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CENTRAL ASIA

# WESTERN BALKANS 6

## Kosovo Country Compendium

World Bank Group

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# Table of Contents

<b>Acknowledgments</b> .....	v
<b>Abbreviations</b> .....	vi
<b>Executive Summary</b> .....	ix
<b>Chapter 1. Introduction: setting the scene</b> .....	1
1.1. Climate and development context .....	2
1.2. Climate change commitments and strategies .....	4
1.3. Institutions, policies, and capacities .....	6
<b>Chapter 2. Adaptation risks and opportunities</b> .....	9
2.1. How is a changing climate affecting risks and opportunities? .....	10
2.2. A changing climate comes with greater risks—but also greater opportunities .....	14
2.3. Enabling adaptation through improved human capital .....	16
2.4. What is Kosovo doing, and how well? .....	19
<b>Chapter 3. Mitigation risks and opportunities</b> .....	23
3.1. Reference Scenario (RS) achieves limited progress on climate change mitigation .....	24
3.2. Radical energy system transformation is required to achieve net zero by 2050 .....	26
3.3. Incremental investments needed for decarbonization .....	28
3.4. Human capital and labor markets transformations .....	30
<b>Chapter 4. Economic impact and opportunities</b> .....	33
4.1. Macroeconomic impact .....	34
4.1.1. Impact of adaptation risks on the economy .....	34
4.1.2. Impact of mitigation on the economy .....	36
4.1.3. Poverty and distributional impact of a net zero transition .....	39
4.2. Financing needs and sources .....	39
4.2.1. Investment needs for adaptation and mitigation .....	39
4.2.2. Green finance .....	41
4.3. Structural and regulatory framework issues .....	42
4.4. Export opportunities .....	44
<b>Chapter 5. Conclusions and recommendations</b> .....	47
<b>Annex A. Climate Change Institutional Assessment: main findings</b> .....	57
<b>Annex B. Assessment of adaptation needs</b> .....	59
<b>Annex C. Exposure to hazards and socio-economic vulnerability on municipal level</b> .....	63
<b>Annex D. Macro model, growth scenarios and detailed mitigation results</b> .....	65
<b>LIST OF FIGURES</b>	
Figure ES.1. Summary of adaptation investment narrative .....	x
Figure 1.1: Energy intensity versus carbon intensity of European countries .....	3
Figure 1.2: GHG emissions, by sector (2019) .....	3
Figure 1.3: Kosovo’s institutional maturity for climate action, by CCIA pillar .....	6
Figure 2.1: The Triple-A Dividend of Resilience framework .....	14
Figure 2.2: Kosovo’s social protection system could be much better harnessed to protect households from climate-induced shocks while promoting their resilience. ....	19

Figure 3.1: System-wide indicators across the RS, NZE, and NZE-HG scenarios for Kosovo .....	25
Figure 3.2: Power sector indicators across the RS, NZE, and NZE-HG scenarios for Kosovo .....	26
Figure 3.3: Discounted investment gap (that is, the difference between NZE and RS) until 2050 by subsector, US\$ billion. ....	29
Figure 3.4: Occupations and numbers of workers that need retraining.....	31
Figure 4.1: Combined economic impacts under the trend and optimistic growth scenarios, without adaptation investments (top panel) and with adaptation investments (bottom panel) .....	36
Figure 4.2: Incremental CAPEX and OPEX of the energy system under trend growth .....	37
Figure 4.3: Incremental CAPEX and OPEX of the energy system under optimistic growth .....	37
Figure 4.4: Incremental impact on macroeconomic aggregates of the NZE target over the Reference scenarios, under trend and optimistic growth .....	38
Figure 4.5: Absolute (NZE scenario) and incremental (NZE vs. Reference scenario) investments .....	40
Figure 4.6: Distribution of banks' loans by NACE sector .....	43
Figure A.1: CCIA Kosovo: Summary and benchmarking indicators, by pillar .....	58
Figure B.1. Summary of adaptation investment narrative.....	61
Figure C.1: Overlapping vulnerabilities in Kosovar municipalities.....	63
Figure C.2: Degree of urbanization of Kosovar municipalities.....	64
Figure C.3: The determinants of socioeconomic vulnerability.....	64

#### LIST OF BOXES

Box 4.1: Preserving the financing capacity of the banking sector.....	43
Box 4.2: Can the Net Zero transition be a path to high income status for the WB6? .....	45
Box A.1: Climate Change Institutional Assessment (CCIA) Methodology .....	57

#### LIST OF TABLES

Table 1.1: Key national laws and strategies .....	5
Table 1.2: Kosovo's 2030 targets in the Clean Energy Package and NECP.....	6
Table 2.1: Main hazards in Kosovo and associated damage before 2015 .....	10
Table 2.2: Kosovo flood risk assessment.....	11
Table 4.1: Projected damage on output (GDP level) and impact of adaptation in the trend growth scenario ....	34
Table A.1: Kosovo CCIA highlights and gaps .....	58
Table B.1: Estimate of adaptation needs.....	59
Table C.1: The most highly exposed municipalities ranked from highest to lowest exposure, by hazard type.....	63
Table D.1: Average annual GDP growth rates, 2025–50 .....	65
Table D.2: Real GDP per capita: differences between NZE and RS scenarios 2030, 2040, and 2050 .....	66

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# Abbreviations

<b>A&amp;R</b>	Adaptation & Resilience	<b>KEPA</b>	Kosovo Environmental Protection Agency
<b>AFIR</b>	Alternative Fuels Infrastructure Regulation	<b>KINESYS-WB6</b>	Knowledge-Based Investigation of Energy System Scenarios for the WB6
<b>AGRO</b>	Agricultural Growth and Rural Opportunities	<b>LSG</b>	Local Self-Government
<b>BCR</b>	Benefit–Cost Ratio	<b>LULUCF</b>	Land Use, Land-Use Change and Forestry
<b>CAPEX</b>	Capital Expenditure	<b>MESPI</b>	Ministry Of Environment, Spatial Planning and Infrastructure
<b>CBAM</b>	Carbon Border Adjustment Mechanism	<b>MRV</b>	Monitoring, Reporting and Verification (of GHG Emissions)
<b>CCA</b>	Climate Change Adaptation	<b>MtCO<sub>2</sub>eq</b>	Million Tons of CO <sub>2</sub> Equivalent
<b>CCDR</b>	Country Climate and Development Report	<b>MW</b>	Megawatts
<b>CCIA</b>	Climate Change Institutional Assessment	<b>NACE</b>	Nomenclature of Economic Activities
<b>C-MFMod</b>	Macro-Structural Model with Climate Module	<b>NAS</b>	National Adaptation Strategy
<b>CPAT</b>	Carbon Price Assessment Tool	<b>NCASPD</b>	National Climate Actions Strategies and Policies Database
<b>CPRS</b>	Climate Policy Related Sectors	<b>NCCC</b>	National Climate Change Council
<b>CPS</b>	Carbon Pricing Scenario	<b>NDC</b>	Nationally Determined Contribution
<b>CSA</b>	Community-Supported Agriculture	<b>NDS</b>	National Development Strategy
<b>DRF</b>	Disaster Risk Finance	<b>NECP</b>	National Energy and Climate Plan
<b>DRM</b>	Disaster Risk Management	<b>NEET</b>	Not In Employment, Education or Training
<b>ECA</b>	Europe and Central Asia	<b>NMT</b>	Non-Motorized Transport
<b>EE</b>	Energy Efficiency	<b>NPV</b>	Net Present Value
<b>EIB</b>	European Investment Bank	<b>NZE</b>	Net Zero Emissions Scenario
<b>EMA</b>	Emergency Management Agency	<b>NZE-HG</b>	Net Zero Emissions Scenario with Higher Growth
<b>ETS</b>	Emissions Trading System	<b>OECD</b>	Organization for Economic Co-Operation and Development
<b>EU</b>	European Union	<b>OPEX</b>	Operational Expenditure
<b>EU-27</b>	The 27 EU Countries	<b>PISA</b>	Program for International Student Assessment
<b>€</b>	Euros	<b>PPP</b>	Public–Private Partnership
<b>EV</b>	Electric Vehicle	<b>PPP</b>	Purchasing Power Parity
<b>GDP</b>	Gross Domestic Product	<b>PV</b>	Photovoltaic
<b>GHG</b>	Greenhouse Gas	<b>RCP</b>	Representative Concentration Pathway
<b>GHS</b>	Global Human Settlement	<b>RE</b>	Renewable Energy
<b>GW</b>	Gigawatt	<b>RS</b>	Reference Scenario
<b>IFI</b>	International Financial Institution		
<b>IHMK</b>	Hydrometeorological Institute of Kosovo		
<b>IMF</b>	International Monetary Fund		

<b>SAS</b>	Social Assistance Scheme
<b>SNG</b>	Subnational Government
<b>SOE</b>	State-Owned Enterprise
<b>STEM</b>	Science Technology Engineering Mathematics
<b>TEN-T</b>	Trans-European Transport Network
<b>TVET</b>	Technical and Vocational Education and Training
<b>UNDP</b>	United Nations Development Programme

<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>US</b>	United States
<b>US\$</b>	United States Dollar
<b>WAM</b>	With Additional Measures
<b>WB6</b>	The Six Western Balkan Countries: Albania, Bosnia And Herzegovina, Kosovo, Montenegro, North Macedonia, And Serbia
<b>WBG</b>	World Bank Group
<b>WEM</b>	With Existing Measures



# Executive Summary

**The Republic of Kosovo, the second-smallest economy in the Western Balkans, has made significant improvements in its living standards in the past decade, but these gains have come with some unwanted environmental and health impacts.** While having the lowest GDP per capita among the Western Balkans 6 (WB6) in recent years, Kosovo has encountered numerous challenges in its development. Political tensions, and only partial recognition within the international community as an independent sovereign state, have hampered foreign direct investment and economic growth. Kosovo also has the highest carbon intensity in Europe; with rich lignite deposits, it has been reliant on coal. The infrastructure of its lignite-based power plants is aging and growing less efficient. Together with aging transport, heating and residential infrastructure, it is further contributing to environmental degradation and negative health outcomes, increasing the economic vulnerability of Kosovars to energy price shocks and energy poverty. Moving away from coal will require comprehensive measures to address the social and economic impacts, especially in coal-dependent regions, to ensure a socially just and inclusive transition.

**Kosovo's climate change policies are, in part, shaped by various external drivers and international commitments; internally, it needs to make more progress by not only intensifying its own climate ambition but strengthening its capacity to actualize that ambition.** Although Kosovo is not a party to either the United Nations Framework Convention on Climate Change (UNFCCC) or the Paris Agreement, it has set up equivalent voluntary national commitments. Additionally, as a contracting party to the Energy Community Treaty, Kosovo has committed to harmonizing its energy and climate legislation with the European Union (EU) acquis<sup>1</sup> and thus contribute to the goal of Europe becoming the first climate-neutral continent by 2050. The Law on Climate Change, enacted in December 2023, is a legislative basis for planning and setting up climate change mitigation and adaptation institutions. But although such commitments are in place, the institutional maturity to implement climate policies in Kosovo is only just emerging (rated as “nascent” by the World Bank’s Climate Change Institutional Assessment). Significant work is being done to strengthen its institutional capacity, but these are still a long way from being judged as mature. The country’s human capital also needs to be substantially developed to ensure that Kosovo is ready for the green transition; estimates are that more than 40 percent of its human capital potential is presently underutilized. Unlike in most other WB6 countries, Kosovo’s working-age population (ages 15–64) is growing. Long-term planning to improve educational and training outcomes will be vital to give its relatively young population the best chance of becoming highly productive.

**As a landlocked country in Southeastern Europe within the central Balkan Peninsula, Kosovo is vulnerable to climate risks.** The country is frequently exposed to forest fires, floods, and landslides. Currently, 36.8 percent of Kosovo’ total area is under medium wildfire risk and 15.8 percent under high wildfire risk. Besides this, mountainous areas of the country are exposed to flash flood risks. Severe floods occurred in 2013, 2014, and 2016, resulting in total estimated damage of over €4 million. Kosovo is also prone to droughts, earthquakes, and heatwaves. Extreme climate events frequently cause severe damage to critical infrastructure, leading to the risk of cascading effects and exacerbating the vulnerabilities of key economic sectors, particularly agriculture, forestry, and water. In addition, these climate effects are localized and are worsening existing socioeconomic vulnerabilities. Vulnerable communities and municipalities with declining populations, and newly expanding urban areas, are more exposed to flooding and other climate risks. Under all the scenarios of the representative greenhouse gases concentration pathways (RCPs), Kosovo could suffer substantial economic damage from climate change. It is estimated that if there were no investments to adapt to the changing climate, by 2050 there would be a substantial decline in output as a result of natural hazards, namely, a decrease of 5.1 percent of GDP under RCP 2.6, 4.2 percent under RCP 4.5, and 4.0 percent under

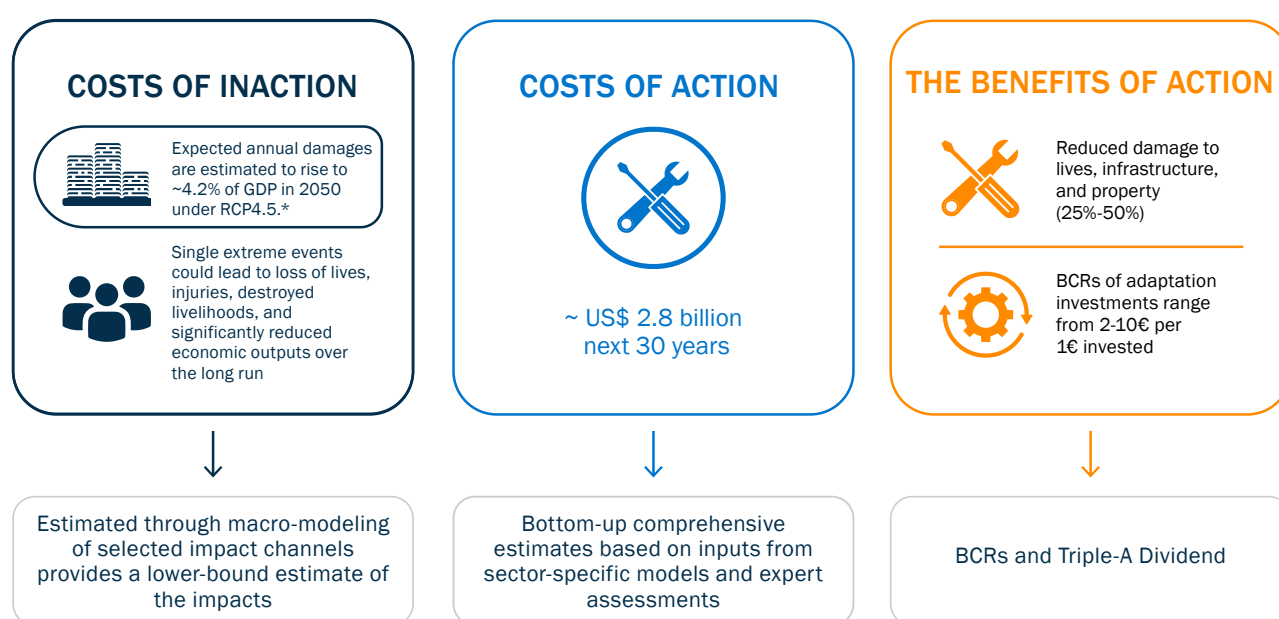
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<sup>1</sup> The European Union *acquis communautaire*, or “EU acquis”—French for that which has been acquired, received, or obtained—refers to the accumulation of common rights, legislation, court decisions, policy objectives, directives, principles, treaty provisions, resolutions, regulations, and obligations that constitute the body of European Union law. It is currently made up of 31 chapters.

RCP 8.5. Limited resources and expertise, along with a disconnection between national and local authorities, hinder Kosovo’s disaster management capabilities, necessitating more investments to enhance coordination, build capacity, support better risk understanding, enhance information early warning systems, and raise community engagement.

**The costs of investing in adaptation are undoubtedly high, but the costs of inaction are even higher, as are the benefits of action.** Kosovo would need to invest an estimated US\$2.8 billion (in 2020 dollars, undiscounted) over the next decade to protect people and property from the damaging and escalating impacts of climate change (Figure ES.1). This initial comprehensive adaptation investment package would cost equivalent to around 0.6–0.9 percent of GDP per year until 2050. Investments in adaptation would yield a “Triple-A Dividend” of three types of benefit: *avoided* losses, *accelerated* economic potential, and *amplified* social and environmental co-benefits. Implementing adaptation climate actions at the national level would greatly reduce the human and economic losses from disasters and climate events and facilitate human capital development.

**FIGURE ES.1. Summary of adaptation investment narrative**



Source: World Bank analysis

Note: GDP = gross domestic product, RCP = representative concentration pathway, BCR = benefit-cost ratio.

\* The macroeconomic model yields annual estimates for damages based on the expected annual loss from each climate hazard. The expected damages are projected to grow over time, reflecting increasingly unpredictable and volatile climate conditions. Combined damages from the drought impact on maize and wheat, heat stress on labor productivity, and riverine floods, are estimated to be 4.2 percent of GDP under RCP 4.5 in 2050 for Kosovo.

**Adaptation investments and projects could also lead to employment growth, an improvement in skills, and increased trade opportunities.** Investing in adaptation would yield other economic benefits, including in key sectors such as agriculture. The USAID Agricultural Growth and Rural Opportunities (AGRO) activity in Kosovo boosted yields of valued fruit and vegetable crops by 50–300 percent, equivalent to US\$1,300–US\$61,000 per hectare. Investing in adaptation would also yield substantial co-benefits. For instance, the implementation of adaptation measures in Kosovo’s railway and waste sectors is expected to bring significant environmental and public health benefits while creating new job opportunities. Additionally, investing in nature-based solutions (NBS) promotes adaptation while yielding substantial co-benefits for the ecosystem and local communities, especially the vulnerable and those in mountainous and downstream areas. NBS for flood prevention can yield high net benefits, with benefit–cost ratios generally greater than 2, up to 12 for peatland restoration, and up to 18 for floodplain restoration. Lastly, investing in human capital helps adapt systems by improving education and productive skills, identifying health issues early, and protecting vulnerable populations from impoverishment.

**Accelerating the energy transition to achieve economy-wide net zero emissions in Kosovo by 2050 is feasible, but it will require radical transformation and decisive action on the national and regional levels.** An energy system modeling analysis was carried out as part of the WB6 CCDR to assess sectoral decarbonization pathways for the WB6 countries. Kosovo's existing climate targets and policies, as outlined in the National Energy and Climate Plan (NECP), are relatively ambitious, but radical transformation of the energy system will be necessary to achieve net zero emissions. To achieve net decarbonization, lignite power plants would need to be transitioned out and fully decommissioned by 2045, replaced by significant upscaling of wind and solar capacity. The intermittent solar energy would need to be complemented by increased battery storage capacity to meet balancing needs. Enhanced cooperation with WB6 and EU countries, and integration into the pan-European energy market, will be critical because of Kosovo's small energy network and limited resources. Meeting this goal will also require energy efficiency improvements across all sectors to slow the growth of energy demand. This will involve replacing existing technologies with electric or other energy-efficient technologies in the heating, transport, industrial and building sectors.

**The target of net zero by 2050 can be achieved with minimal impact on the economy's current potential growth.** Overall, compared to a reference scenario (RS)<sup>2</sup>, Kosovo would need to invest in the energy system an additional US\$760 million until 2030 and US\$4.7 billion until 2050 (expressed in present values and in 2020 dollars) to achieve economy-wide net zero, which is equivalent to about 2.9 percent of GDP per year on average until 2050. Most of this investment would be in the power sector to transition it from the dominance of lignite-based power generation to wind and solar. A significant shift in the demand of private investment will need to occur from buying gasoline- and diesel-engine cars to buying electric vehicles (EVs). The impact of the necessary decarbonization investments on domestic output would be modest compared to its impact on reducing emissions because GDP per capita would be only 0.12 percent lower by 2050, compared to the RS.

**At the private sector level, commercial banks and firms have much to contribute on supporting both mitigation and adaptation action in Kosovo.** Raising capital to finance climate change-induced investments requires creating an enabling regulatory environment. Under a net-zero emissions trajectory for Kosovo, the private sector is expected to do most of the investment in decarbonization (86.7 percent), especially in the transport, buildings, and power sectors. In terms of supporting investment in adaptation, Kosovo needs to build better capacity in the public sector to assess risks and to leverage private finance, while strengthening its capacity to access EU and international donors, such as the Adaptation Fund, the Green Climate Fund, and the Special Climate Change Fund. International financial institutions (IFIs) and domestic development banks could work in partnership with commercial banks on the creation of special credit lines to invest under favorable conditions in low-carbon technologies. For instance, international banks with subsidiaries in Kosovo could use capital optimization instruments and guarantees to reduce the regulatory risk weighting applied to their mandatory and voluntary reserves at the consolidated level, freeing up capital to finance climate mitigation and adaptation projects. Additionally, through public-private partnerships, Kosovo can promote private investment in public services and seek international technical assistance from IFIs for structuring these projects. As the country develops its capital markets, it can seek support from IFIs on the issuance of green and other thematic bonds.

**Adaptation and mitigation can be part of a sustainable growth strategy that delivers higher productivity.** Kosovo can use the climate change adaptation and mitigation measures as opportunities to achieve a more sustainable growth model with higher productivity. To do so, it will need (i) adopting a more equitable fiscal policy, (2) improving the business environment (including adoption and diffusion of technologies, better SOE management) and trade integration, (3) investing in human capital and improving inclusion, and (4) improving environmental management and planning. The public sector's response needs to be three-fold. First, adopting policies that mitigate the economic and social impact of climate change by incentivizing private

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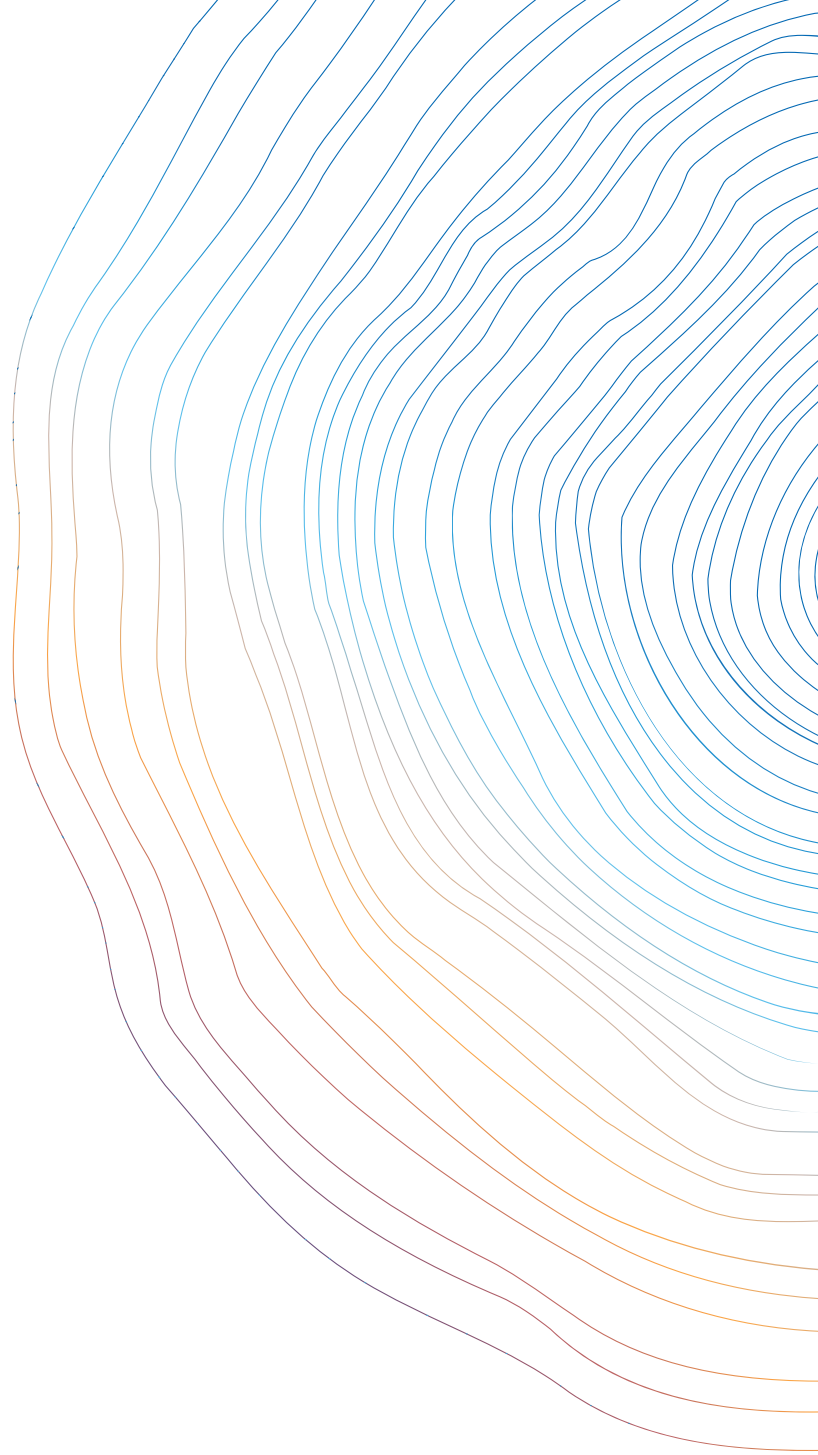
<sup>2</sup> This modeling scenario represents an unconstrained least-cost evolution of the energy system. No specific assumptions are made on the introduction of new policies supporting decarbonization, and the evolution of the energy system is purely driven by economic considerations. This scenario is incompatible with the WB6 countries' aspirations of EU integration and their existing climate change commitments, but it provides a comparable baseline across the six countries for the other decarbonization scenarios.

sector and household action (i.e., zoning, insurance, financing instruments, carbon pricing, incentives for research and innovation, etc.). Second, strengthening efficiency of public spending (i.e., social assistance, education, pharmaceutical spending, etc.). Third, increasing fiscal space by bolstering domestic revenue mobilization through, inter alia, taxation of environmentally- and health harmful products and activities, while reducing tax expenditures and increasing the tax base by reducing the informal economy. These would allow Kosovo to actively monitor and manage fiscal risks from climate change.

