reduce pollution and potentially increase the share of RES in transport. This includes the transboundary line between Kosovo and Albania.			and 3 mn by 2030. 12% of trans-boundary rail transport of goods by 2026 and 35% by 2030.	NDC: 880.4 mn (note: Kosovo – Albania line, the figure is not certain yet).		which the feasibility analysis ends in December 2024, the preliminary figures indicate more than 1.2 bn joint finance between two countries).	
PAM 34	Transport	Digitalisation of transport systems and ITS implementation on TEN-T Core Network in Kosovo	Upgrading essential traffic safety systems is crucial as the modernisation of railway lines will result in increased capacity and traffic volumes. Currently, Kosovo's railway infrastructure is of low quality and lacks the European Rail Traffic Management System (ERTMS). ERTMS is vital for ensuring railway traffic is competitive and safe, so all modernisation projects should include its implementation.	2024-2030	NDC	Up to 30% increased capacity.	n/a	Budget of Kosovo and donors	Yes	High
PAM 35	Transport	Railway electrification	The Energy Strategy includes the planned development of the electrification of the railway in Kosovo, which will reduce fuel consumption, and GHG emissions. Currently, there is no electrified railway line in the country. Therefore, the electrification should be realized gradually by increasing the share of electric trains to 25% in 2030 and 40% in 2040.	2024-2030	NDC	0.9 ktoe of final energy savings by 2030 in NDC compared to BAU	98 mn (2027-2030)	Budget of Kosovo and donors	Yes (98 mn)	Medium

Nr.	Sector	Policy Measure	Description	Assumed period of implement-tation	Scenario (BAU/NDC)	Quantitative effects	Investment amount (EUR)	Source of finance	Additional financing required for NDC (yes/no)	Priority
PAM 36	Transport	Increased share of alternative fuelled vehicles	The Multimodal Transport Strategy 2023-2030 recognized that promoting cleaner vehicles to reduce GHG emissions is one of the pillars for more sustainable transport. It is necessary to make transport more sustainable to achieve the goals set in the European Green Deal, Green Agenda, and Paris Agreement. The aim of the strategy is to gradually increase the	2024-2030	NDC	30.4 ktoe of final energy savings by 2030	~70 mn for 10% subsidisation	n/a	Yes	Medium

			share of vehicles that use alternative fuels (hybrid, electric) to 10% by 2030. It is additionally assumed that alternative fuelled vehicles will reach a share of 20% by 2040.							
PAM 37	Transport	Vehicle fleet change	The number of vehicles in Kosovo has been increasing in the last ten years (2012-2022) with an average annual growth rate of around 9.5%, so this is an excellent opportunity for the state to allow the import of as many new vehicles as possible. The adopted Law on Vehicles No. 05/L-032 prohibits the import of cars older than ten years and cars that do not meet the Euro 4 standard. However, considering the transport sector's impact on the final energy consumption and GHG emissions, an analysis will be made to amend the Law on vehicles to prohibit the import of cars older than eight years.	2024-2030	NDC	n/a	n/a	n/a	n/a	Low
PAM 38	Transport	Modal shift for short distance travel	By substituting less efficient vehicles, using bikes and electric scooters for short distances can reduce the final energy consumption in the transport sector. This measure could include various actions to encourage eco-friendly mobility, such as the construction of bicycle lanes, development of wide and well-lighted pedestrian areas and cycling lanes, widening the sidewalks, and removing barriers from the sidewalks.	2024-2030	NDC	7 ktoe of final energy savings by 2030	n/a	n/a	Yes	Low
Nr.	**Sector**	**Policy Measure**	**Description**	**Assumed period of implement-tation**	**Scenario (BAU/NDC)**	**Quantitative effects**	**Investment amount (EUR)**	**Source of finance**	**Additional financing required for NDC (yes/no)**	**Priority**
PAM 39	Energy supply	Modernization of networks and reducing network losses	The ERO has developed efficient secondary legislation which regulates all aspects of energy infrastructure improvements and overall energy efficiency exploitation. The Regulator approves the 5-year investment plan of the Distribution Network to improve security of supply, reducing the level of network losses.	2023-2027 (until 2030 in the NDC scenario)	BAU, extended in NDC	9% technical losses in distribution network by 2031, gross final energy consumption savings of 21.6 ktoe p.a. by 2031 (vs. 2022 levels of	BAU: 127.12 mn (2023-2027) Additional for NDC: 76.3 mn (2028-2030)	KEDS and KOSTT	76.3 mn (2028-2030)	High

						technical losses in distribution network)				
PAM 40	Energy supply	Rehabilitation of TPP Kosovo B	The National Energy Strategy and the associated Implementation Plan foresee a refurbishment of two units of the power plant Kosovo B. The refurbishment of the Kosovo B1 and B2 units will be carried out in two stages. By the end of 2025 and 2026, respectively, both units will operate in a more efficient, reliable mode, meeting mandatory emissions standards of the Industrial Emissions Directive. Following the rehabilitation, the annual production is expected to increase to a net capacity of 544 MW.	2025-2026	BAU	Net capacity increase from 516 of 544 MW (from 258 to 272 MW per unit) Improvement of net electrical efficiency from 38% to 40%	178 mn (KEK) plus additional EU funds	KEK, EU funds	No	High

Nr.	Sector	Policy Measure	Description	Assumed period of implementation	Scenario (BAU/NDC)	Quantitative effects	Investment amount (EUR)	Source of finance	Additional financing required for NDC (yes/no)	Priority
PAM 41	Energy supply	Rehabilitation of one to two units in TPP Kosovo A	According to the National Energy Strategy and the associated Implementation Plan, it is foreseen that one of the three units of Kosovo A will undergo a refurbishment process at the end of 2024 (currently planned for the end of 2025). A decision on whether to refurbish or phase out a second unit will be made by the end of 2024 the latest. The third operating A unit will be permanently closed once the refurbishment of the other lignite unit(s) has been completed. The refurbished A unit(s) will operate in a strategic reserve mode from 2031 onwards, meaning these unit(s) would be available in the crucial higher demand heating season, or during extraordinary occasions such as the recent energy crisis.	2025-2031	BAU	Net capacity increase from 116 to 180 MW per unit Improvement of net electrical efficiency from 28% to 34%	120-150 mn per unit	KEK	No	High
PAM 42	Energy supply	Increase the network's capacity to handle and	To secure energy security and achieve better market integration, Kosovo is increasingly shifting its efforts towards deployment of	2024-2027 (until 2030 in the NDC	BAU, extended in NDC	Increase of RES capacity that the network is able to	See PAM 39	See PAM 39	See PAM 39	High

		integrate a higher amount of renewable energy sources	renewable energy sources in the energy sector, which requires necessary modernization works of electrical grids to accommodate large variable generation capacities. Increase the amount of variable RES capacity the system would be able to integrate/handle to 2000 MW of RES-based energy in 2031.	scenario)		handle/integrate to 2000 MW in 2031				
PAM 43	Energy supply	Installation of a Battery Energy Storage System	Support Kosovo's energy security and transition to a cleaner energy future through usage of energy storage systems for reserves, availability of the storage systems, and reduced cost of securing adequate electricity supply for Kosovo via installation of at least 170 MW of battery storage capacity in Kosovo's power system	2024-2028	BAU	170 MW of battery storage installed by 2028 (45 MW / 90 MWh by 2027)	USD 202 mn grant (Millennium Challenge Corporation), USD 34 mn (Government of Kosovo), out of which around USD 180 mn for the purchase and installation of battery storage itself.	Millennium Challenge Corporation (MCC), Budget of Kosovo	No	High

Nr.	Sector	Policy Measure	Description	Assumed period of implementation	Scenario (BAU/NDC)	Quantitative effects	Investment amount (EUR)	Source of finance	Additional financing required for NDC (yes/no)	Priority
PAM 44	Residential	Implementation of new supporting schemes dedicated to electricity vulnerable consumers	Supporting electricity vulnerable consumers and protect them from the effects of expected price hikes amidst further market liberalization. Replacing existing support scheme to enhance its allocation efficiency through better targeting and reduction of funding leakage to non-vulnerable consumers.	2024 (2025-2030 in NDC scenario)	BAU, extended in NDC	Higher percentage of vulnerable energy consumers reached by support scheme	20 mn invested in 2024 in a pilot program, costs for extension until 2030 estimated at 120 mn	Budget of Kosovo	Yes (120 mn)	High
PAM 45	Research and Education	Education and trainings for skilled workers in the areas of sustainable energy technologies	Includes targeted measures for promoting education of skilled workers for buildings renovation, district heat installation, PV and heat pumps installation etc. This measure is of crucial importance, it is an enabler, for almost all of the measures in the energy efficiency dimension especially those related with building renovation.	2024-2030	NDC	n/a	n/a	n/a	Yes	High

8. Annex II: Prioritization of policies and measures

In this voluntary NDC, a large number of mitigation measures across different sectors of the Kosovar economy are presented (see Annex I) and form the basis for the analysis of Kosovo's emissions reduction potential presented in Chapter 3. Importantly, this includes both policies and measures presented in strategic and legislative documents, but also additional policies and measures in line with Kosovo's Energy and Climate Plan (NECP). While the former are in many cases already under implementation and backed up by financial resources, the later will require additional resources in terms of implementation efforts and finance.

In this context, prioritization concerns are relevant given scarce capacities and budget. A suggestion for such a prioritization is offered in the rightmost column of Annex I. For deriving these priority judgments, the following aspects were taken into account:

- Mitigation potential of the policy measure.
- Financial resources needed for successful implementation.
- Institutional requirements (staff capacity at public institutions, etc) required for implementation
- Availability of technological means necessary for implementation
- Potential co-benefits of implementing the measure (e.g. job creation, health impacts, etc.), especially those benefiting marginalised groups
- Role of the policy measure as an enabler for the implementation of other policy measures (e.g. grid renovations as a precondition for increased integration of RES)

In terms of co-benefits, considering linkages between mitigation and adaptation measures is also an important angle to consider. For instance, as shown in Chapter 3 and elaborated in Chapter 4, mitigation measures in the AFOLU sector such as reforestation have a large emissions reduction potential while at the same time providing important adaptation benefits such as stabilising soil or reducing heat stress.