**Kosovo needs to ensure competitive neutrality and incentivize climate actions within state-owned enterprises (SOEs).** Kosovo has the second largest share of SOEs in climate-vulnerable sectors in the Western Balkans (69 percent), after Montenegro (73 percent). SOEs also have a strong presence in mitigation-relevant sectors, such as power, transport, and utilities in general. By strengthening the competition framework and ensuring competitive neutrality, Kosovo can level the playing field between public and private companies and attract private investment in climate. Furthermore, Kosovo can incentivize climate action within SOEs by improving their corporate governance and by fostering collaborations between SOEs and private firms.

**The green transition will have to be designed and implemented in a just manner.** Transitioning to cleaner energy sources would also require ensuring a just transition for coal-affected communities. It is important to implement policies and initiatives that support workers and regions heavily reliant on coal mining and related industries as countries move toward more sustainable energy solutions. Moreover, the net zero transition will have a distributional impact on household consumption due to variations on generation and supply costs, potentially leading to changes in the prices of energy and non-energy products. The government should focus on targeted support to households, incorporating revenue recycling, to soften potential effects on those who are less well-off. Therefore, careful consideration is needed to ensure a Just Transition for all and to prevent the worsening of energy poverty.

**The report ends with a summary of detailed recommendations for policy reforms and investments, along with the complexities and timelines likely to be associated with implementation.** The recommendations focus on what can and should be done in the short term (until 2030), with an eye to laying the groundwork for the scale-up of climate action in subsequent decades. The recommendations span across resilience and adaptation, decarbonization and mitigation, and macroeconomy and financing.



Chapter 1

# Introduction: Setting the scene

## 1.1. Climate and development context

**Among the WB6 countries, the Republic of Kosovo is the second-smallest economy in population and GDP and has the lowest GDP per capita at purchasing power parity (PPP).**<sup>3</sup> Only partial recognition of Kosovo within the international community as an independent sovereign state<sup>4</sup> has hampered foreign direct investment and economic growth, and political tensions between Kosovo and Serbia continue to delay regional initiatives, including electricity market integration.

**EU accession, coupled with changes in the regulatory and trade environments, can offer opportunities to revive growth in a sustainable manner.** Accession to the EU can be an anchor for future growth and development. In the context of limited fiscal space and ability to attract investment, Kosovar firms can seek EU funds for research, development, and innovation in green and digital technology. The EU Growth Plan for the Western Balkans incentivizes the region's preparations for EU membership and accelerates reforms via the €6 billion Reform and Growth Facility in 2024-2027, with €883 million tentatively allocated to Kosovo, subject to the achievement of the payment conditions.

**Kosovo's high carbon and energy intensity—driven by heavy reliance on coal—has serious environmental and health impacts.** In 2020, Kosovo ranked second among European countries in terms of CO<sub>2</sub> emissions per unit of GDP at PPP, being nearly 3.5 times more carbon intense than EU-27 (Figure 1.1). Kosovo is estimated to be among the 20 lignite-richest countries in the world, with lignite resources totaling over 9 billion metric tons,<sup>5</sup> although these estimates do not reflect the lignite accessibility and the cost of production, varying technologies, the commodity prices and other factors that translate resources into reserves. Lignite-fired power plants provide most of the country's electricity generation (93 percent in 2021).<sup>6</sup> These aging and inefficient plants, as well as the transport sector and residential heating fired by solid fuels, emit not only CO<sub>2</sub> but also significant amounts of air pollutants. Ranking as the 10th-most polluted country in the world,<sup>7</sup> air quality is a major concern in Kosovo. Air pollution causes about 760 premature deaths a year, and it is estimated that welfare costs between US\$160 million and US\$310 million a year (2.5–4.7 percent of GDP in 2016).<sup>8</sup>

**Kosovo's GHG emissions profile—reflecting its heavy reliance on fossil fuels and aging infrastructure—points to the significant decarbonization potential of its electricity/heat and transport sectors.** The country's GHG emissions have grown to nearly 9 MtCO<sub>2</sub>eq in 2019<sup>9</sup> and now make up 8 percent of total emissions in the WB6 region. Energy-related emissions (that is, from fuel combustion) represent 86 percent of total emissions, with 63 percent coming from electricity and heat production, 13 percent from transport, 6 percent from manufacturing/construction and 4 percent from buildings. Agriculture is responsible for 7 percent of GHG emissions, while waste and industrial processes account for 4 and 3 percent, respectively (Figure 1.2). Since most of Kosovo's GHG emissions are energy-related, its decarbonization path will call for replacing fossil fuels in all sectors, particularly in power/heat and transport.

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<sup>3</sup> Organisation for Economic Co-operation and Development (OECD), Facts and figures of the Western Balkans, OECD iLibrary (n.d.), [https://www.oecd-ilibrary.org/development/multi-dimensional-review-of-the-western-balkans\\_2cc279e8-en;jsessionid=8tAzX5KL6-6Ze8cgYnSuN3-27WNxq656G40FC-T2.ip-10-240-5-42](https://www.oecd-ilibrary.org/development/multi-dimensional-review-of-the-western-balkans_2cc279e8-en;jsessionid=8tAzX5KL6-6Ze8cgYnSuN3-27WNxq656G40FC-T2.ip-10-240-5-42).

<sup>4</sup> Following Kosovo's declaration of independence from Serbia in 2008, only approximately 100 out of 193 United Nations states recognize Kosovo's sovereignty. See World Population Review, Countries that Recognize Kosovo 2024 (2024), <https://worldpopulationreview.com/country-rankings/countries-that-recognize-kosovo>.

<sup>5</sup> Statista, Resources of lignite worldwide in 2022, by leading country (2022), <https://www.statista.com/statistics/264777/top-countries-based-on-soft-brown-coal-resources/>.

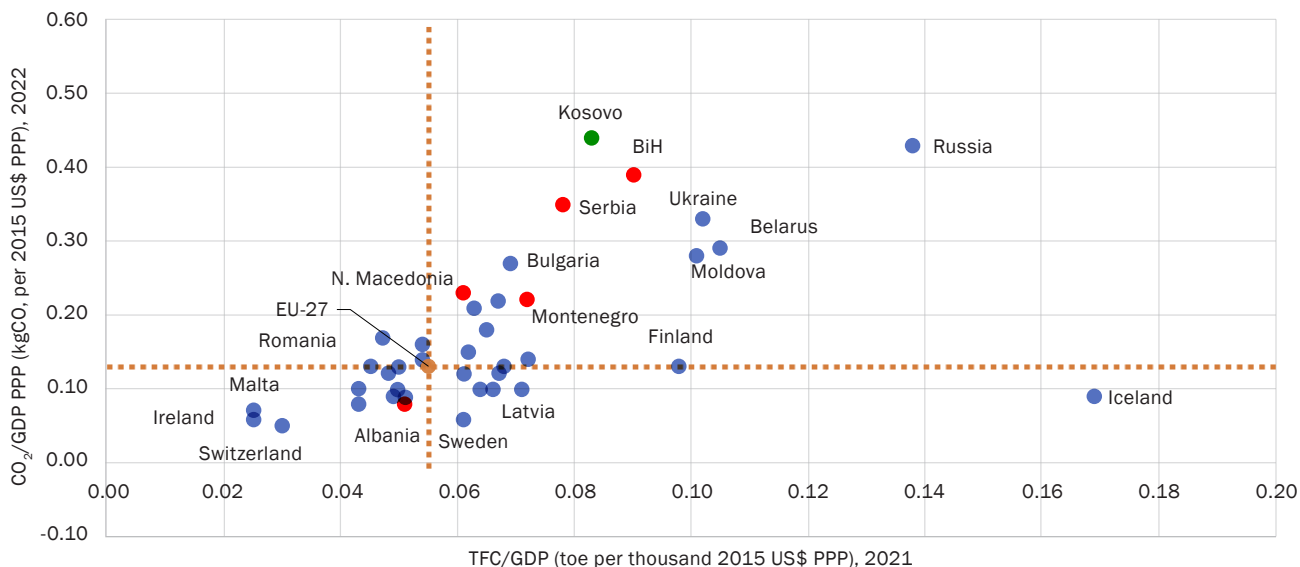
<sup>6</sup> Energy Regulatory Office, Republic of Kosovo, Annual Report 2021 (Pristina, Kosovo: Energy Regulatory Office, 2022), <https://www.ero-ks.org/zrre/sites/default/files/Publikimet/Raportet%20Vjetor/Annual%20Report%202021.pdf>.

<sup>7</sup> IQAir, Air quality in Kosovo, last updated May 12, 2024, <https://www.iqair.com/kosovo>.

<sup>8</sup> World Bank, Air Pollution Management in Kosovo 2019, Western Balkans Regional AQM Report (Washington, DC: World Bank, 2019), <https://openknowledge.worldbank.org/server/api/core/bitstreams/85d8a80e-51a3-5bc0-b7fd-6063c90a865c/content>.

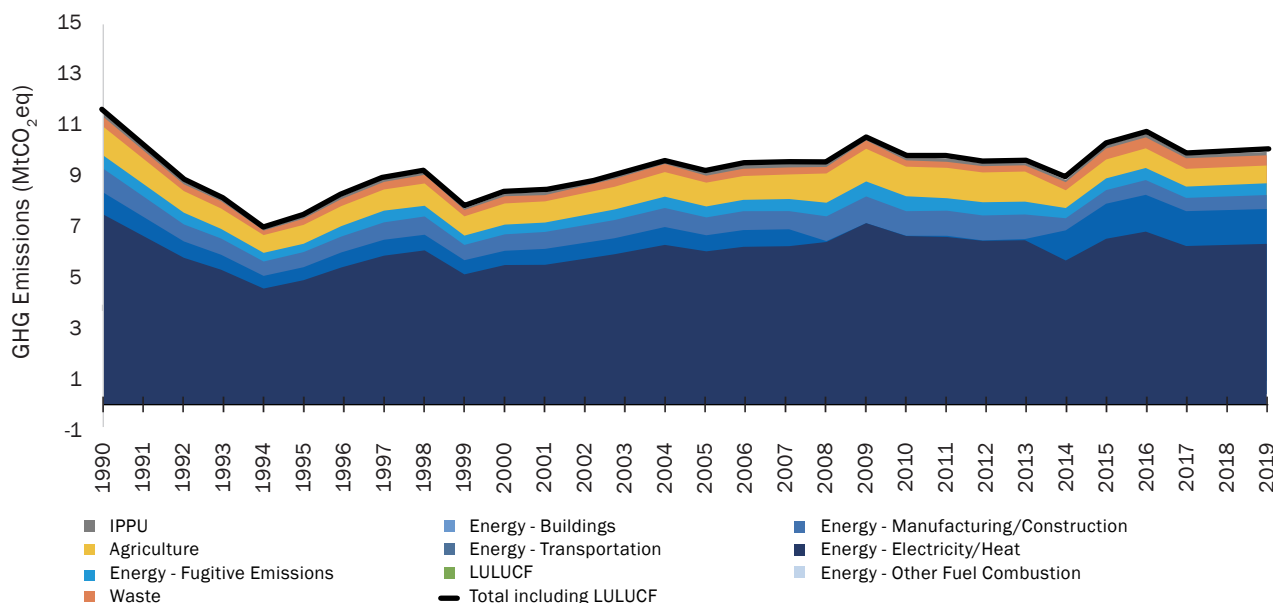
<sup>9</sup> To avoid COVID-related distortions, 2019 is used as final historical emissions year.

**FIGURE 1.1: Energy intensity versus carbon intensity of European countries**



Source: IEA (2021). World Indicators; IEA (2022) Indicators for CO<sub>2</sub> Emissions.

**FIGURE 1.2: GHG emissions, by sector (2019)**



Source: Climate Watch (2023); Kosovo Environmental Protection Agency (2022).

**The relatively high energy intensity of Kosovo makes it more vulnerable to energy price shocks and deepens energy poverty concerns.** About 22 percent of Kosovar households spend 10 percent or more of their average monthly expenditure on energy bills,<sup>10</sup> a typical threshold for energy poverty, and more than another 40 percent are unable to keep their homes adequately warm.<sup>11</sup> This energy poverty is caused by a combination of factors including low income, a high share of disposable income spent on energy, and low

<sup>10</sup> World Bank estimates based on ECAPOV, a World Bank data repository that harmonizes nationally representative household surveys.

<sup>11</sup> Eurostat, Inability to keep home adequately warm – EU-SILC survey (2022), [https://ec.europa.eu/eurostat/databrowser/view/ILC\\_MDSES01/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/ILC_MDSES01/default/table?lang=en). Data are not available for Bosnia and Herzegovina.

energy efficiency, particularly in the building sector.<sup>12</sup> Any decarbonization initiatives that may result in energy price increases therefore need to be accompanied by targeted measures to protect the most vulnerable.

**The EU's Carbon Border Adjustment Mechanism (CBAM) is expected to have only a limited, long-term macroeconomic impact but to present significant challenges to important carbon-intensive sectors.**

Managing these challenges will require both private sector actions and government policies. A 2021 World Bank modeling exercise in Kosovo<sup>13</sup> estimated that CBAM will have only a minor negative impact on GDP by 2035, approximately -0.3 percent, assuming no mitigating action is taken by the government or affected entities. The economy is expected to adjust to CBAM primarily by reallocating labor and capital and exploring new markets. But the sectors targeted by CBAM will be significantly affected, leading to output, export, and employment losses due to the increased costs associated with products with a high carbon content. Carbon-intensive electricity generation will be particularly vulnerable, so both industry and government will need to act to ensure a smoother transition to lower-carbon processes and minimize the socioeconomic impacts of CBAM. CBAM should also incentivize Kosovo to adopt a national carbon pricing scheme or join a regional emissions trading system, which is being discussed by Energy Community contracting parties.

**Transitioning away from coal will require comprehensive measures to address the social and economic impacts of the transition on coal regions and ensure a socially just, inclusive transition.**

The retirement of coal-fired power plants Kosovo A and Kosovo B, and the closure of coal mines, will directly affect coal communities. It could lead to the loss of thousands of jobs and cause social and economic inequalities, including poverty and reduced access to essential services. A successful Just Transition to coal mine closure therefore needs to be built on three pillars: institutional governance, people and communities, and environmental remediation and repurposing of land and assets (see Box 3.4 in the regional CCDR report for greater detail). The introduction of a carbon pricing system can provide revenue that can directly contribute to a Just Transition and coal region redevelopment. Additionally, the cleanup of legacy pollution and remediation of former mining land could provide work for many current miners since the required skill sets are similar. Depleted coal mines could be rehabilitated and repurposed into agriculture, light industry, and the commercial or recreational sectors, while former mine employees could be retrained for new roles. The World Bank's comprehensive Land Use Repurposing Assessment (LURA) in Kosovo of lands used for mining or for thermal power plants sought to determine the optimal alternative uses of these lands if they were to be repurposed. according to a World Bank assessment, transitioning away from coal would also be an opportunity to develop renewable energy through private sector participation, for example, public-private partnerships. Consequently, deteriorated land from mining could be used for solar photovoltaic (PV) or wind power plants. Identifying new economic opportunities outside coal mining, and appropriately supporting affected workers' transitions, ought to be a priority. But this requires short-term investments in the upskilling/reskilling of workers affected by the coal phase-out, together with income support to facilitate job transitions or protect those closer to retirement age who will face a difficult labor market. In the longer term, by contrast, improving vocational education and nonformal education systems will be key.

## 1.2. Climate change commitments and strategies

**Kosovo's climate objectives are driven by its aspiration to accede to the EU, its international obligations, and policy priorities integrated into national development plans.**

As a contracting party to the Energy Community Treaty, Kosovo must harmonize its energy and climate laws with those of the EU. By signing the 2020 Sofia Declaration on the Green Agenda for the Western Balkans, the government has expressed its intention to align with the European Green Deal and contribute to Europe becoming the first climate-neutral continent by 2050. Even though Kosovo is not a party to the United Nations Framework Convention on Climate Change (UNFCCC) nor the Paris Agreement, in 2021 it initiated a discussion with international

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<sup>12</sup> GIZ, Energy Poverty in Kosovo: Impact Assessment of Energy Poverty on Vulnerable Groups in Kosovo (2022), <https://www.giz.de/en/downloads/giz2023-en-factsheet-energy-poverty.pdf>.

<sup>13</sup> World Bank, "Environmental Tax Reform in Kosovo: Policy Note" (unpublished), (Washington, DC: World Bank, 2021).



stakeholders to prepare a voluntary nationally determined contribution (NDC). National challenges such as air pollution are another driver of the adoption of policies that directly or indirectly affect climate action. Both the National Development Strategy to 2030 and the Energy Strategy 2022–2031 aim to improve energy efficiency and increase the use of renewable energy. But more specific planning for both mitigation and adaptation, provided in the 2019–2028 Climate Strategy of Kosovo, is only nascent.

**In December 2023, an important milestone was achieved with the enactment of the Law on Climate Change.** The Law provides a legal basis for planning and institutional arrangements for mitigation and adaptation. It foresees the preparation of a long-term decarbonization strategy with a time horizon of 30 years, to be revised every five years, and of a national adaptation plan. Table 1.1 captures the main laws and strategies related to climate change mitigation and adaptation.

**TABLE 1.1: Key national laws and strategies**

Strategies				Laws			
NECP	Climate Change / Low-Carbon Development Strategy	National Adaptation Plans	Energy Strategy	Law on Climate Change	Law on Air Quality	Law on Energy Efficiency	Law on Renewable Energy
» until 2040	✓ until 2028	✗	✓ until 2031	✓	✗	✓ under revision	✓

Source: World Bank compilation of various energy national laws and strategies.

Note: Green: Document approved and valid. Blue: Draft document exists but has not yet been approved. Red: Document does not exist or has expired.

**The adaptation planning framework is only nascent, with only several relevant objectives in the Climate Change Strategy, but no elaborated national adaptation plan.** The objectives of the Strategy include developing new mechanisms for reducing climate change-related risk in vulnerable sectors, and capacity building for adaptation. The development of a national adaptation plan is planned according to the Climate Change Law.

**Kosovo does not have enough information assets to address climate change risks.** The climate change scenarios are not available, while the hydro meteorological data are available only for some locations. No local-scale hazard maps are available for Kosovo except for flood risk maps.

**The Climate Strategy of Kosovo and the draft NECP provide the planning framework and commitments for mitigation.** The Climate Strategy covers the period 2019–2028 and contains an inventory of GHG emissions, scenarios, and assessments, and subsequent vision, mission, and action planning. Even though the planning is medium-term, and Kosovo has not adopted a net zero target in the longer term, the Strategy sets out an outlook of zero emissions by 2050. Its implementation is lagging, with only one action plan developed for the 2019–2021 period enacted and no implementation reports available. As an Energy Community contracting party, Kosovo is expected to adopt, by June 2024, its NECP which spans until 2030, reflecting its commitment to achieving its energy and climate objectives. The draft NECP of July 2023 sets ambitious mitigation targets that are consistent with the targets of the Energy Community Clean Energy Package (Table 1.2).<sup>14</sup> In addition to measures to support energy efficiency and renewable energy, the draft NECP envisages phasing out one unit of the coal-fired thermal power plant Kosovo A. It also calls for a study on the effects of CBAM and/or the setting of a domestic carbon price.

<sup>14</sup> Energy Community, The Clean Energy Package targets (2024), <https://www.energy-community.org/implementation/package/CEP.html>.

**TABLE 1.2: Kosovo’s 2030 targets in the Clean Energy Package and NECP**

Net GHG emissions reduction by 2030 from 2016 level	Emissions level in 2030 (MtCO <sub>2</sub> eq)	Share of energy from renewable energy sources in gross final consumption in 2030*	Final energy consumption in 2030 (Mtoe)	Primary energy consumption in 2030 (Mtoe)
-16.3%	8.95	32.0% from 18.9% in 2005	1.8 from 4.25 in 2020	2.7 from 4.7 in 2020

Sources: Clean Energy Package: <https://www.energy-community.org/implementation/package/CEP.html> and Kosovo draft NECP (2023)

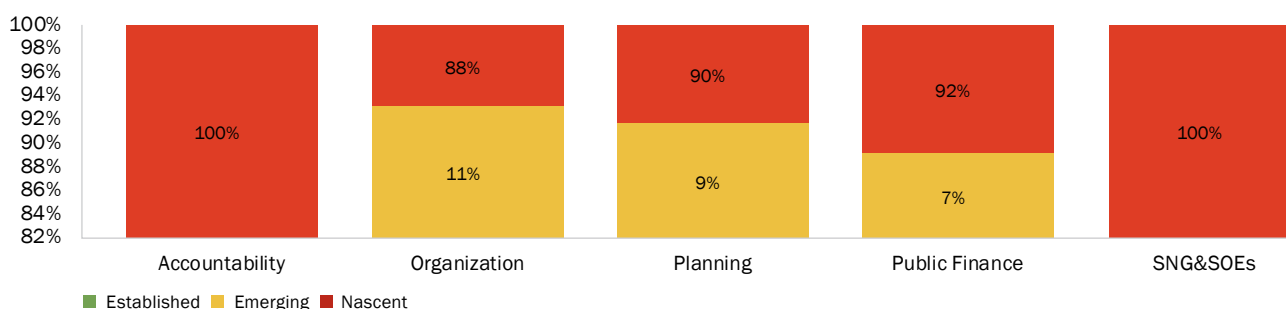
\* Renewable energy source targets by sector: 49.6 percent in heating and cooling, 44.8 in electricity, and 3.6 percent in transport

**The Law on Climate Change sets the requirements for monitoring, reporting and verification (MRV) and for the GHG emission national inventory system.** The Climate Change Law provides a clear mandate for MRV, with the Kosovo Environmental Protection Agency (KEPA) responsible for compiling the GHG emission inventories at a national level.

### 1.3. Institutions, policies, and capacities

**Overall Kosovo features very nascent institutional maturity for addressing climate change,** according to the World Bank’s Climate Change Institutional Assessment (CCIA), which examines a country’s capacity to plan, implement, and sustain climate change policies over multiple political cycles by analyzing 74 indicators across five pillars. The indicators score different aspects of countries’ institutional maturity for climate action as “nascent,” “emerging,” or “established,” with further breakdown within each of these categories. Since the CCIA is a point-in-time analysis, the findings may fail to capture certain recent developments because of the rapid pace of regulatory and institutional development across the region. Nevertheless, it serves as a useful empirical baseline to highlight achievements and gaps across the region, helping to inform peer learning and innovation in climate action. Annex A outlines the CCIA methodology and summarizes the CCIA results, which demonstrate that Kosovo’s institutional maturity is less advanced than the Western Balkans average across all pillars. Figure 1.3 shows the level of Kosovo’s ability and action by pillar.

**FIGURE 1.3: Kosovo’s institutional maturity for climate action, by CCIA pillar.**



Sources: Country Institutional Capabilities for Climate Change Action: Western Balkans Climate Change Institutional Change (CCIA); D4C National Climate Actions Strategies and Policies Database (NCASPD).

**The structures and capacities for climate action are yet to be established.** The Ministry of Environment, Spatial Planning and Infrastructure (MESPI) is responsible for the overall climate change agenda, while the Ministry of Economy prepares the NECP and energy sector strategies, and the Emergency Management Agency (EMA) under the Ministry of Internal Affairs undertakes disaster risk management. Supported by UNDP, MESPI, which leads inter-ministerial coordination, is planning to reorganize its structure and create a Climate Change department with five staff members. The Climate Change Law anticipates the establishment of a National Climate Change Council (NCCC) and its Secretariat to assist MESPI and facilitate coordination among all public and private sector actors in relation to climate policies. A scientific advisory board to NCCC may also be established. The secondary legislation to create the NCCC has not yet been adopted, and the frequency of NCCC meetings, rules, and procedures are yet to be determined.

**Climate change is not integrated into public finance management.** A green public procurement framework does not yet exist, nor does climate-informed investment planning. There are no dedicated climate finance instruments, except for the energy efficiency (EE) Fund, which became operational in early 2023.

**The local self-governments are not assigned any function for climate action.** Currently, the only obligation relevant for mitigation is the obligation of LSGs to prepare EE programs, but there are no reduction targets. All municipalities claim the need for increasing their capacity in climate change management.<sup>15</sup>

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**Accountability, transparency, and engagement mechanisms are nascent.** Access to climate information is limited, as are stakeholder engagement mechanisms on climate policy. There are no mechanisms for independent expert advice: the Law foresees the establishment of a scientific advisory board, but it is unclear whether it will operate as a fully independent body. Legislative oversight for climate action is nascent: the Parliament is in process of establishing an informal Green Parliamentary Group, which among other things will handle climate-related issues and oversee climate action in the country.

**Adequate human capital in Kosovo will be critical for climate action, but its development faces significant challenges.** Kosovo's Human Capital Index score of 0.57 means that 43 percent of its human potential is unutilized.<sup>17</sup> The results of the 2022 PISA assessment for Kosovo showed declining performance, with learning outcomes among the lowest in the Europe and Central Asia (ECA) region. On average, the 2022 scores of Kosovar children were down in mathematics, reading and science compared to 2018. Inequalities in human capital outcomes also persist. Although inequalities in human capital outcomes persist, the 39-point difference in Kosovo between the top 25 percent most socioeconomically advantaged students and the bottom 25 percent in PISA mathematics scores is significantly smaller than the average difference between the two groups across OECD countries (93 points)<sup>18</sup>. Weak learning outcomes affect lifelong employment opportunities and living standards. Unlike in most Western Balkan countries, the working-age population (ages 15–64) in Kosovo is growing.

**To harness the potential of its relatively young population, Kosovo needs to improve its labor market outcomes, but these are among the weakest in the Western Balkans.** In 2019, only 29.9 percent of working-age Kosovars were employed, compared to an average was 54.6 percent in the WB6. Inactivity rates, especially among women and the youth, are also high. Fewer than half (40.1 percent) of working-age Kosovars were either employed or unemployed; among women, the corresponding figure was just 20.5 percent, and 24.2 percent among youth. In 2018, almost one-third of Kosovars aged 15–24 was neither in employment, education, nor training (NEET)—the highest proportion in the Western Balkans. Health service delivery and essential medical products face significant limitations in the country, resulting in restricted access to healthcare. Because of this, many seek medical care in neighboring countries.<sup>19</sup> Yet during a major climate disaster such as a flood, Kosovars may not be able to travel cross-border to access health services. Compounding this issue is the limited capacity for data analysis within the health system because the health

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<sup>15</sup> World Bank and Global Facility for Disaster Reduction and Recovery (GFDRR), Ready 2 Respond Diagnostic Report: Emergency Preparedness and Response Assessment—Kosovo (Washington, DC: World Bank, 2021), <https://documents1.worldbank.org/curated/en/959001621917488766/pdf/Kosovo-Ready-2-Respond-Emergency-Preparedness-and-Response-Assessment-Diagnostic-Report.pdf>.

<sup>16</sup> World Bank and Global Facility for Disaster Reduction and Recovery (GFDRR), Ready 2 Respond Diagnostic Report: Emergency Preparedness and Response Assessment—Kosovo (Washington, DC: World Bank, 2021), <https://documents1.worldbank.org/curated/en/959001621917488766/pdf/Kosovo-Ready-2-Respond-Emergency-Preparedness-and-Response-Assessment-Diagnostic-Report.pdf>.

<sup>17</sup> The index is a summary measure of the amount of human capital that a child born today can expect to acquire by age 18, given the risks of inadequate health and inadequate education that occur in the country where she or he lives.

<sup>18</sup> OECD, "PISA 2022 Results: Factsheets—Kosovo," December 5, 2023, <https://www.oecd.org/publication/pisa-2022-results/country-notes/kosovo-1f99d575/#chapter-d1e11>.

<sup>19</sup> International Trade Administration (ITA), Kosovo—Country Commercial Guide, last updated January 24, 2024, <https://www.trade.gov/country-commercial-guides/kosovo-health>.

information system is not fully functioning.<sup>20</sup> Although there is an official package of essential health services (EHS) in place to deliver continued services during emergencies, there is no identified list of those health services, nor a systematic monitoring system for the continuity and delivery of EHS.<sup>21</sup> Additionally, the country's reliance on importing medical equipment and pharmaceuticals contributes to potential vulnerabilities in the health sector.<sup>22</sup> Enhancing these challenges is the shortage of staff in the public health sector.<sup>23</sup> In summary, substantial investments in human capital are critical to ensure that Kosovars can respond to climate change and undertake effective adaptation steps.

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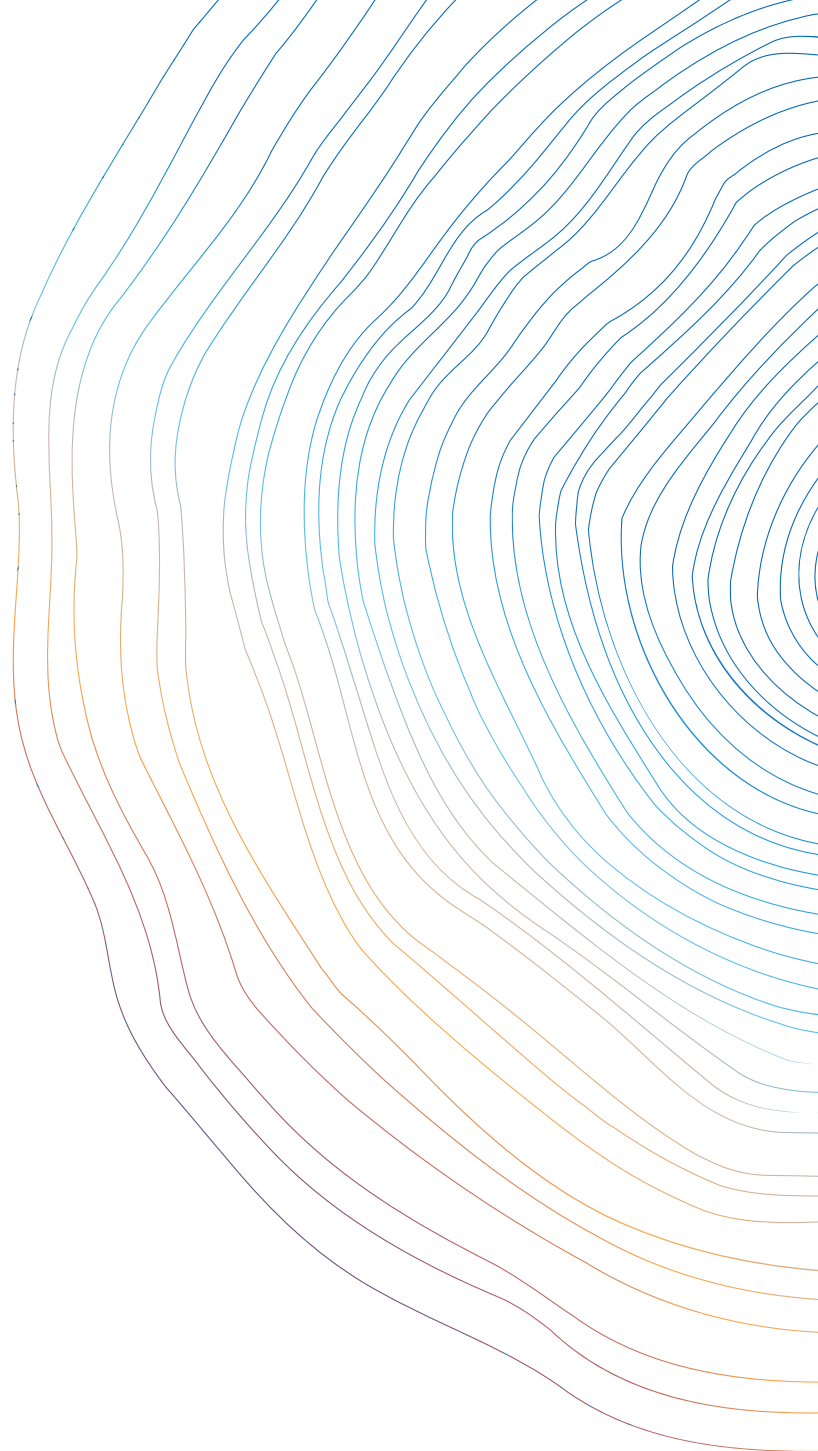
<sup>20</sup> Ardita Tahirukaj, Sergy Koryak, Isme Humolli, Bujar Rexhepi, and Florian Tille, Maintaining Essential Health Services in Kosovo (WHO Health Services Learning Lab, 2021),

[https://hlh.who.int/ab-detail/action-brief-kosovo---deep-dive#:~:text=The%20health%20system%20in%20Kosovo.of%20its%20GDP%20\(2.5%25\).](https://hlh.who.int/ab-detail/action-brief-kosovo---deep-dive#:~:text=The%20health%20system%20in%20Kosovo.of%20its%20GDP%20(2.5%25).)

<sup>21</sup> Tahirukaj et al., Maintaining Essential Health Services in Kosovo.

<sup>22</sup> ITA, Kosovo—Country Commercial Guide.

<sup>23</sup> Tahirukaj et al., Maintaining Essential Health Services in Kosovo.



## Chapter 2

# Adaptation risks and opportunities

## 2.1. How is a changing climate affecting risks and opportunities?

**As a landlocked country in the central Balkan Peninsula of Southeastern Europe, Kosovo is vulnerable to climate risks.** The climate is moderately continental, with warm summers and cold winters. The country experiences high annual precipitation, including significant snowfall in the winter. But with a terrain characterized by varying elevations, there are variations in temperature and rainfall distribution. In the southwestern Dukagjini Plain, the climate gradually shifts to mild Mediterranean, with more frost-free days and higher annual precipitation.<sup>24</sup> Mountainous areas experience both colder temperatures and greater precipitation.<sup>25</sup> These climatic characteristics and variations expose the country to different natural hazards.<sup>26</sup>

**According to the Disaster Inventory Management System (DesInventar), Kosovo is frequently exposed to forest fires, floods, and landslides.** Forests, covering 43 percent of the country, have become increasingly susceptible to wildfires since 2000, particularly in late spring and in the dry summer.<sup>27</sup> Currently, 36.8 percent of Kosovo' total area is under medium wildfire risk and 15.8 percent under high wildfire risk.<sup>28</sup> Mountainous areas are subject to flash floods, particularly in highly exposed river basins such as the Drini basin, where floods occur every two to three years.<sup>29</sup> Severe floods occurred in the country in 2013, 2014, and 2016, resulting in total estimated damage of over €4 million. In January 2016, flash floods triggered by heavy rainfall and rapid snowmelt affected the municipalities of Malishevë/Mališevo and Glogovac/Glogovac.<sup>30</sup> Presently, 47.9 percent of the country' total area is susceptible to very high and high landslide risks,<sup>31</sup> especially the Mitrovicë/Mitrovica, Prishtinë/Pristina, Peja/Pec, and Shtërpçë/Strpce areas, with at least a quarter of the communities vulnerable to landslides and carrying a 1 percent of incidence rate (10 percent over 10 years).<sup>32</sup> Table 2.1 below presents Kosovo hazards data before 2015.

**TABLE 2.1: Main hazards in Kosovo and associated damage before 2015**

Hazards	No. of Events	Damage (US\$)
Forest fire	1038	9,100,000
Flood	294	2,000,000
Landslide	47	140,000

Source: Disaster Inventory Management System (DesInventar)<sup>33</sup>

**Kosovo is also subject to heat-related challenges such as droughts and heatwaves.** Temperatures in Kosovo have begun to soar. According to the Hydrometeorological Institute of Kosovo (IHMK) and Accuweather, July in Kosovo consistently ranks as the hottest month annually. In 2023, the minimum temperatures in July—typically the warmest month of the year in Kosovo—were unusually high, making it the second-hottest month since

<sup>24</sup> USAID, "Climate Risk Profile: Kosovo," USAID Climatelinks portal (2017), [https://www.climatelinks.org/sites/default/files/asset/document/2017\\_USAID\\_Climate%20Change%20Risk%20Profile%20-%20Kosovo.pdf](https://www.climatelinks.org/sites/default/files/asset/document/2017_USAID_Climate%20Change%20Risk%20Profile%20-%20Kosovo.pdf).

<sup>25</sup> John B. Allcock, John R. Lampe, and Antonia Young, "Kosovo," Encyclopedia Britannica, accessed 13 May 2024, <https://www.britannica.com/place/Kosovo>.

<sup>26</sup> United Nations Development Programme (UNDP), Disaster Risk Reduction Capacity Assessment Report for Kosovo (New York: UNDP, 2011), <https://www.cadri.net/system/files/2021-06/KOSOVO-Capacity-Assessment-Report-for-DRR.pdf>.

<sup>27</sup> World Bank and GFDRR, Emergency Preparedness and Response Assessment: Kosovo.

<sup>28</sup> World Bank analysis (CIMA data) and European Land susceptibility (ELSUSV2).

<sup>29</sup> World Bank and GFDRR, Emergency Preparedness and Response Assessment: Kosovo.

<sup>30</sup> South-East Europe Urban Resilience Building Action Network (SEEUrbn), Kosovo (2018), <http://seeurban.net/country-kosovo>.

<sup>31</sup> European Landslide Susceptibility V2 (ELSUS v2) at 200m resolution.

<sup>32</sup> United Nations Development Programme (UNDP), Kosovo Disaster Risk Reduction Initiative (KDDRI), (New York: UNDP, 2013), <https://info.undp.org/docs/pdc/Documents/KOS/2013.05.28%20KDDRI%20Prodoc%20SIGNED.pdf>.

<sup>33</sup> UNDRR and DesInventar Sendai, Framework for Disaster Risk Reduction (n.d.), [https://www.desinventar.net/DesInventar/country\\_profile.jsp?countrycode=xkx&lang=EN](https://www.desinventar.net/DesInventar/country_profile.jsp?countrycode=xkx&lang=EN).

2001 in terms of average minimum temperature.<sup>34</sup> The country has been affected by drought several times in the last two decades.<sup>35</sup> Approximately 80 percent of Kosovo’s municipalities have experienced water scarcity since 2004; about 70 percent of those cases have worsened in recent years owing to factors like droughts and the improper use of water resources.<sup>36</sup>

**Kosovo is situated in a seismically active zone that is prone to earthquakes.** On many occasions, the country has suffered significant levels of destruction from earthquakes in neighboring countries such as Albania, Montenegro, Macedonia, and Serbia.<sup>37</sup> In 2010, the eastern part of the country faced a magnitude 5.2 earthquake,<sup>38</sup> centered near Istog and felt in Pristina and Skopje, occurred at a depth of 2 km, causing building damage but no casualties. A 5.1-magnitude earthquake in Gjilan/Gnjilane resulted in one death and 50 injuries in April 2002.<sup>39</sup> The 1963 Skopje earthquake, the most devastating in recent history, had a magnitude of 6.1, causing over 1,000 deaths, injuring up to 4,000 people, and displacing about 200,000.

**With the changing climate, the incidence and intensity of natural hazards, along with their impacts, are also expected to worsen.** Extreme rainfall events and variations in river flow will lead to more frequent and severe flooding, while high temperatures, uncertain rainfall, and reduced runoff will heighten the risk of drought, heatwaves, and forest fires.<sup>40</sup> Driven by increasing exposure, Kosovo’s flood risk is expected to increase under all the three possible future climate scenarios (RCP 2.6, 4.5 and 8.5) in terms of average annual loss. But against the baseline, the loss ratio<sup>41</sup> and average population exposed<sup>42</sup> is projected to increase for RCP 2.6 and decrease for RCP 4.5 and RCP 8.5 because of the overall drying of the region leading to lower average riverine flood risk (although rare extreme events will continue to occur and may even increase, in particular, flash floods).

**TABLE 2.2: Kosovo flood risk assessment**

Scenario	Average annual loss (US\$, millions)	Loss ratio (%)	Average population exposed
Baseline	57,935,932.20	0.21	13076
RCP 2.6	130,680,015.60	0.23	14811
RCP 4.5	106,633,533.40	0.19	10763
RCP 8.5	99,130,769.87	0.17	9665

**Climate change poses the risk of cascading effects, exacerbating the vulnerabilities of Kosovo’s prime economic sectors, particularly agriculture, forestry, and water.** With agriculture contributing 7 percent of value added to the economy and providing income for rural households facing poverty, recent floods and inadequate irrigation systems have highlighted the vulnerabilities of the economy and of Kosovo’s poor.<sup>43</sup> Fluctuations in rainfall leave regions without irrigation exposed to droughts and/or floods.<sup>44</sup> Forestry too

<sup>34</sup> SOT, “How have the temperatures in Kosovo changed over the years?” SOTNews, 25 July 2023, <https://sot.com.al/english/rajoni/si-kane-ndryshuar-temperaturat-ne-kosove-nder-vite-i602461>.

<sup>35</sup> World Bank, Water Security Outlook for Kosovo (Washington, DC: World Bank, 2018), <https://documents1.worldbank.org/curated/en/496071548849630510/pdf/Water-Security-Outlook-for-Kosovo.pdf>.

<sup>36</sup> Organization for Security and Co-operation in Europe (OSCE) Mission in Kosovo, Water Supply Issues in Kosovo (2018), <https://www.osce.org/files/f/documents/5/b/32988.pdf>.

<sup>37</sup> UNDP, Kosovo Disaster Risk Reduction Initiative.

<sup>38</sup> As measured by the Seismological Institute in Pristina. See UNDP, Kosovo Disaster Risk Reduction Initiative.

<sup>39</sup> Petrit Çollaku. 2010. Bad Quake Could Flatten Pristina’s New Builds. BalkanInsight. <https://balkaninsight.com/2010/03/12/bad-quake-could-flatten-pristina-s-new-builds/>.

<sup>40</sup> Kurt Glock, Michael Tritthart, Dragan Mladan, Mirjana Galjak, Predrag Stanojević, Milan Gocić, Slaviša Trajković, et al., Report on natural disasters in the Western Balkans (Brussels: European Commission, 2017), [https://ec.europa.eu/programmes/erasmus-plus/project-result-content/3f2e79f0-053a-4f91-bff4-44c34fa240cb/Report\\_on\\_natural\\_disasters\\_in\\_WB.pdf](https://ec.europa.eu/programmes/erasmus-plus/project-result-content/3f2e79f0-053a-4f91-bff4-44c34fa240cb/Report_on_natural_disasters_in_WB.pdf).

<sup>41</sup> Loss ratio is the average annual loss divided by the estimated reconstruction cost of the entire building stock.

<sup>42</sup> People who live in an area experiencing more than 20 cm of water during a flood.

<sup>43</sup> International Monetary Fund (IMF), Republic of Kosovo: Request for Stand-by Arrangement and an Arrangement Under the Resilience and Sustainability Facility—World Bank Assessment Letter for the Resilience and Sustainability Facility (Washington, DC: IMF, 2023), <https://www.elibrary.imf.org/view/journals/002/2023/200/article-A002-en.xml>.

<sup>44</sup> USAID 2017, Climate Risk Profile: Kosovo. <https://www.climatelinks.org/countries/kosovo>.

faces escalating risks from wildfires, species changes, and soil erosion, accelerating its declining quality and declining productivity.<sup>45</sup> Besides these sectors, climate change compounds Kosovo's existing problems with water scarcity and poor air quality. Poor design of drainage and sewage systems in urban areas increases vulnerability to floods, which further threatens potable water sources.<sup>46</sup>

**Extreme climate events, particularly floods, cause significant damage to Kosovo's critical infrastructure.**

Urban flooding risk is heightened by inadequate stormwater management infrastructure, poor infrastructure design practices – for example, mixing sanitation and stormwater management infrastructure – and rapid and uncontrolled urban growth. In 2013, floods destroyed Kutinje bridge in Leposavić town and a 50-meter-long protective wall in Banjska village.<sup>47</sup> The floods also submerged local roads and caused severe damage in Zubin Potok, burying an 80-meter section of a road. In January 2023, Skenderaj municipality suffered about €12 million in damage to physical assets and infrastructure from floods.<sup>48</sup> In April 2024, heavy rains caused widespread floods in Kosovo, damaging infrastructure and causing landslides that blocked roads. The floods affected fields, gardens, and structures, washing away road sections and causing the collapse of five bridges over the Ibar River.<sup>49</sup>

**Exposure to climate change and to related hazards deeply affects human health in Kosovo.**

Besides the already mentioned impact of air pollution on human health, climate change also significantly impacts water quality in Kosovo.<sup>50</sup> There is evidence of prevalent water pollution that heightens the risk of waterborne diseases, particularly affecting children with conditions like diarrhea. About 13 deaths a year among Kosovar children under 5 years can be attributed to water contamination.<sup>51</sup> Two cases underscore the vulnerability of water resources to climate hazards in Kosovo: during the winter of 2013–2014, Kosovo faced serious destruction of its water supply as a result of droughts caused by anomalous winter processes,<sup>52</sup> and floods in 2021 affected the water supply in Pristina.<sup>53</sup> Furthermore, rising temperatures, especially heatwaves, can cause several morbidities including heat exhaustion, dehydration, and heatstroke. Exposure to extreme heat has been linked to increased mortality and morbidity.<sup>54</sup> The data for Kosovo are limited, but there is strong evidence of heat-related mortality in neighboring countries.<sup>55</sup> Additionally, climate change increases the risk of vector-borne diseases by influencing habitat and transmission patterns.<sup>56</sup> Crimean–Congo hemorrhagic fever has been linked to climate change in the country.<sup>57</sup> It is therefore important for Kosovo to develop targeted interventions to reduce the risk of vector and water-borne diseases amid climate change.

**Exposure to natural hazards is linked with, and aggravates, existing socioeconomic vulnerabilities.**

**Kosovo's 38 municipalities (*komunë/opštine*)** face varying levels of socioeconomic stresses that interact with, and are compounded by, climate shocks. Population decline represents one such significant challenge.

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<sup>45</sup> IMF, Republic of Kosovo: Request for Stand-by Arrangement.

<sup>46</sup> USAID 2017, Climate Risk Profile: Kosovo. <https://www.climatelinks.org/countries/kosovo>.

<sup>47</sup> Slavković R, Ristic V., Goran Dikic G. Božanić D. 2021. Report on natural disasters in the Western Balkans-NatRisk. [https://www.researchgate.net/publication/349240500\\_Report\\_on\\_natural\\_disasters\\_in\\_the\\_Western\\_Balkans-NatRisk](https://www.researchgate.net/publication/349240500_Report_on_natural_disasters_in_the_Western_Balkans-NatRisk).

<sup>48</sup> Fjollë Caka, "Cities and Climate-Resilience in Kosovo," ResPublica blog, March 7, 2023, <https://respublica.edu.mk/blog-en/environment/cities-and-climate-resilience-in-kosovo/?lang=en>.

<sup>49</sup> Kurt Glock et al., Report on natural disasters.

<sup>50</sup> Ministry of Environment and Spatial Planning, Climate Change Strategy 2019-2028 (Pristina: Republic of Kosovo, 2018), [https://www.lfmbw.net/wp-content/uploads/2024/02/Climate-Change-Strategy-and-Action-Plan\\_sep\\_2018.pdf](https://www.lfmbw.net/wp-content/uploads/2024/02/Climate-Change-Strategy-and-Action-Plan_sep_2018.pdf).

<sup>51</sup> World Bank, Water Security Outlook for Kosovo.

<sup>52</sup> Henny A. J. van Lanen, Anne F. van Loon, Stefan Ploum, Gregor Laaha, Juraj Parajka, and Emmanuel Garnier, Hydrological drought in cold climates: new drought types (EGU General Assembly, 2014), <https://ui.adsabs.harvard.edu/abs/2014EGUGA..1613026V/abstract>.

<sup>53</sup> Fjollë Caka, "Hotspot ahead of its time: Kosovo\* has been feeling the heat since the 1960s," UN Sustainable Development Group Action 2030 blog, November 11, 2021, <https://unsdg.un.org/latest/blog/hotspot-ahead-of-its-time-kosovo-has-been-feeling-heat-1960s>.

<sup>54</sup> C. Huang, A.G. Barnett, X. Wang, P. Vaneckova, G. FitzGerald, and S. Tong, "Projecting future heat-related mortality under climate change scenarios: a systematic review," Environmental Health Perspectives 119, no. 12 (December 2011): 1681–90, <https://doi.org/10.1289/ehp.1103456>.

<sup>55</sup> USAID, "Climate Risk Profile: Kosovo."

<sup>56</sup> Wellcome, "How climate change affects vector-borne diseases," Wellcome.org, November 28, 2023, <https://wellcome.org/news/how-climate-change-affects-vector-borne-diseases>.

<sup>57</sup> USAID, "Climate Risk Profile: Kosovo."



In the decade from 2012 to 2021, the Kosovo Agency of Statistics recorded a population decline from 1.815 million to just above 1.7 million. Over 31 municipalities have shrunk in the last two decades. Approximately 80 percent of these are low-density urban areas or rural, more isolated areas and are also highly exposed to hazards. The average declining municipality also has a 30 percent higher exposure to wildfires than the average growing municipality, and 37 percent higher exposure to landslides.<sup>58</sup> The difference in exposure to floods is smaller (3 percent, on average) and not statistically significant. Nonetheless, all the municipalities with significantly high average flood risk have also experienced population decline.

**Yet all urban areas in Kosovo have been expanding despite no pressing needs to accommodate population and in doing so, they have become significantly more exposed to floods.** Of the 34 urban areas with population above 5000 in Kosovo,<sup>59</sup> only 12 have been growing in the past two decades, yet all 34 have increased their urban footprint. The result is a 70 percent increase in built-up for the average city, compared to a 7 percent decrease in population, suggesting that cities in Kosovo have been expanding inefficiently. Indeed, the extent of their urban sprawl is, on average, among the highest in the WB6 countries. Besides spatial inefficiency, new urban expansion in the last two decades has occurred on city parcels whose average exposure to floods is double that of previously existing urban built-up areas. This has resulted in an average increase in flood exposure of about 38 percent. But the same does not apply to exposure to landslides, which is virtually unchanged.

**Modeling the effects of climate change on GDP—whether shocks or slower-moving stressors—is a tricky science, even with state-of-the-art econometrics tools.** The channels via which impacts take place are difficult to account for in an exhaustive way. This is further compounded by the uncertainties in climate and exposure data especially when projected, and the difficulty of calibrating vulnerabilities. For instance, while overall flooding risks are expected to fall, the incidence of flash floods is expected to rise.

**More generally, modeling fails to capture the impacts of certain extreme events and wildfires are a case in point.** Historical data quickly becomes sparse as one goes back in time, impact channels are multifaceted and seldom well understood, and projections of the hazard in question are often yet to be tested. Modeling impacts at the annual level is next to impossible for highly nonlinear climate shifts whose dynamics are not yet fully captured in climate models—the hydrological cycle, for instance—and they yield large uncertainties, once again expensive to propagate. Finally, as discussed earlier, climate hazards interact with and compound one another; yet models, at best, capture the dynamics of a single climate hazard, missing the complexity of the links. Nonetheless, chapter 4 attempts to provide the very best possible assessment of the potential lower-bound magnitudes of damage and their impacts on GDP. Interpreting these estimates should be contextualized by an understanding of the extreme and often unpredictable nature of climate shocks and stressors, as described in this section.

**To counter the growing risks linked to the changing climate, Kosovo will need to consider large investments in adaptation—investments that can yield large benefits (see section 2.2).** The total cost of the proposed policy actions and investments for an initial adaptation package is approximately US\$2.8 billion (see section 5.1). By sector, the estimates are US\$126.18 million (DRM), US\$4.1 million (urban), US\$1.073 billion (water), US\$19.9 million (forestry and biodiversity), US\$628.4 million (agriculture), US\$821.9 billion (transport), US\$32.64 million (education, skills, and labor markets), US\$114.83 million (social protection systems), and US\$20.12 million (health system). Multiple sources of information were used to estimate the needs and costs, including national strategic documents, for example, the Action Plan on Climate Change Strategy 2019–2021. This was supplemented by inputs from local and international sectoral experts and validated with costs from previous projects such as those previously financed by the World Bank Group. Annex B details the methodology employed. The proposed measures cover a range of adaptation needs such as policies and hard and soft infrastructure, with varying timelines and complexities depending on the focus area. Chapter 5 elaborates on these.

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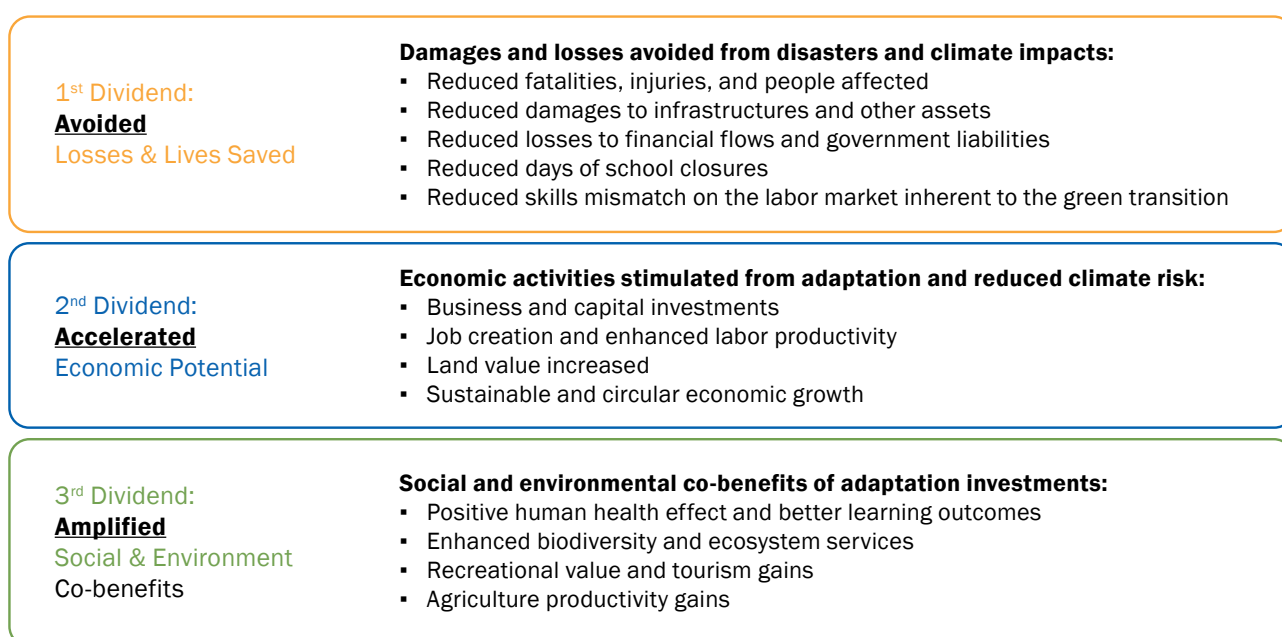
<sup>58</sup> GEM flood data, World Bank analysis (CIMA data); European Land susceptibility (ELSUSV2).

<sup>59</sup> See chapter 3 of the Regional Report for further details on the identification of urban areas.

## 2.2. A changing climate comes with greater risks—but also greater opportunities

Investing in adaptation can yield substantial social, economic, and environmental benefits that can be expressed using the Triple-A Dividend framework—that is, investments that bring with them three distinct sets of returns: **avoided** losses, **accelerated** economic benefits, and **amplified** social and environmental spillovers. The Triple-A Dividend framework reconciles perspectives from the humanitarian, environmental, and economic fields (Figure 2.1).<sup>60</sup> It identifies three types of benefits: i) avoided losses and lives saved during a disaster or climate event; ii) accelerated economic potential as a result of stimulated investments and bolstered economic activities due to the reduction in background climate and disaster risks; and, finally, iii) amplified social and environmental spillovers in the form of the co-benefits of adaptation investments.

**FIGURE 2.1: The Triple-A Dividend of Resilience framework**



Source: Authors, adapted from Tanner et al. 2015<sup>61</sup>

**Avoided losses: Investing in adaptation and in financial preparedness for climate resilience reduces losses, particularly in the agriculture sector.** Reports have estimated that investing in adaptation globally could generate total net benefits of US\$7.1 trillion and an average BCR (benefit–cost ratio) of 4. (BCRs typically range from 2.5 to 5.5 but some can exceed 10).<sup>62</sup> Climate change adaptation is essential to prevent economic losses, to drive innovations for revenue growth, cost savings and sustainability, and to safeguard the well-being of communities and ecosystems.<sup>63</sup> For instance, early-warning systems offer substantial cost-

<sup>60</sup> The original term, “Triple Dividend of Resilience,” has been modified here as “Triple-A Dividend of Resilience” to hint at the potential financial dividends from these economic and other co-benefits. The Triple Dividend framework was developed and presented in T. Tanner, et al., The Triple Dividend of Resilience: Realizing Development Goals through the Multiple Benefits of Disaster Risk Management (London and Washington, DC: Overseas Development Institute and World Bank, 2015). Tanner, T. et al., 2015. The Triple Dividend of Resilience: Realizing Development Goals through the Multiple Benefits of Disaster Risk Management. Overseas Development Institute and World Bank, London and Washington, DC. <https://documents1.worldbank.org/curated/en/993161515193991394/pdf/P151463-01-05-2018-1515193988640.pdf>.

<sup>61</sup> Tanner, T. et al., 2015. The Triple Dividend of Resilience: Realizing Development Goals through the Multiple Benefits of Disaster Risk Management. Overseas Development Institute and World Bank, London and Washington, DC. <https://documents1.worldbank.org/curated/en/993161515193991394/pdf/P151463-01-05-2018-1515193988640.pdf>

<sup>62</sup> Global Commission on Adaptation, Adapt Now: A global call for leadership on climate resilience, 2019. [https://gca.org/wp-content/uploads/2019/09/GlobalCommission\\_Report\\_FINAL.pdf?\\_gl=1\\*1gronxf\\*\\_ga\\*MTYwMzUzMjU2My4xNjk2NTgwOTA3\\*\\_up\\*MQ](https://gca.org/wp-content/uploads/2019/09/GlobalCommission_Report_FINAL.pdf?_gl=1*1gronxf*_ga*MTYwMzUzMjU2My4xNjk2NTgwOTA3*_up*MQ).

<sup>63</sup> PwC, Accelerating Business Action on Climate Change Adaptation (2023). <https://www.pwc.com/gx/en/services/sustainability/publications/critical-business-actions-for-climate-change-adaptation.html>.

effective benefits by saving lives and protecting assets.<sup>64</sup> For example, providing a one-day warning of an impending heatwave can reduce the subsequent damage by 30 percent, and allocating US\$800 million to such warning systems in developing countries could avert losses of US\$3 million to US\$16 billion annually.<sup>65</sup> By using early-warning systems and crop protection measures, it is estimated that the USAID AGRO activity in Kosovo boosted yields of valued fruit and vegetable crops by 50–300 percent, economic values by US\$1,300 to US\$61,000 per hectare, reduced irrigation water demand by up to 4,000 cubic meters per hectare, and averted crop losses of up to 80 percent.<sup>66</sup>

**Accelerated economic potential: Investing in climate change adaptation also stimulates sustainable development because it provides new opportunities for economic growth, investments, and job creation.**

According to the Economic and Investment Plan for the Western Balkans developed by the European Commission, taking action in climate adaptation promotes circular economic growth and provides new business opportunities related to sustainability.<sup>67</sup> The EU climate bank is collaborating with the European Commission through its Global Gateway strategy and other financing partners to facilitate Kosovo's transition to an inclusive growth model. This involves creating employment, ensuring the protection and sustainable use of natural resources, and fortifying resilience against climate risks. Since 2020, the European Investment Bank (EIB) has allocated €108.8 million under the Team Europe initiative to Kosovo's railway sector, to small- and medium-size enterprises, and to the construction of wastewater plants in Mitrovica and Gjilan.<sup>68</sup> These projects are expected to bring significant environmental and public health benefits, while its implementation also creates job opportunities. Investing in adaptation also supports employment and sustainable and climate-resilient urban development, although Kosovo's education and training systems will need to adapt to the skills required by these investments for this labor demand to be met.<sup>69</sup> In the process, some jobs will be lost, but the net effect is expected to be positive. There will also be significant changes in many jobs, which are therefore expected to require additional (green and other) skills.<sup>70</sup> Increased retraining and overall improvement in education may also benefit the national economy. According to a recent study, a year of education strengthens pro-climate beliefs, stimulates pro-climate change behaviors, influences policy preferences, and promotes green voting, with voting gains equivalent to a substantial 35 percent increase.<sup>71</sup>

**Amplified social & environmental co-benefits: Finally, adaptation actions such as the development of climate-resilient communities, infrastructure, ecosystems, and policies can yield substantial social and environmental co-benefits.**

The UNDP's Climate Promise initiative, supported by the Government of Japan, has been instrumental in assisting Kosovo's growth and enhancing its resilience against the impacts of climate change. As a part of this initiative, within a short span UNDP Kosovo collaborated with the Ministry of Economy and the Ministry of Environment, Spatial Planning, and Infrastructure (MESPI) to design a Circular Economy Roadmap and create thematic policy briefs in the climate sector. The initiative also fostered partnerships with, and provided training to, civil society organizations (CSOs) in Kosovo to develop

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<sup>64</sup> Global Commission on Adaptation, Adapt Now.

<sup>65</sup> Global Commission on Adaptation, Adapt Now.

<sup>66</sup> USAID, Kosovo: AGRO Activity – Climate Risk Management Case Study. USAID Climatelinks portal (2021), <https://www.climatelinks.org/resources/kosovo-agro-activity-climate-risk-management-case-study>.

<sup>67</sup> European Commission, Economic and Investment Plan for the Western Balkans (Brussels: European Commission, 2020), [https://neighbourhood-enlargement.ec.europa.eu/document/download/88af76e6-ab8e-4c96-966e-332528550af5\\_en?filename=EIP-WB-GG-October%202023.pdf](https://neighbourhood-enlargement.ec.europa.eu/document/download/88af76e6-ab8e-4c96-966e-332528550af5_en?filename=EIP-WB-GG-October%202023.pdf).

<sup>68</sup> European Investment Bank (EIB), "Kosovo: EIB Vice-President reiterates support for sustainable key infrastructure investments, helping Kosovo build a resilient economy," May 8, 2023, <https://www.eib.org/en/press/all/2023-192-eib-vice-president-reiterates-support-for-sustainable-key-infrastructure-investments-helping-kosovo-build-a-resilient-economy>.

<sup>69</sup> Marijan Gajšak, Lili Ilieva, Miodrag Grujić, Tamara Trumbić, and Dragan Blažev, Study on the Climate-resilient Infrastructure in North Macedonia (UNDP and Eco Ltd., 2022), <https://api.klimatskipromeni.mk/data/rest/file/download/b8600f4a08a5020202a2deb79ef7b893eecb7173c1f001c5c96d9c1c791e5f0d.pdf>.

<sup>70</sup> Javier Sanchez-Reaza, Diego Ambasz, Predrag Djukic, and Karla J. McEvoy, Making the European Green Deal Work for People: The Role of Human Development in the Green Transition (Washington DC: World Bank, 2022), <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099041223115535930/p1759480d118870710ab2e0d8a3d859d75f>.

<sup>71</sup> Noam Angrist, Kevin Winseck, Harry A. Patrinos, and Joshua S. Graff Zivin, Human Capital and Climate Change, NBER Working Paper no. 31000, <https://www.nber.org/papers/w31000>.

tools for identifying and reporting environmental corruption and other misconduct.<sup>72</sup> Strategic investments are also under way to promote climate change adaptation and resilience efforts, including improving the efficiency of water utilization through the EU-funded Irrigation Systems project, the construction of a dam in Southeastern Kosovo—the country’s most water scarce area via the FLOWS2 pipeline, and the implementation of innovative approaches to remediate contaminated land in the Cleaning and Greening Kosovo Project.<sup>73</sup>

## 2.3. Enabling adaptation through improved human capital

**Human capital is a cornerstone of adaptation efforts.** Adaptation politics and investments require reforms and adjustments to which people will need to respond by changing their consumption and investment patterns, including in education, and, possibly, in employment. People-focused interventions are therefore required in education, health, social protection to enable people to take advantage of these opportunities, while also protecting them from changes in access to resources and higher food and fuel prices, for example. Without such investments, there is a risk that some will be left behind, potentially weakening the political support for such transformations.

**Education and science play an important role in adaptation to climate change, but more attention is required at the country level.** The main education system issues to be tackled in Kosovo include access to childcare,<sup>74</sup> quality of teaching,<sup>75</sup> digitalization and digital skills, the quality and relevance of vocational education and training, curricula modernization, access and equity, financing, and governance.<sup>76</sup> The results of the 2022 OECD PISA<sup>77</sup> showed that significant work needs to be done in Kosovo to improve declining student performance and learning outcomes, currently among lowest in the ECA region, and mitigate the aftereffects of the COVID pandemic. Education improvement will require preparing all teachers in Kosovo for green education and may cost between US\$2.6 million and US\$7.7 million. Higher education and science would also need to play a significant role in advancing mitigation in the Western Balkans. Given the many common challenges and the limited resources, more collaboration projects among the Western Balkan countries should be promoted and supported. The role of higher education in providing skills and undertaking research and innovation in support of climate change adaptation could thus be strengthened. As part of the adaptation, the country will need to consider greening its schools and health facilities.<sup>78</sup>

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<sup>72</sup> UNDP, “Kosovo – steps ahead in climate action,” UNDP Stories, November 16, 2022, <https://www.undp.org/kosovo/stories/kosovo-steps-ahead-climate-action>.

<sup>73</sup> IMF, Republic of Kosovo: Request for Stand-by Arrangement.

<sup>74</sup> Demas, Angela, Mrike Aliu, Sarah Coll-Black, Aglaia Zafeirakou, Aline Hankey, and Boryana Gotcheva, A Situational Analysis of Early Childhood Development Services in Kosovo (Washington, DC: World Bank, 2021), <https://openknowledge.worldbank.org/entities/publication/b45a44e1-cd3e-51dc-87f4-91412c614cce>.

<sup>75</sup> Rita Almeida, Ciro Avitabile, and Tigran Shmis, “Beyond the learning drop: Why countries in Eastern Europe and Central Asia should act now to avoid a teacher crisis,” World Bank Education for Global Development blog, December 14, 2023, <https://blogs.worldbank.org/en/education/beyond-learning-drop-why-countries-eastern-europe-and-central-asia-should-act-now-avoid>.

<sup>76</sup> OECD, Multi-dimensional Review of the Western Balkans: From Analysis to Action (Paris: OECD, 2022), <https://doi.org/10.1787/23087358>.

<sup>77</sup> OECD, “PISA 2022 Results: Factsheets—Kosovo.”

<sup>78</sup> Adrien Dozol, Diego Ambasz, and Tigran Shmis, Greening Public Human Development Buildings in Croatia: Support for the Implementation of the European Green Deal in the Croatian Health and Education Sectors (Washington, DC: World Bank, 2023), <https://openknowledge.worldbank.org/entities/publication/d08b2790-d9b8-4e1c-b675-6b815b2dcfae>.

**Education and science play an important role in adaptation to climate change, but more attention is required at the country level.** The main education system issues to be tackled in Kosovo include access to childcare,<sup>79</sup> quality of teaching,<sup>80</sup> digitalization and digital skills, the quality and relevance of vocational education and training, curricula modernization, access and equity, financing, and governance.<sup>81</sup> The results of the 2022 OECD PISA<sup>82</sup> showed that significant work needs to be done in Kosovo to improve declining student performance and learning outcomes, currently among lowest in the ECA region, and mitigate the aftereffects of the COVID pandemic. Education improvement will require preparing all teachers in Kosovo for green education and may cost between US\$2.6 million and US\$7.7 million. Higher education and science would also need to play a significant role in advancing mitigation in the Western Balkans. Given the many common challenges and the limited resources, more collaboration projects among the Western Balkan countries should be promoted and supported. The role of higher education in providing skills and undertaking research and innovation in support of climate change adaptation could thus be strengthened. As part of the adaptation, the country will need to consider greening its schools and health facilities.<sup>83</sup>

**The health system in Kosovo has a good foundation to support adaptation to climate change, but it also has some weaknesses, including those that emerged during the COVID-19 pandemic.** In 2019, Kosovo had the lowest share of total expenditure on health as a percentage of its GDP - 5.1% - among the Western Balkans EU candidate countries and potential candidates (Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, Serbia), with government health expenditure accounting to 60-65% of the total health expenditure.<sup>84</sup> The health system faces challenges such as inefficient financing and overall poor quality of care.<sup>85</sup> This, in turn, results in limited capacity to respond effectively to climate hazards and disasters, as evidenced by the observable lack of preparedness during the COVID-19 pandemic.<sup>86</sup> There was a dearth of dedicated disaster response resources in the health sector.<sup>87</sup> Crucial components of the health system, such as outbreak detection and control, and the diagnosis and treatment of major noncommunicable diseases, were disrupted.<sup>88</sup> Additionally, there was weak monitoring of health system performance during the pandemic, underscoring the health system's limited preparedness. Despite these drawbacks, since then measures to enhance patient safety and human resource management in the primary health care have been introduced.<sup>89</sup>

**The government of Kosovo remains committed to strengthening the health care system's capacity to manage and respond to climate change and related hazards, but a lot still has to be done.** Kosovo has shown commitment to addressing climate change through its policies and has integrated the central importance of climate resilience within its health sector. Although the country has not developed a National Adaptation Strategy, it is engaged in working on a voluntary Nationally Determined Contributions (NDCs)<sup>90</sup> which encompass health sector adaptation measures. Additionally, Kosovo's 2019–2028 Climate Change

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<sup>79</sup> Demas, Angela, Mrike Aliu, Sarah Coll-Black, Aglaia Zafeirakou, Aline Hankey, and Boryana Gotcheva, A Situational Analysis of Early Childhood Development Services in Kosovo (Washington, DC: World Bank, 2021), <https://openknowledge.worldbank.org/entities/publication/b45a44e1-cd3e-51dc-87f4-91412c614cce>.

<sup>80</sup> Rita Almeida, Ciro Avitabile, and Tigran Shmis, "Beyond the learning drop: Why countries in Eastern Europe and Central Asia should act now to avoid a teacher crisis," World Bank Education for Global Development blog, December 14, 2023, <https://blogs.worldbank.org/en/education/beyond-learning-drop-why-countries-eastern-europe-and-central-asia-should-act-now-avoid>.

<sup>81</sup> OECD, Multi-dimensional Review of the Western Balkans: From Analysis to Action (Paris: OECD, 2022), <https://doi.org/10.1787/23087358>.

<sup>82</sup> OECD, "PISA 2022 Results: Factsheets—Kosovo."

<sup>83</sup> Adrien Dozol, Diego Ambasz, and Tigran Shmis, Greening Public Human Development Buildings in Croatia: Support for the Implementation of the European Green Deal in the Croatian Health and Education Sectors (Washington, DC: World Bank, 2023), <https://openknowledge.worldbank.org/entities/publication/d08b2790-d9b8-4e1c-b675-6b815b2dcfae>.

<sup>84</sup> Nguyen, Ha Thi Hong; Strizrep, Tihomir; Prinz, Daniel; Aliu, Mrike. 2023. Advancing Health Financing Reforms Toward Universal Health Coverage in Kosovo. © Washington, DC: World Bank. <http://hdl.handle.net/10986/40459> License: CC BY-NC 3.0 IGO.

<sup>85</sup> Tahirukaj et al., Maintaining Essential Health Services in Kosovo.

<sup>86</sup> Tahirukaj et al., Maintaining Essential Health Services in Kosovo.

<sup>87</sup> Tahirukaj et al., Maintaining Essential Health Services in Kosovo.

<sup>88</sup> Tahirukaj et al., Maintaining Essential Health Services in Kosovo.

<sup>89</sup> G. Bojaj, B. Tahirbegolli, P. Beqiri, I. Alloqi, I. Tahirbegolli, E. Van Poel, S. Willems, N. Rizanaj, and I. Hoxha, "Health Service Management and Patient Safety in Primary Care during the COVID-19 Pandemic in Kosovo," Int J Environ Res Public Health 20 no. 4 (February 2023): 3768, <https://doi.org/10.3390/ijerph20043768>.

<sup>90</sup> IMF, Republic of Kosovo: Request for Stand-by Arrangement.

Strategy<sup>91</sup> highlights the need to address the health impacts of climate change, with specific emphasis on the effects of air pollution on respiratory health. To enhance climate adaptation and mitigation within the health system, the system needs to invest resources in managing risks and disasters, strengthen its ability to respond adequately to immediate and sudden climate-related events like floods, heat waves, and epidemics, and in medium term, enhance its capacity to adapt to the changing disease burden. Strengthening surveillance and monitoring mechanisms for climate-related diseases is vital, and to that end the use of electronic health systems for emergencies needs to be promoted. It is also important that healthcare professionals be afforded continual capacity-building opportunities to ensure the healthcare system's readiness to address the evolving challenges of climate change. Health systems, as well, have a role in supporting the green transition.<sup>92</sup> As the green transition progresses, there will be an increasing need for good quality and accessible health services, including mental health support, to support the population undertaking the transition. Special attention should be given to the needs of the most vulnerable to ensure equitable access and use of various health services because these populations are the most at risk.

**Reducing the uncertainty and risks that climate change poses to people's income, consumption, and human capital investments requires increasing the coverage and adequacy of Kosovo's social protection systems.** Kosovo's social protection system is established, with nearly half the population receiving some form of social protection benefit. But the system is dominated by numerous noncontributory pension schemes, particularly old age and war-related pensions. The social insurance system in Kosovo is nascent, providing no support to workers to transition between jobs, given the current lack of unemployment benefits. As currently designed, the country's social assistance programs—because of their eligibility criteria, many of which are unrelated to poverty status, and the limited budget allocations made to the Social Assistance Scheme (SAS), the country's only poverty-targeted program—do not provide any temporary income support to poor households that experience job loss or income shocks. The system does not have any built-in emergency shock response or one-off assistance programs, although a standalone emergency program (Measure 15) was introduced in response to the COVID-19 pandemic. To mitigate the cost of energy, Kosovo provides some financial support to existing beneficiaries of the SAS and to selected pensions. Reforms are under way to establish a dedicated program for energy-vulnerable consumers that can expand coverage, as needed, if and when energy prices rise.

**With a number of reforms under way, the government recognizes the opportunity to leverage the social protection system to protect households from climate shocks.** There is a strong case to reform the SAS to establish a poverty-targeted social assistance scheme that is more equitable and adaptive. Analysis shows that eliminating categorical eligibility criteria (such as age, presence of a child in a household, disability status, among others) and introducing a poverty test would enable the SAS to better mirror the country's poverty profile while also creating a legal foundation that would allow the Scheme to expand coverage as the dynamics of poverty evolve in the country and fiscal space for poverty-targeted programs emerges. Such a reform would also lay the foundation to establish the systems and procedures to scale up the SAS in response to climate shocks. The government is leading efforts to put these reforms into practice, which would significantly impact the outcomes presented in Figure 2.2. This figure presents an assessment of the capacity of Kosovo's social protection system to respond to climate shocks along four pillars: (i) programs and delivery systems, (ii) data and information, (iii) financing, and (iv) institutional arrangements.<sup>93</sup> Beyond the legal reforms to the SAS, investments in operational aspects such as outreach, targeting, enrollment, and payments will be needed to enable a rapid expansion in program coverage when a shock occurs. These

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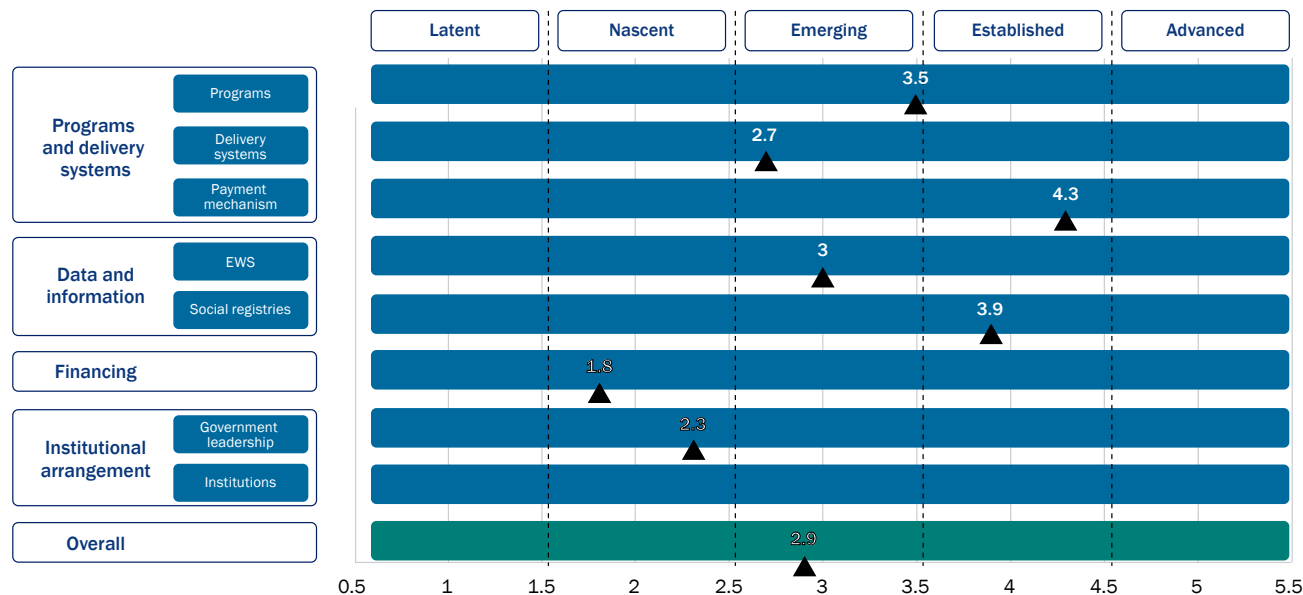
<sup>91</sup> Ministry of Environment and Spatial Planning, Climate Change Strategy 2019-2028.

<sup>92</sup> P.A. Schulte, A. Bhattacharya, C.R. Butler, H.K. Chun, B. Jacklitsch, T. Jacobs, M. Kiefer, et al., "Advancing the framework for considering the effects of climate change on worker safety and health," *J Occup Environ Hyg.* 13, no. 11 (November 2016): 847–65. <https://doi.org/10.1080/15459624.2016.1179388>.

<sup>93</sup> The World Bank's Social Protection Stress Test Tool rapidly assesses the readiness and ability of national social protection systems to adapt or scale-up in response to shock, thereby pinpointing areas for greater investment. See World Bank, *Stress Testing Social Protection: A rapid appraisal of the adaptability of social protection systems and their readiness to scale-up—A Guide for Practitioners* (Washington, DC: World Bank, 2021), <https://documents1.worldbank.org/curated/en/559321634917529231/pdf/Stress-Testing-Social-Protection-A-Rapid-Appraisal-of-the-Adaptability-of-Social-Protection-Systems-and-Their-Readiness-to-Scale-Up-A-Guide-for-Practitioners.pdf>.

efforts can be reinforced through better alignment of social protection, disaster risk management, and climate change adaptation legislation and policies to permit greater flexibility in the targeting and duration of social protection assistance. It will also require the development of strategies, mechanisms, and budgets to ensure there is adequate disaster risk financing to realize these initiatives.

**FIGURE 2.2: Kosovo’s social protection system could be much better harnessed to protect households from climate-induced shocks while promoting their resilience.**



Source: Fizzgibon C., Coll-Black S, 2023, Findings of the World Bank Stress Test in the Western Balkans Draft. Washington DC: World Bank.

## 2.4. What is Kosovo doing, and how well?

**Kosovo has legal frameworks for environmental protection.** The 2011 Law on Protection against Natural and Other Disasters<sup>94</sup> is the basis; it regulates protection and rescuing activities for natural and manmade disasters, and outlines the duties of the government and municipalities, such as assessing, monitoring, providing real-time warnings of disaster risks, and organizing protection and emergency preparedness activities. One limitation of the law, however, is that it is response-oriented and has limited focus on preparedness. Besides the 2011 Law, the National Response Plan provides a legal framework for incident management from a national perspective.<sup>95</sup> There is also the disaster risk reduction strategy and plan of action,<sup>96</sup> which aims at enhancing natural and technological disaster risk reduction and sustainable development in the country. The main goals of the strategy, which coordinates activities at the local level, include integrating risk reduction in policy development, enhancing risk management capacities, improving community safety and disaster resilience, and raising awareness. There are also two documents on disaster risk assessment: the National Risk Assessment Document<sup>97</sup> and the Regulation on Post Disaster Damage Assessment.<sup>98</sup>

**A disconnection between national and local authorities hinders the strengthening of the country’s disaster and emergency response capabilities.** The main institution in Kosovo responsible for disaster

<sup>94</sup> Republic of Kosovo, “Law No. 04/L-027 on Protection against Natural and Other Disasters. Assembly of Republic of Kosovo, Based on Article 65 (1) of the Constitution of the Republic of Kosovo,” Official Gazette of the Republic of Kosovo no. 22 (October 19, 2011). <https://gzk.rks-gov.net/ActDetail.aspx?ActID=2775&langid=2>

<sup>95</sup> Republic of Kosovo. 2010. “National Response Plan.” Pristina [https://ame.rks-gov.net/content/templates/ame/uploads/2020-10/National\\_Response\\_Plan.pdf](https://ame.rks-gov.net/content/templates/ame/uploads/2020-10/National_Response_Plan.pdf)

<sup>96</sup> Republic of Kosovo. 2015. Disaster risk reduction strategy and plan of action 2016-2020. <https://faolex.fao.org/docs/pdf/kos170267.pdf>

<sup>97</sup> Republic of Kosovo. National Risk Assessment Document.

<sup>98</sup> Republic of Kosovo. Regulation on Post Disaster Damage Assessment.

management is the Emergency Management Agency (EMA),<sup>99</sup> under the Ministry of Internal Affairs. Its primary duties are to implement disaster management plans and policies, coordinate relevant agencies at the national and local levels, conduct awareness raising, education and training programs, undertake damage assessments, and monitor the emergency management database. Though the EMA is responsible for directing emergency management in Kosovo, the operations are carried out by local municipalities. There is a lack of coordination between national and local actors, severely limited human resources and limited technical expertise in certain areas.<sup>100</sup> As identified in key national documents, there is among others an urgent need to enhance training and capacity building for all agencies related to DRM, strengthen the government's capacity to better understand disaster risks, improve information and early warning systems in coordination with IHMK, and increase disaster risk awareness through enhanced community engagement and education.<sup>101</sup>

**Kosovo is taking action to align the country's legal policies on climate change adaptation with the EU's climate framework.** The 2014–2024 Strategy on Climate Change aligns with sustainable development plans and emphasizes Kosovo's adaptation to climate change.<sup>102</sup> It targets disaster risk reduction, enhances the capacity of vulnerable communities, and empowers stakeholders to integrate climate adaptation into local and national development.<sup>103</sup> The 2019–2028 Climate Change Strategy and Action Plan is the initial phase of Kosovo's climate change adaptation.<sup>104</sup> It is closely aligned with the government's priorities, specifically the 2017–2021 Government Program of the Republic of Kosovo and the 2016–2021 National Development Strategy (NDS). The strategy aims to develop climate policies, establish disaster risk reduction mechanisms, enhance adaptive capacities of vulnerable communities, and strengthen the institutional framework.<sup>105</sup> Also, the Ministry of Environment and Spatial Planning (MESP) is overseeing the implementation of a three-year action plan (2019–2021) for the Climate Change Strategy that was approved.<sup>106</sup>

**Nonetheless, limited progress has been made in the regulatory framework for climate adaptation and resilience strengthening.** Since the Law on Climate Change and National Adaptation Strategy (NAS) is yet to be adopted, Kosovo is actively developing a voluntary Nationally Determined Contributions (NDCs) system that will incorporate adaptation measures in vulnerable sectors like water, health, biodiversity, agriculture, forestry, and land use.<sup>107</sup> The frameworks under development aim to establish new instruments and enhance existing tools for disaster risk reduction in economically significant, climate-vulnerable sectors. The NAS specifically targets improving the adaptive capacity of natural systems and society, including marginalized groups, women, and poor farmers, to address the impacts and risks of climate change on their lives and livelihoods.<sup>108</sup> These measures are regarded as foundational to reducing the risk of current and future climate impacts, and cost-effectively reducing the damage from them. At the city level, some of these measures are being developed into planned actions. For instance, the City of Pristina Green City Action Plan<sup>109</sup> outlines a 10-year plan with 11 strategic goals that address sector-specific, cross-cutting environmental challenges, including climate change and resilience.

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<sup>99</sup> Republic of Kosovo. 2023. Agency for Emergency Management. <https://ame.rks-gov.net/page/en-us/home>

<sup>100</sup> UNDP. 2016. Integrating Gender into the Climate Change Adaptation and Disaster Risk Reduction Policies and Strategies. <https://www.undp.org/kosovo/publications/gender-drr-cca-report>

<sup>101</sup> Government of Kosovo. 2022. State Strategy for Reducing the Risk from Natural Disasters and Other Disasters 2023-2028. <https://ame.rks-gov.net/vleresimilRezikshmerise/en-us/STATE%20STRATEGY%20FOR%20REDUCING%20THE%20RISK%20FROM%20NATURAL%20DISASTERS%20AND%20OTHER%20DISASTERS%202023%20-%202028.pdf?>

<sup>102</sup> Kosovo. 2014. Kosovo: Strategy on climate change 2014-2024. <https://www.preventionweb.net/publication/kosovo-strategy-climate-change-2014-2024>

<sup>103</sup> Kosovo. 2014. Kosovo: Strategy on climate change 2014-2024. <https://www.preventionweb.net/publication/kosovo-strategy-climate-change-2014-2024>

<sup>104</sup> Ministry of Environment and Spatial Planning, Climate Change Strategy 2019-2028.

<sup>105</sup> Ministry of Environment and Spatial Planning, Climate Change Strategy 2019-2028.

<sup>106</sup> IMF, Republic of Kosovo: Request for Stand-by Arrangement.

<sup>107</sup> Ibid.

<sup>108</sup> Kosovo Environmental Program, Ministry of Environment and Spatial Planning (MESP) – Environmental Protection and Water Department. <https://kepweb.org/>

<sup>109</sup> European Bank for Reconstruction and Development. 2021. City of Pristina: Green City Action Plan. [https://ebrdgreencities.com/assets/Uploads/PDF/Pristina-GCAP\\_ENG\\_August-2021.pdf](https://ebrdgreencities.com/assets/Uploads/PDF/Pristina-GCAP_ENG_August-2021.pdf)



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**As might be expected for a country exposed to hydrometeorological hazards, Kosovo has sound regulations related to water management and flood protection, but it needs a shift toward on-the-ground implementation of its strategies.** Kosovo has robust policies and legal and strategic frameworks for the water sector, which is largely aligned with EU requirements. Such regulations include administrative instructions for flood protection against harmful water actions (flood protection)<sup>113</sup> and the Law on the Waters of Kosovo.<sup>114</sup> The main challenges lie in operationalizing the framework through effective implementation and enforcement, creating integrated development plans through national coordination, and building capacity for core functions and operational sustainability.<sup>115</sup> The Inter-Ministerial Water Council facilitates intersectoral coordination to integrate water issues into government development policies,<sup>116</sup> but its current composition and function could be strengthened to include key sectors and to wield more influence.

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<sup>110</sup> IMF, Republic of Kosovo: Request for Stand-by Arrangement.

<sup>111</sup> Kosovo Environmental Program, Ministry of Environment and Spatial Planning (MESP) – Environmental Protection and Water Department. <https://kepweb.org/>

<sup>112</sup> European Bank for Reconstruction and Development. 2021. City of Pristina: Green City Action Plan. [https://ebrdgreencities.com/assets/Uploads/PDF/Pristina-GCAP\\_ENG\\_August-2021.pdf](https://ebrdgreencities.com/assets/Uploads/PDF/Pristina-GCAP_ENG_August-2021.pdf)

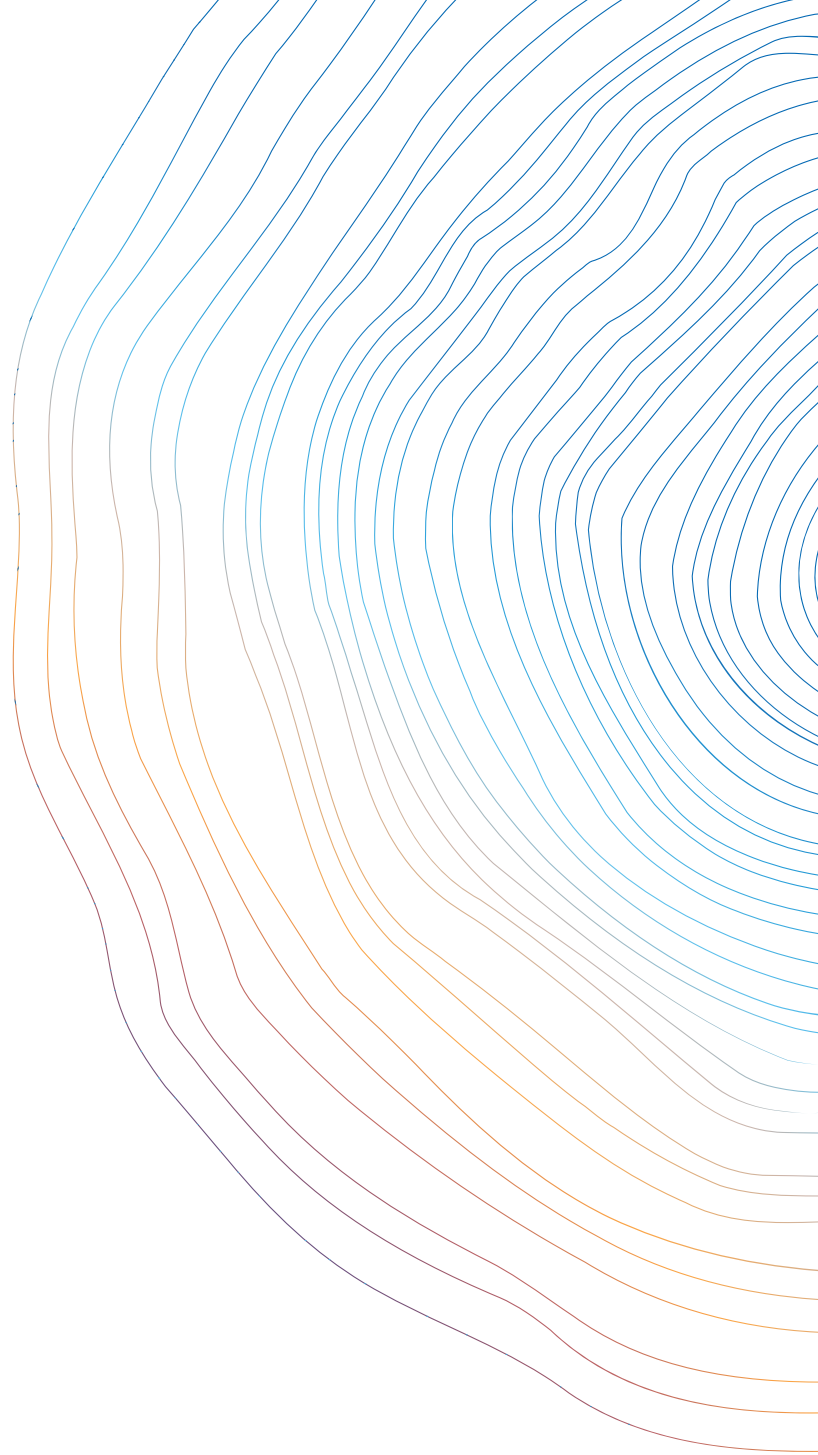
<sup>113</sup> Republic of Kosovo. 2015. Administrative instruction for protection against harmful water actions (flood protection). <https://gzk.rks-gov.net/ActDetail.aspx?ActID=11679>

<sup>114</sup> Republic of Kosovo. 2013. Law on the Waters of Kosovo. <https://gzk.rks-gov.net/ActDetail.aspx?ActID=8659>

<sup>115</sup> World Bank, Water Security Outlook for Kosovo.

<sup>116</sup> IMF, Republic of Kosovo: Request for Stand-by Arrangement.





## Chapter 3

# Mitigation risks and opportunities

**An energy system modeling analysis was carried as part of the WB6 CCDR out to assess sectoral decarbonization pathways for the economies of Kosovo and the other WB6 countries.** The analysis aimed to develop possible decarbonization scenarios and compare them to a reference scenario, in order to highlight the extent to which the energy systems will have to transform to reach net zero GHG emissions by 2050, and to provide policymakers with recommendations on how this can be achieved, with a focus on shorter-term actions.

**The analysis relied on the KINESYS-WB6 (Knowledge-based Investigation of Energy System Scenarios for the WB6) model, a global energy system model based on TIMES (The Integrated MARKAL-EFOM1 System) and applied to the WB6.** KINESYS-WB6 explicitly covers GHG emissions from fuel combustion and fugitive emissions from fossil fuel extraction and from transport. To set economy-wide GHG emissions targets to model quantity-constrained scenarios, projections from official government strategies (especially the NECPs) were used for the sectors not included in the KINESYS-WB6 model to set targets for the energy-related sectors. The main scenarios modeled included (i) the Reference Scenario (RS), an unconstrained (without GHG emissions targets) least-cost development scenario - this scenario is incompatible with the WB6 countries' aspirations of EU integration and their existing climate change commitments, but it provides a comparable baseline across the six countries for the decarbonization scenarios described below;<sup>117</sup> (ii) the Net Zero Emissions scenario (NZE), in which GHG emissions constraints are imposed to achieve economy-wide net zero by 2050; (iii) the Net Zero Emissions scenario with Higher Growth (NZE-HG), which is similar to the NZE but assumes higher GDP growth rates for the WB6; and (iv) the Carbon Pricing Scenario (CPS), a price-constrained scenario in which the WB6 countries are assumed to adopt an emissions trading scheme covering all sectors of the economy with an allowance price in line with the European Commission's projections for the EU ETS price in a net-zero-by-2050 scenario. Further details on the modeling approach and assumptions are presented in the Western Balkans 6 regional CCDR and in the Mitigation Background Note accompanying this CCDR.

### **3.1. Reference Scenario (RS) achieves limited progress on climate change mitigation**

**In the RS, economy-wide GHG emissions (that is, including sectors outside the model scope) for Kosovo would reach 13.2 MtCO<sub>2</sub>eq in 2050, about 15 percent higher than estimated 1990 emissions (see row 1 in Figure 3.1).** Kosovo's energy mix would remain relatively unchanged over the next decades, with limited level of penetration of renewable energy (RE) sources. The primary energy supply mix would continue to be dominated by fossil fuels (see row 2 in Figure 3.1). In 2050, coal would account for almost 65 percent of the total primary energy supply (versus about 60 percent in 2019). Bioenergy (that is, biomass and biofuels) would decrease to about 4 percent in 2050 (versus 14 percent in 2019) and renewables (mostly solar and wind) would show relatively modest growth, increasing to 8 percent in 2050 (versus 1 percent in 2019) of the total primary energy supply.

**In the power sector, coal generation would increase by 50 percent (over 2019 levels) until 2040, but after this, most of the incremental demand would be met by solar and wind.** In 2040, coal would account for about 90 percent of total electricity generation (see Figure 3.2), followed by wind (4 percent) and hydro (3 percent). Beyond 2040, however, solar photovoltaic (PV) and wind start to become cost-beneficial and would start picking up,<sup>118</sup> reaching almost 25 percent of total generation in 2050. Coal and hydro would remain stable in absolute terms, but in 2050 their shares would decrease to 72 and 2 percent of the total, respectively.

**Although it represents the least-cost development pathway under no external constraints, the RS is not a viable scenario for a sustainable development of Kosovo's energy sectors, as it would not eliminate the existing negative externalities and it would be incompatible with their aspirations of EU integration**

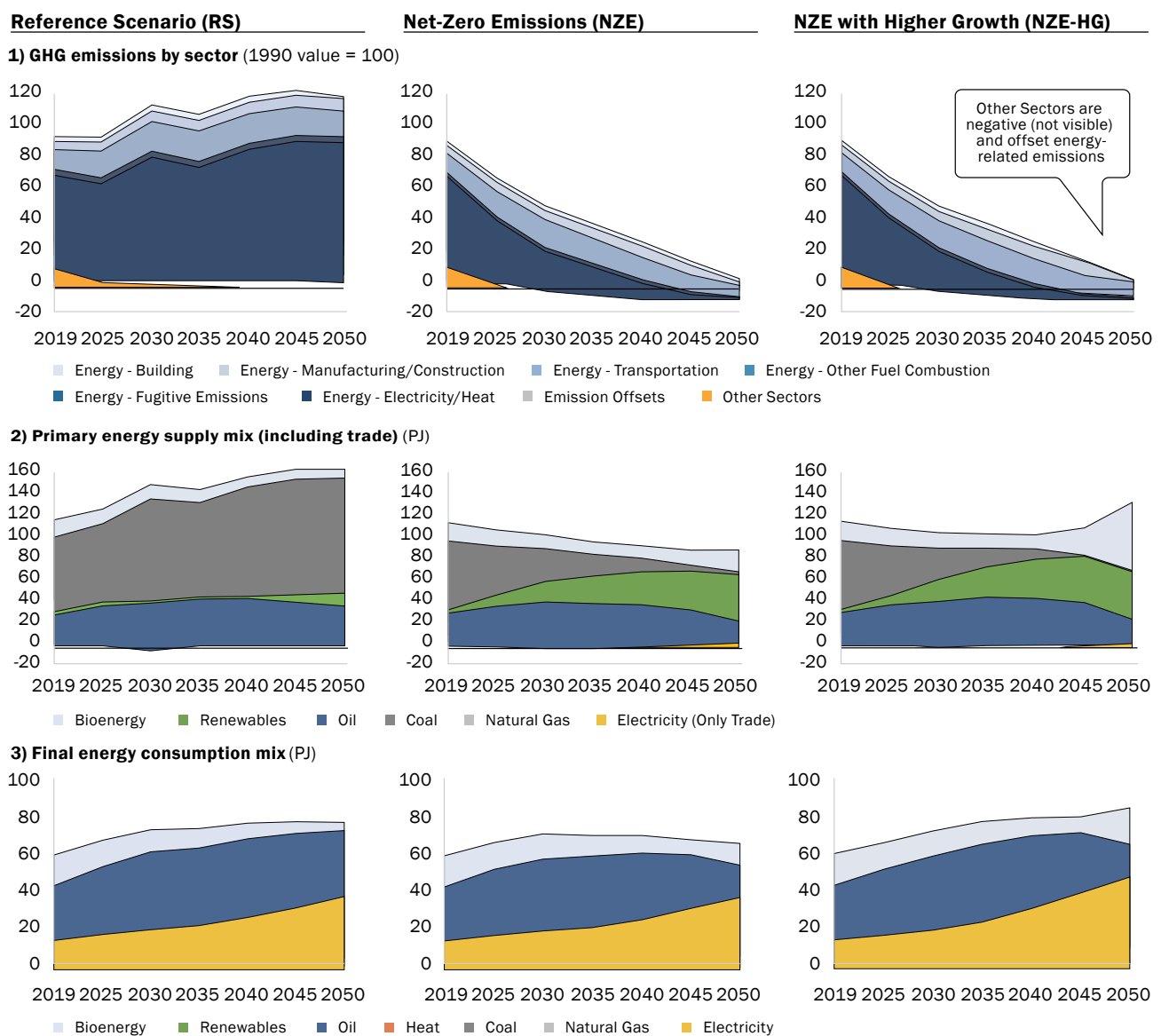
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<sup>117</sup> NECP targets are not considered in this scenario.

<sup>118</sup> Solar might be the least-cost option without looking at system balancing costs. Wind provides less variable capacity and is available when electricity prices are typically higher (during winter and peak hours).

**and their existing climate change commitments.** The results of the RS are driven by the fact that lignite-fired generation remains relatively competitive overtime with its mostly fully depreciated generation fleet. However, significant negative financial and non-financial impacts that were not quantified in the model would arise from delaying the transition. First, prolonged reliance on coal would continue causing severe air pollution challenges and exacerbate the environmental and health impacts of coal mining and generation. Second, it would have energy security implications, especially in light of the recent episodes of coal supply disruptions and the increasing difficulty procuring financing for investments in coal mining and power plants. Third, it would hamper the competitiveness of the economy in terms of job creation and attractiveness for foreign direct investment and financing from international financial institutions. Lastly, the lack of progress on coal phase-out would be incompatible with EU integration and the commitments the country has made with the Sofia Declaration.

**FIGURE 3.1: System-wide indicators across the RS, NZE, and NZE-HG scenarios\* for Kosovo**



Source: World Bank analysis.

\* NZE: net zero emissions scenario, NZE-HG: net zero emissions scenario with higher growth

1 Includes sectors not covered by KYNESIS-WB6, that is, agriculture, waste, LULUCF (land use, land use change, and forestry), and IPPU (industrial processes and product use). After 2025, total emissions from "Other Sectors" becomes negative (because of negative emissions from LULUCF) and are offset by positive emissions in energy-related sectors.

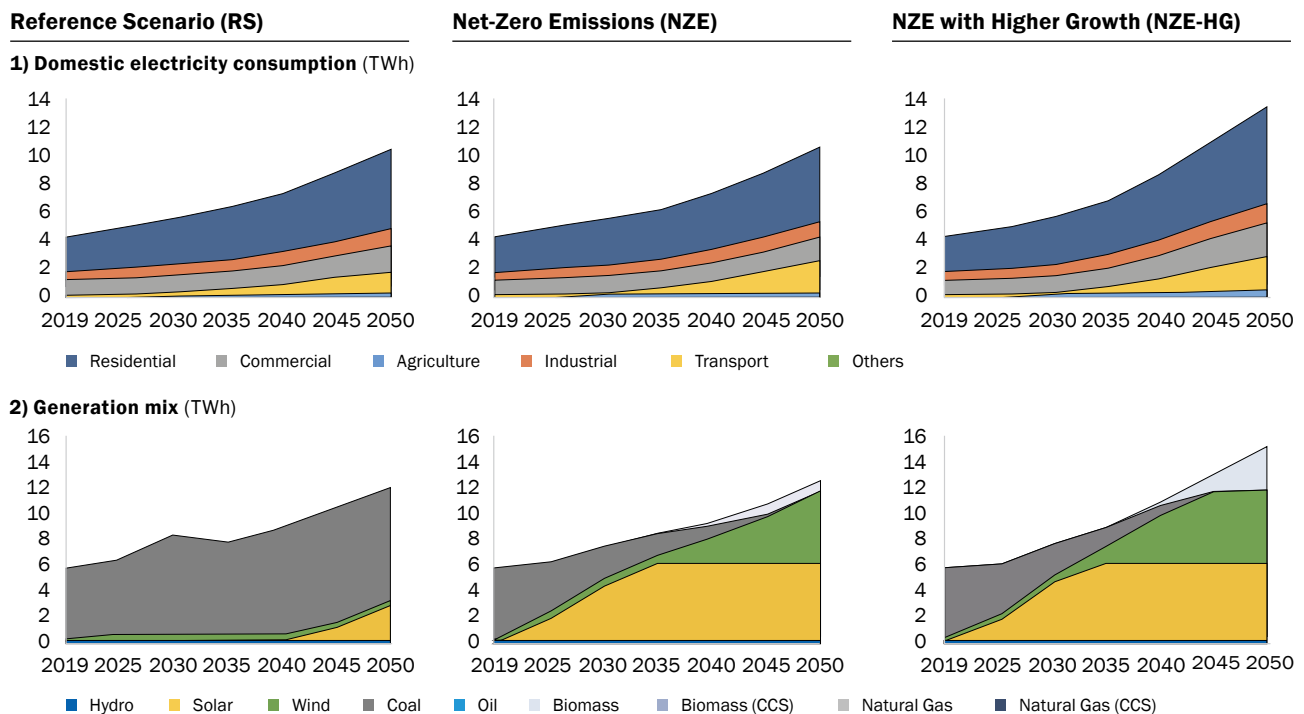
2 "Electricity" refers to the consumption of electricity in end-use sectors; "renewables" refers to the direct use of RE in end-use sectors.

**The comparison of the unconstrained evolution of GHG emissions in the RS with the projections of the scenario “with existing measures” (WEM) defined in the NECPs reveals that, unlike other WB6 countries, Kosovo’s WEM targets are already relatively ambitious.** Kosovo’s energy-related GHG emissions resulting from the unconstrained least-cost energy sector development defined in the Reference scenario would be 13.3 MtCO<sub>2</sub>eq<sup>119</sup> in 2040, while the WEM target from the NECP is significantly lower, at 6.2 MtCO<sub>2</sub>eq for the same year. This suggests that the definition of the WEM scenario in the country’s NECP is relatively ambitious and would represent an actual constraint on the development of Kosovo’s energy sector.

### 3.2. Radical energy system transformation is required to achieve net zero by 2050

**Achieving economy-wide net zero GHG emissions by 2050 would require large-scale investments in the near-complete decarbonization of the power sector.** In a least-cost net zero scenario, lignite power plants would be decommissioned by 2045. The large scale-up of solar PV and wind capacities would have to start sooner than in the RS (from 2025–2030 instead of 2040) and proceed faster, especially for solar. With the phase-out of coal, battery storage and hydro would balance intermittent solar and wind generation. As a result, power sector emissions would decrease from about 6.5 MtCO<sub>2</sub>eq in 2019 to 0 MtCO<sub>2</sub>eq in 2050. In the NZE, the share of renewable energy in total electricity generation would increase from about 6 percent in 2019 (hydro and wind) to 100 percent in 2050 (see Figure 3.2; 2). Kosovo would have to install about 2.9 GW of wind by 2050 (versus 110 MW in the RS) and almost 4.6 GW of solar (versus 2 GW in the RS). In addition, 1.84 GW of battery storage would have to be built and 175 MW of power plants fueled by biomass. Biomass power plants would play an important role in counterbalancing the seasonal/longer-term variability of wind and solar.<sup>120</sup> In 2050, Kosovo would reach its economically viable wind and solar potential, which would push the country to start importing electricity (5 percent of total electricity consumed in 2050). This highlights how important it is to Kosovo’s economy for regional integration to be strengthened.

**FIGURE 3.2: Power sector indicators across the RS, NZE, and NZE-HG scenarios for Kosovo**



Source: World Bank analysis.

<sup>119</sup> For the purpose of the comparison with the NECP, this value excludes nonenergy-related emissions.

<sup>120</sup> Forestry management and stewardship are crucial to making sure that biomass resources are available. The biomass potential per country and production costs were taken from Globiom Scenario SDGs.

**The least-cost pathway to achieving net zero by 2050 would require significant energy efficiency improvements and the large-scale use of electricity and zero-carbon energy carriers in end-use sectors.**

As shown in row 3 of Figure 3.1 (final energy consumption mix), in 2050 final energy demand in the NZE would need to be about 15 percent lower than the demand under the RS in the same year, or about 10 percent higher than in 2019. Achieving this would require ambitious policies to support energy efficiency improvements across all sectors. At the same time, the final energy mix would be different in the NZE compared to the RS: in 2050, about 60 percent of final energy demand would be met by electricity (especially in the transport and heating sectors), versus about 50 percent in the RS, while oil and oil products would account for about 25 percent of final energy demand, versus 45 percent in the RS. Zero-carbon energy carriers (that is, biofuels, biomass, and biogas) would support the decarbonization of hard-to-abate sectors (for example, specific transport segments) and would account for about 15 percent of final energy demand in 2050 in the NZE, compared to 5 percent in the RS.

**In the NZE, GHG emissions from the transport sector could be abated by 45 percent by adopting a three-pronged, Avoid-Shift-Improve strategy consisting of demand reductions (Avoid), a shift of demand to more sustainable modes (Shift), and the adoption of more energy-efficient vehicles running on cleaner fuels (Improve).**

The relatively limited reduction in GHG emissions in the transport sector in the NZE compared to the other sectors, and to the transport sectors of other WB6 countries, is justified by the fact that Kosovo would benefit from having significant carbon sinks that would lower the overall decarbonization effort required from other sectors to achieve net zero. The least-cost optimizations suggests that the transport sector, as one of the sectors with the highest abatement costs, could continue having positive GHG emissions in 2050. Avoid strategies (for example, integrated land-use planning to reduce travel distances, digital accessibility, and remote working when possible) could help reduce total passenger transport demand in 2050 by 5 percent in the NZE compared to the RS. Additional policies and incentives could support the shift of the residual demand for transport services from more polluting means of transport to less carbon-intensive ones. In 2050, private road transport would account for 70 percent of motorized passenger transport activity in the NZE versus 82 percent in the RS,<sup>121</sup> while rail would account for 5 percent of freight transport activity versus 2 percent in the RS. But most of the GHG emissions reductions in the transport sector would have to come from Improve strategies (that is, the adoption of more fuel-efficient vehicles and the transition to cleaner fuels). Specific energy consumption (that is, the amount of energy required per vehicle-km) would have to improve substantially for both passenger and freight transport and be 40–60 percent lower in 2050 than in 2019. This would be achieved by both fuel-efficiency improvements internal combustion-engine vehicles and, by 2050, a substantial increase in the penetration of electricity, biofuels, and hydrogen into the transport fuel mix. In the passenger transport segment, in 2050 electricity would account for about 70 percent of total fuel energy demand. Passenger cars would be mostly electrified—85 percent of total stock. In the freight transport segment, in 2050 conventional fuels would still account for about 70 percent of total fuel energy consumption, followed by electricity (about 30 percent). In addition, a more efficient use of trucks by increasing the average payload (up to 15 percent more by 2050 in the NZE compared to the RS) could significantly reduce the specific energy consumption by ton-km, by allowing for the use of high-capacity vehicles, and by leveraging logistics digitalization for asset sharing and the optimization of operations.

**The decarbonization of the buildings and industry sectors would require energy efficiency improvements on top of the RS, combined with higher levels of electrification of demand and a switch to cleaner energy sources.**

The implementation of energy efficiency measures could reduce energy demand in the residential and commercial sectors by almost 8 percent in 2050 in the NZE compared to the RS. In the NZE, electricity would account for about 85 percent of final energy demand in 2050 compared to about 40 percent today, while biomass would decrease from 60 percent today to about 8 percent of the final energy demand in 2050. Insulation measures are expected to reduce by about 30 percent the space heating demand in buildings in 2050 under the NZE. In the industrial sector, under the NZE, oil and oil products would account for about 25

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<sup>121</sup> Excluding the share of active mobility (walking and cycling), which is assumed will capture up to 4 percent of passenger car demand by 2050 in the NZE.

percent of the final energy demand versus 70 percent today, and would be replaced partly by biofuel gases/ biomass, electricity, and hydrogen (46, 25, and 4 percent in 2050, respectively). In Kosovo, carbon capture and storage would not become economically viable until 2050, as a result of the carbon sinks that lower the overall level of effort required of the industrial sector.

**The establishment of a well-functioning waste management system would be essential to curb methane emissions and to make the waste sector more resilient in the face of climate-related shocks.** In the absence of action, these emissions would continue rising. To reduce emissions from the waste sector, priority should be given to increasing waste collection, minimizing open dumping and uncontrolled landfilling, managing landfill gas, and diverting organic waste from landfills. This should be accompanied by measures to integrate sector development, minimize and separate waste, increase and improve treatment, and improve sector governance, especially with regard to the availability and predictability of operational financing. Waste management also brings other positive environmental and health outcomes, such as a reduction in soil and marine pollution (including from plastics) and better local health and environmental outcomes. Better waste management also accelerates economic development by improving access to public services, helping to create jobs, and enhancing livability.

**Methane emissions from agriculture would have to be actively monitored and reduced.** The main source of agriculture emissions is livestock production, including cattle and small ruminants, generated from enteric fermentation, manure left on pastures, and poor manure management. In the agriculture sector, measures to reduce methane emissions can include improving the genetic makeup of the livestock (through breeding), optimizing animal feed, establishing a system of safe disposal of animal byproducts, and improving manure and pasture management.

**In an optimistic growth scenario, Kosovo would have to make additional efforts to achieve economy-wide net zero targets.** In 2050, Kosovo's GDP is assumed to be about 36 percent higher in the NZE-HG than in the NZE and RS, which would correspond to a similar increase in the demand for services. But efforts to further improve energy efficiency could lead to an increase in final energy demand of 30 percent compared to the NZE. In addition, in the NZE-HG meeting the decarbonization targets would require resorting to higher levels of the penetration of biomass and increasing power imports as solar and wind are reaching their full potential in the NZE. For example, in the NZE-HG, Kosovo would have to install the same amount of solar and wind than in NZE (4.6 GW solar and 2.9 wind) but would need to install an additional 800 MW of thermal power fueled with biomass and increase by 25 percent the electricity imported in 2050. In the NZE-HG, electricity generation and supply cost would be double what they are in the NZE because of the need to resort to lower-quality renewable energy resources.

### 3.3. Incremental investments needed for decarbonization

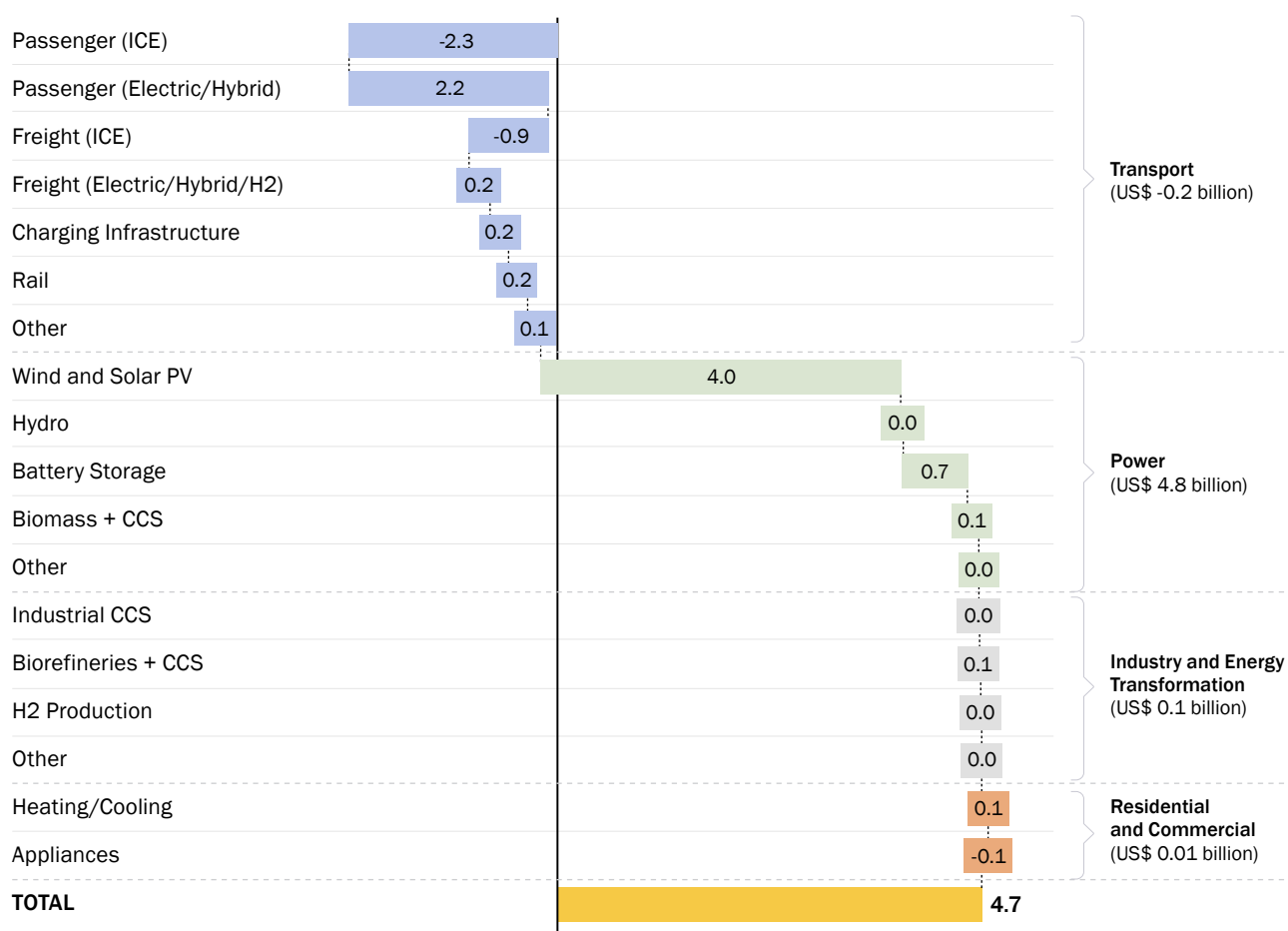
**Overall, compared to the RS, in the NZE Kosovo would need to invest in the energy system an additional US\$760 million until 2030 and US\$4.7 billion until 2050 (expressed in present values and in 2020 dollars) to achieve economy-wide net zero.** This investment is incremental to the discounted investments required in the RS, which amount to US\$17.5 billion until 2030 and US\$39.1 billion until 2050. The incremental investment is equivalent to about 1.2 percent of GDP until 2030 and 2.9 percent until 2050, on average. Approximately 85 percent of the investments could come from the private sector (including households). But the higher investment required would be at least partially compensated by lower operating costs, estimated at -1.02 percent of GDP per year on average through 2050. Additionally, the relatively small magnitude of the incremental investments until 2030 suggests that to embark on a path toward full decarbonization, Kosovo would need only small course adjustments until 2030 to redirect its energy sector investments, on top of what is planned as part of the RS.

**Most of the incremental investment until 2050 would go to the power sector.** The incremental investment by 2050 (US\$4.7 billion) would be composed of positive and negative incremental investments in the power sector (US\$4.8 billion), transport (-US\$191 million), and industry and energy transformation (US\$57 million)



(all expressed in 2020 dollars). Figure 3.3 shows the breakdown by subsector. In the power sector, the incremental investment would ramp up after 2030, and most of it would be directed toward the scale-up of wind and solar PV capacities. In the transport sector, as a result of the Avoid strategies to reduce transport demand and the Shift strategies to shift demand from road vehicles to rail, the investments in electric vehicles would be comparable to the absolute reduction in investment in gasoline- and diesel-engine vehicles, which would lower the net incremental investment required. But significant incremental investments would still be required to modernize and expand the rail network and deploy charging infrastructure for electric vehicles. Incremental investments in rail infrastructure and rolling stock are expected to be US\$230 million by 2050 (in 2020 dollars). In the residential and commercial sectors, most of the investments in energy efficiency and cleaner, more efficient heaters (sustainable heating) are already cost-competitive in the RS.

**FIGURE 3.3: Discounted investment gap (that is, the difference between NZE and RS) until 2050 by subsector, US\$ billion.**



Source: World Bank analysis.

**In absolute terms, the energy transition would be costlier in the NZE-HG because a larger economy corresponds to higher levels of energy demand, and the required investments would be higher than in NZE in terms of share of GDP.** In the NZE-HG, to achieve economy-wide net zero, Kosovo would need to invest in the energy system US\$48.8 billion until 2050 (versus US\$43.7 billion in the NZE), all expressed in present values and in 2020 dollars. But the investments required until 2050 would correspond to about 3.5 percent of the discounted GDP over the same period, which is similar to the corresponding value in the NZE (3.4 percent).

## 3.4. Human capital and labor markets transformations

**The green transition in Kosovo will require significant retraining that goes beyond the high-polluting sectors.** Transitioning to greener forms of production, distribution, and consumption can affect the labor market positively or negatively, including migration patterns (for example, acting as a push factor for migration as a consequence of the decreased demand for certain jobs or skills or conversely attracting higher skilled migrant or diaspora to come back to fill new green opportunities). The effects go beyond the most polluting industries (for example, coal mining) because significant transformations will be seen in other occupations (for example, mechanical engineering). This requires investment in retraining and upskilling to remain productive in a given occupation, or to move to another occupation with similar skill requirements. The extent of this reskilling depends on the gap between the current skills and the future skills required. Reskilling and upskilling can be considered short-term investments, but the evolving demand for labor will require longer-term investments to enhance the human capital needed for Kosovo to reach net zero by 2050. This means, structural reforms will be necessary in the education system.

**A green transition requires comprehensive reform of education and training systems.** Taking advantage of green growth opportunities could lead to significant changes in occupational standards and skills needs. Education must provide students with the skills and competencies needed in the current and future labor markets and should be supported by active labor market policies to reskill and upskill those affected by the green transition. Given the sizeable proportion of the labor force that is at risk and has significant retraining needs, it is critical for Montenegro to start adapting its education system from early learning to the technical and vocational education and training (TVET) and higher education levels to enable the education systems to produce the green skills that will be needed in the new economy.

**The skills impact on the Kosovo economy will go beyond just the brown industries, with 16.7 percent of the workforce requiring upskilling or retraining in the medium run.** Only 2.8 percent of jobs are in the brown industries, but the green transition will affect approximately one out of six workers in the entire labor force because of changes in technology or business models. Currently 26,000 workers are especially at risk because they are employed in occupations for which a high percentage of jobs will need retraining, and for which the skills gap is large.<sup>122</sup> Missing the required investments in retraining and upskilling will put individuals at risk of unemployment, and firms at risk of missing growth opportunities owing to a lack of an adequately trained workforce (Figure 3.4).

**The skill gaps for workers in at-risk occupations will require large investments.** The transition costs in each at-risk occupation depend on the size of the skills gap—how similar their skills are to the ones required in the closest occupation. On average, workers in affected occupations will need to significantly improve their skills to transition to a green occupation. Alternatively, they may transition to safe occupations that are not green but will remain relevant to the economy.

**The skills most needed for the transition involve cognitive abilities and knowledge of STEM—science, technology, engineering, and mathematics.** In contrast with physical or psychomotor abilities, developing cognitively based skills takes substantial time. Skills such as complex problem solving, critical thinking, and equipment maintenance are also needed, while social skills are of a second order of importance. To facilitate this skills development, Active Labor Market Policies (ALMPs) that support on-the-job training or upskilling for unemployed people will not be enough. They will need to be complemented with long-term education and training reforms. This also requires adjustments on the supply side of training provision beyond just the classical education system, including training for adult workers, with an increasing role for the private sector to play. Our estimates show that the cost of retraining and reskilling the most at-risk workers in Kosovo may

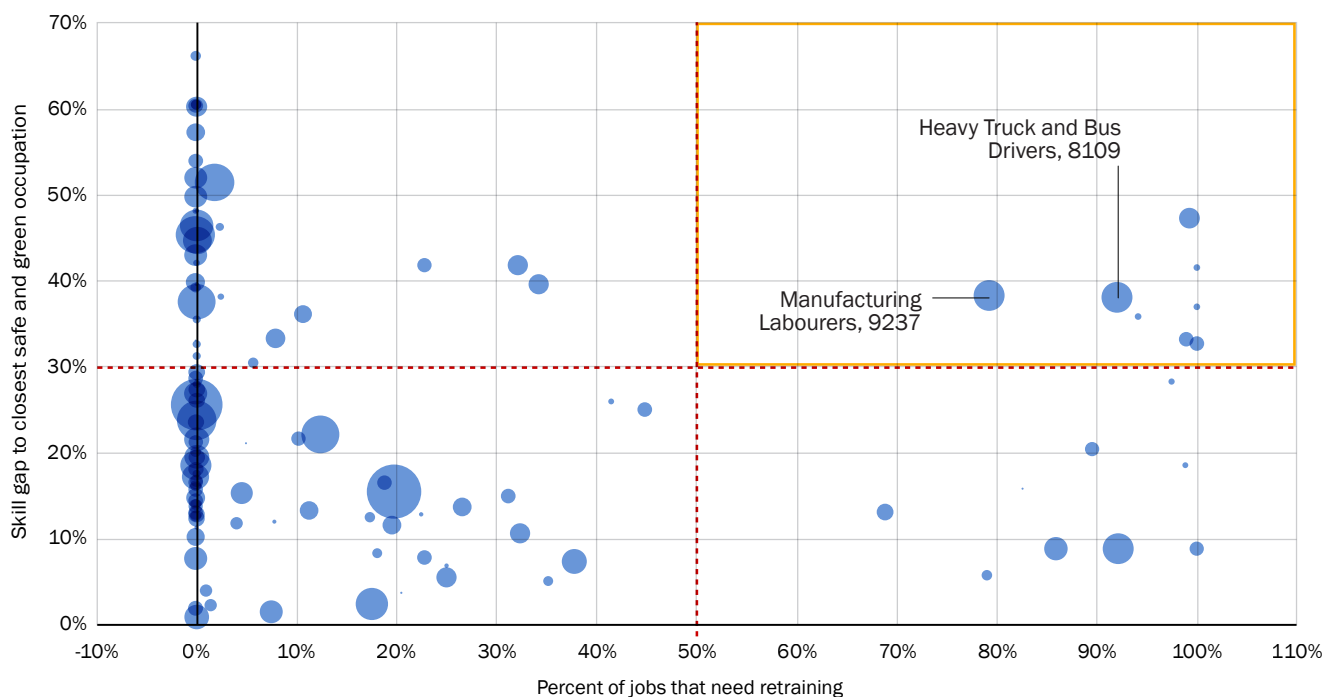
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<sup>122</sup> These occupations are classified in the O\*Net model and include 1. Wood Treeters, Cabinet-makers and Related Trades Workers; 2. Other Craft and Related Workers; 3. Metal Processing and Finishing Plant Operators; 3. Rubber, Plastic and Paper Products Machine Operators; 4. Food and Related Products Machine Operators; 5. Wood Processing and Papermaking Plant Operators; 6. Other Stationary Plant and Machine Operators; 7. Heavy Truck and Bus Drivers; 8. Manufacturing Laborers; and 9. Other Elementary Workers.

reach US\$17 million if they are retrained into safe occupations, and up to US\$63 million if they are retrained into green occupations.

**Migration impacts the pace of the green transition.** The emigration of qualified workers can limit the availability of skills in the country that are required for the green transition. While the majority of migration from Kosovo has been low-skill workers, there is a concern about ‘brain drain’ (loss of skilled workers) in key sectors/occupations and the overall decreasing trend in the labor force. On the other hand, having a powerful and highly engaged diaspora, as Kosovo does, in countries with more advanced green technologies such as Germany can facilitate knowledge and technology transfer to Kosovo, aiding the green transition.

**FIGURE 3.4: Occupations and numbers of workers that need retraining**

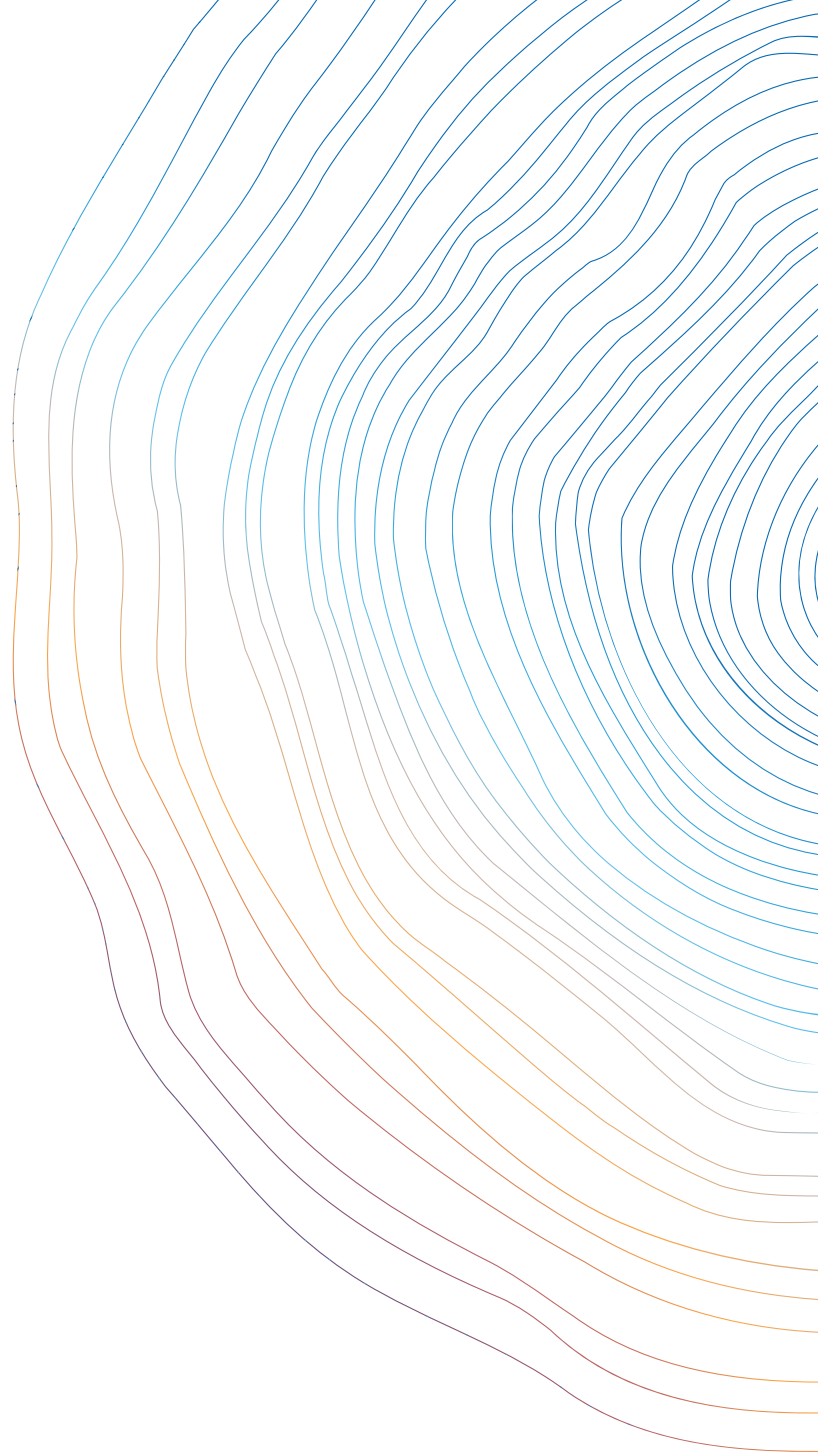


Source: Garrote, Gukovas and Makovec (2024): “Jobs, Skills and the Green Transition in ECA” Data from Labor Force Survey of Kosovo (2021)  
 Note: The yellow area shows the most affected.

**For climate change mitigation, green technologies must be absorbed, developed, and adapted to local needs and circumstances.** Although catching-up economies rarely operate at the technology frontier, their rate of economic growth depends on their capacity to absorb institutional and technological advancements that bring them closer to the more developed economies (Lee et al. 2021).<sup>123</sup> Technology absorption refers to the acquisition, development, assimilation, and utilization of technological knowledge and capability by firms and other entities from external sources. It entails mastering specific technologies, adjusting them to local needs, and creating rich knowledge spillovers that can then lead to further innovations. Two key components in the adoption and absorption of green technologies are the development of skills and enabling cooperation between the public and private sectors through the sharing of research and cofinancing.

<sup>123</sup> Lee, Jeong-Dong, Keun Lee, Dirk Meissner, Slavo Radosevic, and Nicholas S. Vonortas, “Technology Upgrading and Economic Catch-Up Context, Overview, and Conclusions,” in *The Challenges of Technology and Economic Catch-up in Emerging Economies*, edited by Jeong-Dong Lee, Keun Lee, Dirk Meissner, Slavo Radosevic, and Nicholas S. Vonortas (Oxford: Oxford University Press, 2021), 1–34.





## Chapter 4

# Economic impact and opportunities

As part of the WB6 CCDR, economic impact analysis was carried out to assess the economic and distributional impacts of the pathways presented in the earlier sections. The analysis assessed the economic impact of climate-related damage, and the economic and poverty impacts of decarbonization pathways, using the Macro-Structural Model with climate module (CC-MFMod) developed by the World Bank, and second, the Carbon Price Assessment Tool (CPAT, developed jointly by the World Bank and the International Monetary Fund). Based on this analysis, the chapter also identifies financing needs and structural and regulatory issues that need to be addressed to capitalize on the need for adaptation and mitigation, by investing in a greener and more productive economy. While increased and more diversified trade is an integral part of any strategy for growth and for resilience, especially for the Western Balkans, this section also points out opportunities in green value chains that could be further explored.

## 4.1. Macroeconomic impact

### 4.1.1. Impact of adaptation risks on the economy

Kosovo is exposed to hydrometeorological and geological hazards that could worsen in intensity and frequency and cause significant economic damage. Floods, droughts, forest fires, and earthquakes are among the main hazards associated with climate change. Flash floods are common in mountainous areas, and sometimes lead to mudslides. Kosovo is also exposed to landslides, particularly in Mitrovica, Pristina, Pec, and Strpce. At least one-quarter of these communities are vulnerable to landslides and rock falls. Under a trend growth scenario, and in a partial modeling exercise covering only selected impact channels for riverine floods, drought (impact on wheat and maize) and heat stress on labor, simulation results indicate that, taken together, natural hazards could result in up to a 5.1 percent reduction in output by 2050, depending on the climate change scenario. In particular, the estimated output loss by 2050 could reach 5.1 percent under RCP 2.6, 4.2 percent under RCP 4.5, and 4.0 percent under RCP 8.5.

In both the trend and optimistic scenarios, the most significant economic damage resulted from riverine floods (Table 4.1). Results indicate that the output loss in both the trend and optimistic growth scenarios was most severe under the lowest climate change scenario, given that this scenario is associated with the highest amount of riverine flooding. However, model biases, and a focus on average risk metrics, most likely lead to failure of our modeling to capture impacts from the most extreme hydrological cycles, in particular those of flash floods. By 2050, under the trend growth scenario, riverine flooding could lead to a 4.6 percent reduction in output under RCP 2.6, 3.4 percent under RCP 4.5 and 3.1 percent under RCP 8.5.

**TABLE 4.1: Projected damage on output (GDP level) and impact of adaptation in the trend growth scenario\***

Real GDP % deviation from baseline	RCP 2.6			RCP 4.5			RCP 8.5		
Without adaptation investments									
	2030	2040	2050	2030	2040	2050	2030	2040	2050
<b>Riverine floods</b>	-1.4	-3.3	-4.6	-1.0	-2.4	-3.4	-0.9	-2.1	-3.1
<b>Heat stress</b>	-0.1	-0.2	-0.4	-0.2	-0.4	-0.6	-0.2	-0.5	-0.8
<b>Droughts**</b>	-0.2	-0.3	-0.3	-0.2	-0.3	-0.3	-0.2	-0.3	-0.3
<b>Combined</b>	-1.6	-3.8	-5.1	-1.3	-3.0	-4.2	-1.3	-2.9	-4.0
With adaptation investments									
<b>Riverine floods</b>	-1.2	-2.9	-4.1	-0.8	-2.0	-2.8	-0.7	-1.7	-2.5
<b>Heat stress</b>	-0.1	-0.1	-0.2	-0.1	-0.2	-0.4	-0.1	-0.3	-0.6
<b>Droughts**</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Combined</b>	-1.2	-2.9	-4.1	-0.9	-2.2	-3.2	-0.8	-2.0	-3.0

Source: World Bank estimates with inputs from JBA, IIASA and CIMA

Note: \* The changes in the level of GDP or output are equivalent to changes in GDP per capita as the population figure is the same with and without the climate damage.

\*\*Droughts via their impact on maize and wheat.

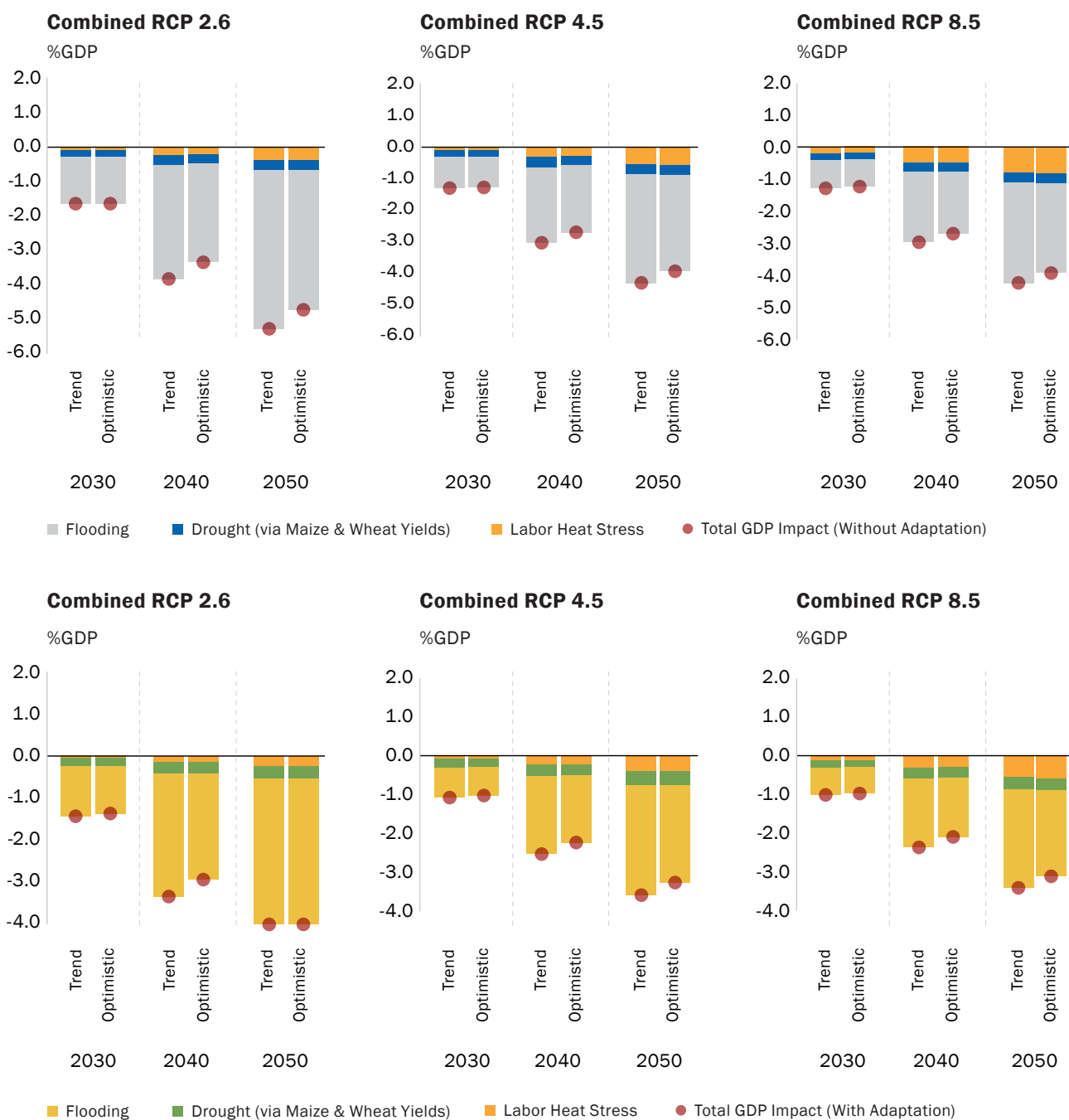
**Other impact channels such as droughts and heat stress are expected to have negative economic impacts, although at a lower magnitude (Table 4.1); their impact is underestimated due to the partial nature of the exercise.** Heat stress is expected to lower economic activity primarily through its impact on productivity. Notably, scenarios characterized by a bigger temperature rise predict more pronounced losses. Under the most extreme climate scenario with an RCP of 8.5, GDP would be 0.8 percent lower in 2050 under the trend scenario and 0 optimistic scenario. The effect of droughts was estimated through a combined assessment of its impact on maize and wheat yields. As shown in Table 4.1, the estimated impact of droughts on economic activity results in a reduction in GDP of 0.3 percent in 2050 in all the climate change scenarios, and under both the trend growth scenario and optimistic growth scenario (not shown). The limited impact on economic activity results from both the relatively small share of agriculture in economic activity (7.4 percent of GDP in 2022), but also from the fact that the model does not consider the impacts of droughts on other sectors such as power generation, forestry, and the country's ecosystems are not considered.

**Kosovo is also vulnerable to possible damage arising from its exposure to earthquakes.** Considering the country's risk of exposure, in 2050 damage associated with earthquakes could lead to a 1.8 percent reduction in output under the trend scenario, and 1.6 percent under the optimistic growth scenario. This indicative metric provides an estimate of the potential exposure to earthquake damage and does not capture the impact of extreme events to which Kosovo could be exposed.

**Adaptation investments could reduce output losses, with the benefits increasing over time.** Modeling results suggest that an increase in investments in adaptation to address riverine flood, drought and heat impacts worth on average 1.4 percent of GDP yearly between 2022 and 2050 under RCP 8.5 would result in GDP losses by 2050 of 3.0 percent under the trend scenario, against a 4.0 percent loss in 2050 without adaptation investment; the exercise captures only a lower-bound estimate of adaptation investments for the selected channels, this estimate being dominated by simple investments easy to project and could be refined, yielding lower costs and higher benefits. As shown in Figure 4.1, Kosovo's benefits from investing in adaptation are expected to increase over time and rise under more severe climate change scenarios. Investment in adaptation to earthquakes would lead to a 0.5 percent output contraction under the trend scenario compared to 1.8 percent with no adaptation, and 0.4 percent under the optimistic scenario compared to 1.6 percent with no adaptation.

**An increase in adaptation investments is expected to impact Kosovo's fiscal accounts.** By 2050, under the trend scenario, the package of investments associated with adaptation interventions is expected to lead to a wider fiscal deficit across all RCPs -under an illustrative scenario (not recommended) in which the public sector undertakes all adaptation investment modeled. In 2050, the budget deficit in percent of GDP is expected to deteriorate by 3.6 percentage points of GDP under RCP 2.6, and 3.2 percentage points under both RCP 4.5 and RCP 8.5. Public debt levels are expected to increase significantly, by about 50 percentage points of GDP across the three RCPs, with the highest impact under RCP 2.6, which is associated with higher costs of flooding damage. Under the optimistic growth scenario, the fiscal impact of these investments is more moderate. It is expected that over time these investments will help reduce the economic losses associated with the impact of climate change. The government has options to mitigate the fiscal impact of adaptation investment costs, such as maintaining adequate buffers and creating fiscal space over time, or sharing part of these costs with the private sector and households. Ideally public policy should aim to incentivize the private sector and households to take adaptation actions.

**FIGURE 4.1: Combined economic impacts under the trend and optimistic growth scenarios, without adaptation investments (top panel) and with adaptation investments (bottom panel)**



Source: World Bank estimates with inputs from JBA, IIASA and CIMA

#### 4.1.2. Impact of mitigation on the economy

**For Kosovo to achieve the NZE target by 2050, its energy system will need to radically transform.** The unconstrained Reference Scenario (RS) will achieve only limited progress on climate change mitigation if Kosovo's energy mix remains unchanged and emissions increase by 15 percent to 13.2 MtCO<sub>2</sub>eq by 2050. Attaining the NZE target would therefore require a significant reduction in emissions. To achieve this transformation (as discussed in chapter 3), Kosovo would need to decommission its lignite power plants by 2040 and start building up large solar and wind generation capacities by 2025. As a result, power sector emissions would fall to 0 MtCO<sub>2</sub>eq by 2050. Under the NZE, the share of renewable energy in total electricity generation would rise from 6 percent in 2019 to 100 percent in 2050.

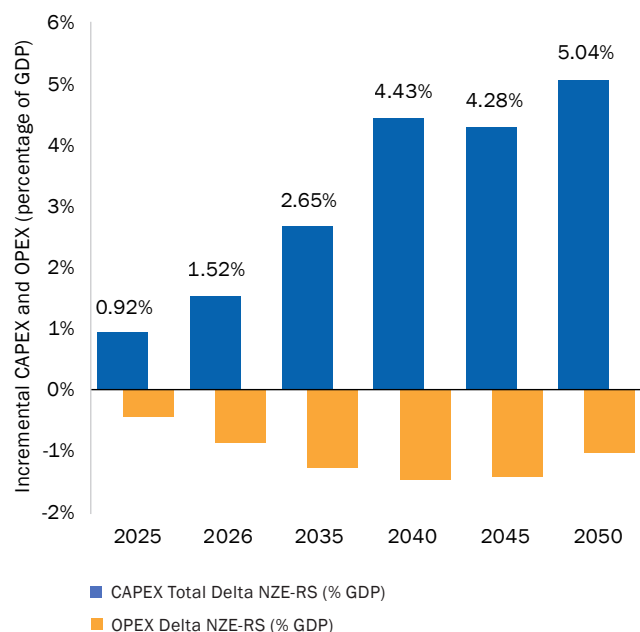


**The impact assessment of achieving NZE targets on macroeconomic aggregates shows that the effect of the energy transition on GDP is limited, though there is an impact on public debt.** Under the trend scenario, the model predicts that GDP growth will accelerate until 2030, reaching an average of 4.9 percent (5 percent under the optimistic scenario), and decelerate thereafter, driven by the impact of an aging population and lower potential growth. Reaching the NZE target would have a minimal impact on GDP, with a reduction of 0.12 percent of GDP in 2050 under the trend scenario and 0.25 of GDP under the optimistic growth scenario. The reduction in output is larger under the optimistic growth scenario primarily because of the higher costs associated with the decarbonization target. Owing to the relatively weaker domestic demand and reduced imports, the impact on the current account deficit (CAD) of achieving the NZE target is positive under both the trend and optimistic growth scenarios.

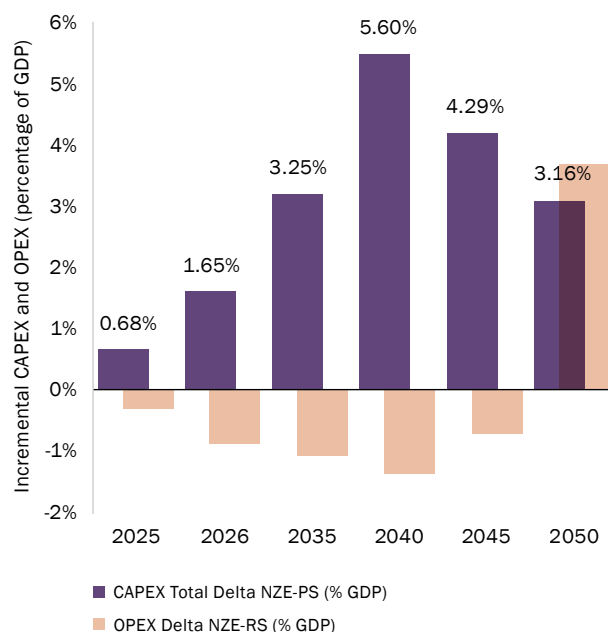
**Decarbonizing the economy will require large-scale investments in the power and transport sectors (Figure 4.2 and Figure 4.3).** In the power sector, most of the incremental investment would result from renewable energy generation, energy efficiency improvements, and storage costs. Under the NZE trend scenario, annual incremental CAPEX would reach 1.3 percent of GDP by 2030, 3.6 percent by 2040, and 4.1 percent by 2050. Over the 2025-2050 period, the annual incremental investment costs of the NZE scenario relative to the RS scenario would reach approximately 2.9 percent points of GDP a year, on average, under both the trend and optimistic growth scenarios. To achieve the NZE target, the scenarios assume that the private sector would assume most of the investment, up to 85 percent until 2040, and an average of 91 percent between 2041 and 2050.

**The decarbonization pathway to NZE by 2050 would bring some cost-saving benefits, particularly lower operational expenditures within the economy.** The reduction in operating expenses in the energy sector is associated with a lower reliance of the economy on fossil fuels. Savings are driven by lower costs of production, heating, and transport, and by gains in energy efficiency and renewable energy generation. Under the trend growth scenario, OPEX cost savings amount to 1.0 percent of GDP between 2025 and 2050. The optimistic growth scenario foresees a limited reduction in OPEX of around 0.1 percent of GDP between 2025 and 2050.

**FIGURE 4.2: Incremental CAPEX and OPEX of the energy system under trend growth**

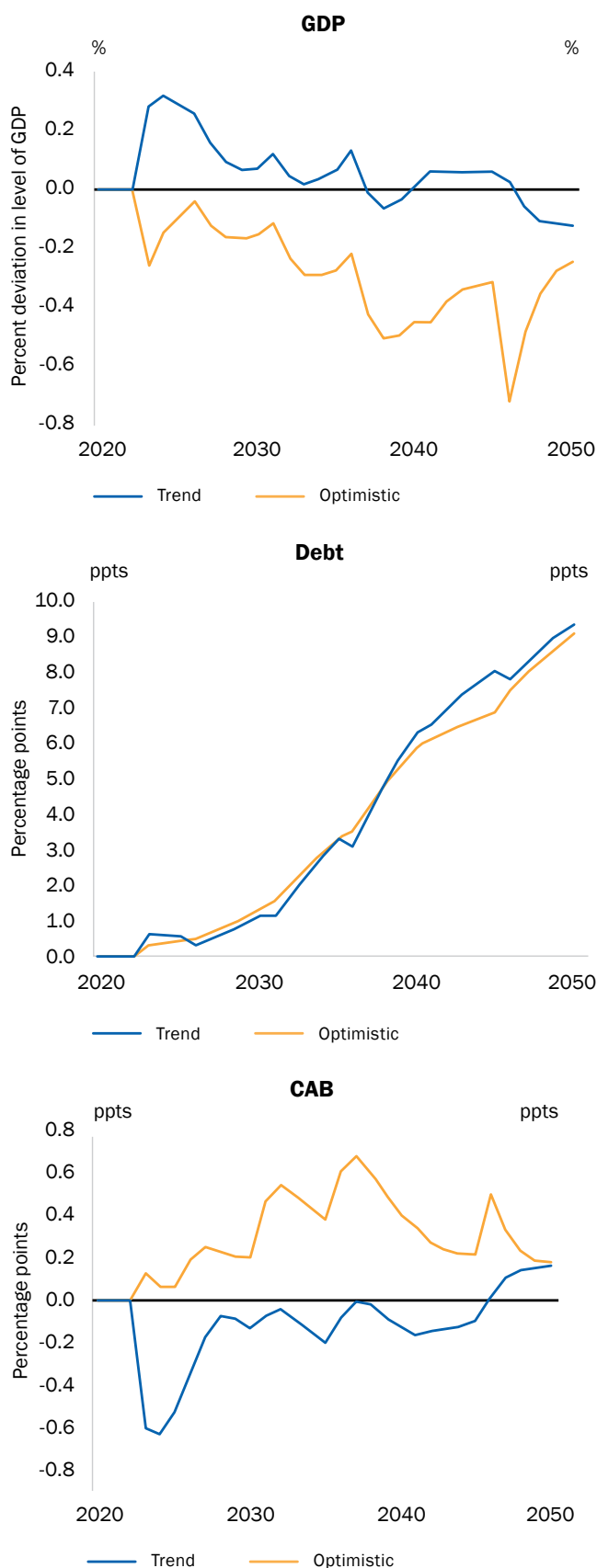


**FIGURE 4.3: Incremental CAPEX and OPEX of the energy system under optimistic growth**



Source: World Bank analysis

**FIGURE 4.4: Incremental impact on macroeconomic aggregates of the NZE target over the Reference scenarios, under trend and optimistic growth**



**Achieving the NZE target will have some impact on Kosovo’s fiscal and external accounts (Figure 4.4).** Under the trend and optimistic growth scenarios, higher costs associated with decarbonization-related activities would lead to a deterioration of the fiscal balance and public debt levels. Higher investments associated with the achievement of the NZE target are expected to lead to a deterioration of around 9 percentage points in debt levels by 2050 under the trend and optimistic growth scenarios (while including the fiscal impact of com benefits). The incremental impact on the fiscal balance due to higher expenditures is reflected in an increase of the fiscal deficit of 0.5 percentage points under the trend scenario and 0.7 percentage points under the optimistic growth scenario. In terms of external accounts, the current account balance is projected to marginally improve by 2050 driven by a reduction in energy import costs. The improvement in the CAB is more pronounced in the optimistic growth scenario, which is associated with weaker demand and import needs.

**For Kosovo, the transition to a low-carbon economy can bring additional co-benefits arising from lower air pollution, fewer road accidents, and decreased road damage.** Reducing reliance on fossil fuels can cut down air pollution levels significantly. By 2050, total cumulative savings resulting from positive externalities from the decarbonization of the economy would amount to US\$2.7 billion in constant 2021 dollars, more than 95 percent of which is associated with savings from lower air pollution, which in Kosovo is identified as a major health risk. This corresponds to a 38 percent reduction in mortality from air pollution by 2050, or a 20 percent reduction cumulatively between 2025 and 2050. Decarbonizing the transport sector would also lead to reduced mortality from road accidents and lower road maintenance costs, amounting to almost US\$67 million of savings in constant 2021 dollars.

### 4.1.3. Poverty and distributional impact of a net zero transition

**It is expected that the package of policies underpinning the transition to a net zero emissions scenario will increase household energy and nonenergy consumption costs.** Compared to the reference scenario, energy prices under the NZE scenario could see very substantial increases starting in 2025. Considering Kosovo's current energy mix, it can be expected that the future pressure on energy prices will be concentrated exclusively on electricity. Based on data from the 2017 Household Budget Survey (HBS), an estimated 16 percent of Kosovar households are electricity-poor. Extreme poor and poor households identified using the national poverty line, and poor households identified as belonging to the poorest 20 percent (bottom quintile) of the population, are twice as likely to be electricity-poor as the overall population. As a result, low-income households are and will continue to be particularly vulnerable to energy price increases, with an even larger share of the population at risk of falling into poverty because of energy price shocks.

**A substantial increase in electricity prices, if unmanaged, could lead to significant losses in household consumption, with an even more adverse impact on poorer households.** In the Western Balkans, Kosovo is expected to see the largest average annual household losses over time. Estimates of the household consumption incidence of the net zero scenario using the CPAT tool point to rising consumption losses. In 2050, the expected incidence is approximately a 7 percent loss of total consumption. This includes mostly direct impacts from higher energy bills faced by households—in other words, the “direct” incidence effect—but also indirect effects associated with the consumption of fossil fuel-intensive nonenergy products—the “indirect” incidence effect. Household consumption losses stemming from price increases in the NZE scenario are roughly equally distributed between urban and rural households. But those losses are expected to be regressively distributed, with the price increases expected to exert a significantly more adverse effect on the lowest-three deciles of households than the wealthier deciles. The regressive nature of the NZE scenario is reflected in a resultant average rise in the consumption-based Gini coefficient of over 1.3 by 2050.

**Revenue recycling could substantially attenuate initial household consumption losses under the NZE scenario.** For instance, in 2030, recycling revenues raised from the policies under the NZE scenario as targeted transfers to the bottom 40 percent of the consumption distribution could offset around 60 percent of the mean household consumption loss, on average, with larger gains for rural households; the cost of such a program would be about 1.47 percent of GDP. By design, the targeted cash transfers would boost overall progressivity under the NZE scenario because they would entail net gains for the first four consumption deciles. This higher degree of progressivity is illustrated in sizable reductions in the Gini coefficient for consumption of around 5 percent relative to the RS.

**During the energy transition, the Government of Kosovo should direct most of its support toward vulnerable households, which are expected to face disproportionately large impacts from the decarbonization of the economy.** To support energy affordability, authorities will need to strengthen the current policy framework with three goals in mind: (1) clearly define criteria for energy vulnerability to identify the households most in need of targeted support; (2) design a permanent delivery model for targeted support to vulnerable households; and (3) continue to support energy efficiency interventions that increase energy savings, including making available more energy-efficient building insulation, space and water heating systems, windows, doors, and lighting.

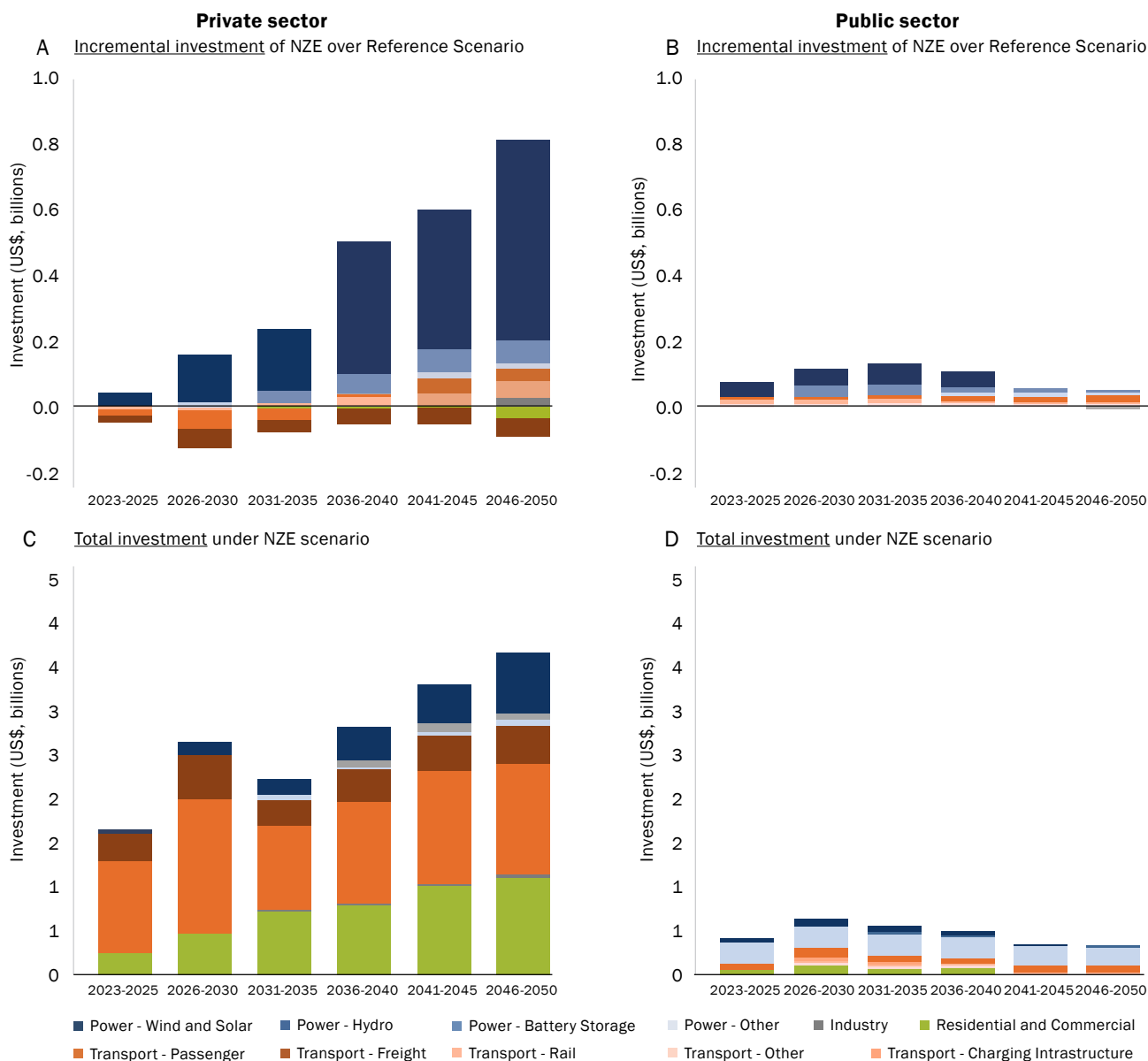
## 4.2. Financing needs and sources

### 4.2.1. Investment needs for adaptation and mitigation

**Kosovo's additional annual adaptation and mitigation investment needs come to 1.4 percent and 2.9 percentage points of GDP respectively for 2025-2050.** The estimates come from the two separate modeling exercises reported in the preceding sections. They relied on the same GDP baseline and were run for trend growth and optimistic growth scenarios. The adaptation modeling exercise (based on adaptation investments to mitigate riverine floods, drought impact on maize and wheat, and labor heat stress) suggests average annual incremental investment rates of 1.6, 1.4, and 1.3 percentage points of GDP for 2025-30, 2031-40,

and 2041-50 respectively. The mitigation exercise suggests average annual incremental investment rates of 1.2, 3.0, and 3.9 percentage points of GDP for 2025-30, 2031-40, and 2041-50 respectively. The incremental investment rates that emerge from the analysis in this report are significant. Incremental adaptation investments will need to be front loaded while mitigation investments will need to be back loaded. Kosovo's incremental investment needs are similar to the Western Balkans's average, of 1.3 and 1.9 percentage points of GDP for 2025-50 for adaptation and mitigation respectively.<sup>124</sup>

**FIGURE 4.5: Absolute (NZE scenario) and incremental (NZE vs. Reference scenario) investments**



Source: World Bank analysis

Note: The numbers represent undiscounted annual investment, averaged over the period.

**Between 2026 and 2050, the Net Zero emissions scenario under trend growth will require public and private investments totaling US\$86.31 billion (in undiscounted 2020 dollars) for mitigation.**

<sup>124</sup> The results from the current adaptation and mitigation exercises cannot be added for two reasons. First, the adaptation results refer to shares of GDP from a smaller economy than the mitigation exercise. Second, a joint modeling exercise, while extremely complex, would have included interactions of adaptation and mitigation variables that could have altered the adaptation and mitigation investment needs. Nevertheless, looking at the two results in tandem is instructive for showing the scale of additional investments needed.

Chapter 3 (Figure 3.3) showed the discounted investment gap—that is, the difference between NZE and RS investments at the sectoral level through 2050 in discounted dollars. A breakdown of this figure shows two things. First, Figures 4.5 A and 4.5 B show a different time profile for the incremental investment between government and the private sector: the incremental government investment is front-loaded and largely on wind and solar and battery storage. In contrast, the incremental private investment is backloaded and largely on wind and solar, though battery storage becomes more important from 2031 onward. The sectors for incremental investment can be viewed as sectors toward which the economy needs to pivot. Looking at total investment under the Net Zero scenario, Figures 4.5 C and D show that the private sector is expected to undertake most of the investment (US\$74.81 billion, 86.7 percent), with the public sector handling for the remaining 13.3 percent (US\$11.50 billion, see Figure 4.5 below, left and right bottom charts, respectively). The important sectors for investment between 2026 and 2050 include transport (US\$45.71, 53.0 percent of the total—93.1 percent private and 6.9 percent public), residential and commercial buildings (US\$21.82 billion, 25.3 percent—94.2 percent private and 5.8 percent public) and power (US\$18.38 billion, 21.3 percent—61.8 percent private and 38.2 percent public). Importantly, while passenger transport and residential and commercial buildings are of common interest, the areas for investment between the public and private sector are expected to differ. The private sector is expected to focus on freight transport, and wind and solar, with the public sector focusing on transmission lines.

#### 4.2.2. Green finance

**More than 85 percent of additional capital investments needed to meet the decarbonization target could be undertaken by the private sector.** Raising capital to finance climate change-induced investments also requires creating an enabling regulatory environment. Mobilizing finance for the green transition would require issuing green bonds, accessing public-private partnerships (PPPs), and tapping into EU pre-accession financing, IFI financing and guarantees.

**International banks operating in Kosovo can use capital optimization guarantees to free up capital for financing climate activities.** The guarantee reduces the regulatory risk-weighting applied to mandatory and voluntary reserves at the consolidated level. Furthermore, political risk guarantees covering War and Civil Disturbances, Breach of Contract, Transfer Restriction and Inconvertibility of local currency into hard currency, and Expropriation by governments can be used to de-risk investments and mobilize private capital in support of projects in strategic sectors, such as power, electric vehicles, green buildings, and the green and resilient transition, overall.

**Kosovo has several options for adaptation investments, but virtually all of them require the government to strengthen its capacity to access EU and international donors, access the private sector, and build better public sector capacity to assess risks and access financing instruments.** Analysis suggests that national authorities lack the tools to assess their financial needs for adaptation and to access the resources required.<sup>125</sup> Kosovo will need to enhance its capacity to access international donors and private investment, with the public sector playing an important role in this. In particular:

- **At the international level, financial support from the EU and other international donors for climate actions could be further utilized to promote adaptation and sustainable economic development.** The Sofia Declaration on the Green Agenda for the Western Balkans, the new Growth Plan and the EU Adaptation Strategy all aim to increase international climate finance for adaptation.<sup>126</sup> The Economic and Investment Plan (EIP) also provides a long-term investment package that will mobilize up to €9 billion to support green transition and climate actions, with the potential to attract an additional €20

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<sup>125</sup> Alfthan, B.; Krilasevic, E.; Venturini, S.; Bajrovic, S.; Jurek, M.; Schoolmeester, T.; Sandei, P.C.; Egerer, H. and Kurvits, T. 2015. Outlook on climate change adaptation in the Western Balkan mountains. United Nations Environment Programme, GRIDArendal and Environmental Innovations Association. Vienna, Arendal and Sarajevo.  
[https://weadapt.org/sites/weadapt.org/files/balkanmountains\\_smd.pdf](https://weadapt.org/sites/weadapt.org/files/balkanmountains_smd.pdf)

<sup>126</sup> European Commission. 2021. Communication from The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions Empty - Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change. COM (2021) 82 final.  
<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:82:FIN>

billion investment in climate actions with the crowding in of private investors.<sup>127</sup> Several adaptation projects have been launched, such as wastewater treatment plants in urban areas of Kosovo. Other funds such as the Adaptation Fund and the Special Climate Change Fund have also deployed billions of dollars in adaptation and could be leveraged further. For instance, in Kosovo's capital city of Pristina, the City Climate Finance Gap Fund has been used to support climate resilience and sustainable urban transformation.<sup>128</sup>

- **At the private sector level, commercial banks and firms have much to contribute.** The NAP of Kosovo suggests that the financing of adaptation actions will rely heavily on the private sector (population, companies, banks), considering the limited financial capacities of national authorities.<sup>129</sup> Climate investments and fundings from the private sector are therefore essential to enhance adaptation. To incentivize the private sector to participate in adaptation finance, a higher level of collaboration between the public and private sectors is required. Government authorities have a crucial role to play in mobilizing private sources of finance toward adaptation actions. For instance, one of its principles of the Coalition of Finance Ministers for Climate Action is “mobilizing climate finance” and it assists member countries to reach this goal by “mobilizing private sources of finance toward climate action in their capacity as Finance Ministers, and by complementing Central Banks and market regulators.”<sup>130</sup> Research shows that, by 2026, the growing market for climate adaptation could be worth US\$2 trillion a year.<sup>131</sup> Further, the banking sector's exposure to climate risks is a key area that need to be managed (see Box 4.1).
- **At the national level, public financing schemes and budgetary planning for adaptation need to be enhanced.** The government should allocate adequate financial sources to support adaptation, clearly outline the responsibilities of all the relevant institutions, and mainstream climate action into budgetary planning at the national and municipal levels. A good example to use would be Albania, which mainstreams climate change into national development planning and budgeting, together with fiscal policy options, through the implementation of the NAP.<sup>132</sup> Disaster risk financing also needs to be enhanced to strengthen the country's financial resilience in the face of climate disasters and yield substantial benefits, especially a reduction in the level of government liabilities.

### 4.3. Structural and regulatory framework issues

**Kosovo's strengths, if harnessed effectively, could drive accelerated growth and elevate living standards.** Strategic reforms targeting macroeconomic stability, governance, and productivity enhancement across firms and farms, alongside investments in human capital and export promotion, including FDI, hold the key to narrowing the gap to its peers.<sup>133</sup> But the lack of job opportunities, together with low labor force participation and high unemployment rates, is a significant hurdle. Despite recent upticks in job creation rates, productivity levels remain subpar, especially in small enterprises and agriculture. Educational quality also needs improvement, and women's economic empowerment barriers persist. Yet Kosovo's advantageous location and youthful population, supported by trade and logistics enhancements, favorable tax and labor environments, robust finance, and diaspora connections, offer growth prospects (see Box 4.2 for a discussion on how the macro modeling choice affects the macroeconomic results and the representation of future growth opportunities, and the importance of innovation and management of state owned enterprises in moving from upper middle income to high income).

<sup>127</sup> Balkan Green Energy News. 2021. EU expects Western Balkan countries to offer quality projects for financing under €9 billion plan. <https://balkangreenenergynews.com/eu-expects-western-balkan-countries-to-offer-quality-projects-for-financing-under-eur-9-billion-plan/>

<sup>128</sup> City Climate Finance Gap Fund. 2023. Building cleaner, greener, more livable cities: Pristina - a blueprint for transforming urban development. <https://www.citygapfund.org/story/building-cleaner-greener-more-livable-cities-pristina-blueprint-transforming-urban>

<sup>129</sup> Ministry of Environment and Spatial Planning, Climate Change Strategy 2019-2028.

<sup>130</sup> The Coalition of Finance Ministers for Climate Action. 2021. About the Coalition. <https://www.financeministersforclimate.org/>

<sup>131</sup> Randall, T. et al. 2023. Private investment for climate change adaptation – difficult to finance or difficult to see the finance? UNDRR - PreventionWeb. <https://www.preventionweb.net/news/private-investment-climate-change-adaptation-difficult-finance-or-difficult-see-finance>

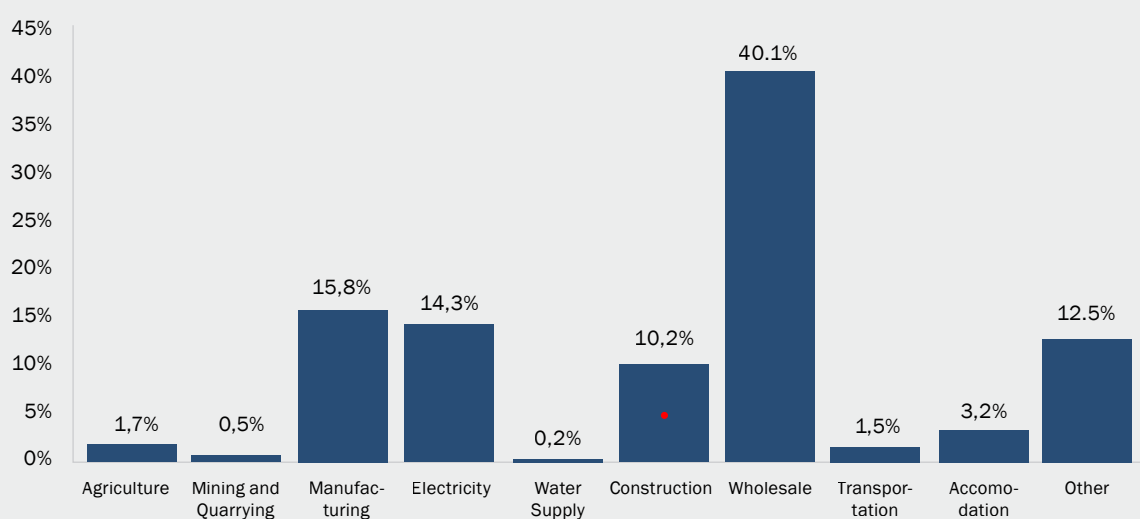
<sup>132</sup> Republic of Albania. 2021. National Adaptation Planning (NAP) to Climate Change in Albania Framework for the Country Process. [https://unfccc.int/sites/default/files/resource/National\\_Adaptation\\_Plan\\_Albania.pdf](https://unfccc.int/sites/default/files/resource/National_Adaptation_Plan_Albania.pdf)

<sup>133</sup> World Bank 2021. Kosovo Country Economic Memorandum – Gearing Up for a More Productive Future.

## BOX 4.1: Preserving the financing capacity of the banking sector

**Portfolios of the banking sector in Kosovo have high risk exposure to both physical risks and green transition risks.** The figure showing the distribution of loans by sectors (below) provides a good overview of the potential double impact of climate change on banks, through both their geographic concentration and thus exposure to natural hazards, and their exposure to Climate Policy Related Sectors (CPRS). Examining the distribution of banks' portfolios by Nomenclature of Economic Activities (NACE) sector shows that just under half of portfolios invest in sectors that most probably will be affected by climate-related policies. In particular, the agriculture, mining and quarrying, construction, electricity, and transportation sectors are likely to be affected by climate change policies, which account for 28.2% of total loan exposure. In addition, part of the manufacturing and accommodation sectors can also be expected to be subject to transition risks.

**FIGURE 4.6: Distribution of banks' loans by NACE sector**



Source: World Bank and Central Bank of Kosovo

**Separately, an analysis of four banks, for which more granular data exist, representing 68 percent of the total loan exposure shows that 56 percent of loan portfolios are in CPRS sectors, mainly the transportation and utility sectors (each at 18.6 percent of the portfolios).** This gives an indication that the approximation using NACE classifications may underestimate the share portfolios exposed to climate change risks. Looking at the geographic distribution of loans, the exposure is highly concentrated in Pristina, while all other regions have significant exposure to manufacturing. Pristina has the bulk of exposure to electricity. In other Western Balkan countries, banking sector exposure based on the CPRS methodology shows exposure of 55 percent in North Macedonia, 45 percent for Albania, 40 percent in Bosnia and Herzegovina, and 35 percent in Republika Srpska.

### **Central banks can take a proactive role in managing the climate-related risks in their financial systems.**

A national overarching strategy and roadmap on green finance is necessary to prioritize actions, allocate the division of labor, and ensure the coordination among key actors, including central banks, and the ministries of finance and economy. Central banks typically have five stages in managing the climate-related risks in their financial systems: (1) a risk assessment, surveys and data collection; (2) preparing regulations and guidelines; (3) incorporating climate risks in supervision; (4) conducting stress testing; and (5) setting capital requirements for climate risks. Central banks in the region are mostly at stage 1, though some of them have advanced to the second phase recently (e.g., North Macedonia). For Kosovo, closing data gaps and harmonization of data would be important steps in mitigating these risks.

**Kosovo's fiscal policies will also have to adapt.** Based on the analysis of the previous section, the impact of climate hazards on the public debt can be high (if no action is taken from households and firms) while the impact of mitigation seems manageable. Both adaptation and mitigation needs will however motivate a change in the mix of public investment (more of one and less of the other, or different way of designing programs or projects) and potentially require additional investment, should fiscal space permit.<sup>134</sup> Kosovo, like several of the WB6, suffers an infrastructure deficit, and climate change as well as potential damages from earthquakes, will create urgencies that can put additional pressure on the public finances and could squeeze out important spending on more traditional areas such as health and education. The public sectors response needs to be three-fold. First, to adopt policies that mitigate the economic and social impact of climate change be incentivizing prevention (i.e. zoning, mandatory insurance, developing financing instruments, carbon pricing, incentives for research and innovation, etc.). Second, review and strengthening efficiency of existing programs (i.e. social assistance, education, pharmaceutical spending, etc.). Third, increase fiscal space by bolstering domestic revenue mobilization Fourth, actively monitor and manage fiscal risks from climate change. The ongoing efforts to improve monitoring and management of fiscal risks are in the budget process are in the right direction.

**By ensuring competitive neutrality and reducing regulatory barriers to competition, Kosovo can boost productivity growth and facilitate firm entry in climate relevant sectors.** Kosovo has the second largest share of SOEs in climate-vulnerable sectors in the Western Balkans (69 percent), after Montenegro (73 percent). SOEs also have a strong presence in mitigation-relevant sectors, such as power, transport and utilities in general. The strong participation of the state was found to be associated with lower business dynamism, discouraging new firms from entering markets, curbing private investment, and potentially slowing the transition to a greener, more sustainable economy. By strengthening the competition framework and ensuring competitive neutrality, Kosovo can level the playing field between public and private companies and attract private investment on climate. Market entry and exit should be facilitated by simplified business registration and deregistration regulations. Furthermore, Kosovo can incentivize climate action within SOEs by improving their corporate governance and by fostering collaborations between SOEs and private firms.

## 4.4. Export opportunities

**The transition to a green economy presents opportunities for growth, development, and technological upgrading.** With a growing number of countries committing themselves to a net zero emissions goal, global demand is shifting away from fossil-fuel based production toward cleaner technologies and products. As new growth opportunities in green product markets open up, cultivating competitiveness in these areas will be an important way for Kosovo to reap greater economic benefits from the green transition. Many of the products and technologies necessary for the green transition are also technologically sophisticated and associated with greater knowledge spillovers. For example, reaching net zero emissions by 2050 will accelerate the deployment of renewable technologies, allowing Kosovo to further benefit from its comparative advantages not only in the wind power and solar power value chains but also in battery storage, where Kosovo is among the first movers in the region. Kosovo falls along a significant geological trend offering potential for critical minerals being demanded by the energy transition, and past production has demonstrated that mining can foster value-addition in manufacturing. To realize this opportunity today, a transparent, non-discretionary and predictable investment climate is needed to stimulate mineral exploration and an assessment of commercial viability of production. This would enable Kosovo to contribute to the rising global demand for nickel and cobalt, used in the wind power value chain, and expand exports of zinc and copper used the solar power value chain.

**Additionally, the green transition opens up opportunities for Kosovo in the realm of energy efficiency.** By adopting more energy-efficient technologies and practices, Kosovo can improve its industrial competitiveness, reduce the cost of energy for businesses and households, and lower greenhouse gas emissions. This can lead to the development of new industries focused on the production and export of

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<sup>134</sup> See Republic of Kosovo – Systematic Country Diagnostic Update. World Bank 2022, and Kosovo Country Economic Memorandum 2022–Gearing Up for a More Productive Future, World Bank 2022.



energy-efficient products and services, such as insulation materials, lighting, and smart-grid technologies.

**In addition to energy, Kosovo can explore opportunities in sustainable and climate-smart agriculture.**

As the global demand for sustainably produced food rises, Kosovo could position itself as a supplier of high-quality, ecofriendly agricultural products. This would not only cater to the export market but also support rural development and biodiversity conservation in the country. By adopting sustainable land management practices, Kosovo could also combat soil degradation and increase the resilience of its agricultural sector in the face of climate change.

#### **BOX 4.2: Can the Net Zero transition be a path to high income status for the WB6?**

**The energy and macro modeling approaches in this report aimed to make a direct comparison of the energy system costs and its macro impact between the net zero scenario and the RS for the same level of energy demand.** This ensured that the comparison was made for the same size of the economy and the same GDP growth rates (The analysis was undertaken for two sizes of an economy, one that grew at trend growth and one that grew at optimistic growth.). The results, which include externalities from lower pollution, show that about half of the WB6 economies can achieve net zero emissions without compromising their per capita growth rate level relative to the RS. This result holds for both trend growth and optimistic growth scenarios.

**However, a net zero transition can have a longer-term impact on GDP growth through increased trade, investment, and finance, contingent on structural reforms and country specific conditions.** The potential longer-term impact is not modeled in this or the regional report but can be expected to materialize as higher trade, investment, and financing opportunities would very likely result in a higher GDP growth rate, provided that the prerequisite structural reforms are made to increase potential GDP. Country-specific conditions such as technological capabilities, access to resources, and preferences can also play determining roles. The context for these opportunities is the EU's commitment to achieving net zero emissions by 2050. To support this goal, the EU Green Deal, the Western Balkans Growth Plan, and CBAM are in place. In contrast to the opportunities presented under the net zero transition, under RS countries could face penalties in their economic relation with the EU as their emissions targets are inconsistent with EU policy goals. These penalties could not only come through the CBAM but also through reduced investment and finance opportunities.

**To capitalize on the energy transition, the WB6 will need to increase their productivity.** Middle-income countries are able to transition to high-income countries by improving their productivity. The World Development Report (WDR 2024) looks at the transition from upper middle income to high income status and makes several important points. First, while in early stages of development, when countries are far from the technological frontier, investments contribute significantly to economic growth, while in the middle stages of development, infusion of technologies (adoption and diffusion of technologies created elsewhere) makes an increasingly large contribution to growth alongside investment, and in the later stages of development, homegrown innovation plays the largest role in improving productivity. An economy's technological frontier can be pushed forward by infusion and innovation brought by new entrants into the market, as well as by incumbents (including SOEs). Second, a combination of carbon pricing and support programs would encourage the adoption of lower carbon technologies and spur competition through infusion and innovation, as long as markets are competitive. Energy efficiency gains will lower costs for households and businesses. Third, incumbents, which often seek to preserve their dominant status in a market, can be disciplined through competition policies. SOEs, as incumbents, can be encouraged to innovate through shareholder action, governance or regulatory actions. Existing market leaders can only maintain their market share if they adapt to current incentives, such as finding more efficient ways to use and produce energy in the power and transportation sectors. Entrants and incumbents can be incentivized, as necessary, with subsidies for infusion and innovation. The implication for the energy transition of the WB6, where SOEs play a significant role in each economy, is that energy markets need to be contestable, using programs and policies to incentivize this competition. Furthermore, the ECA Companion Report to the WDR (2024, forthcoming) notes that the transition to net zero needs to be based on (i) continued economic transformation, (ii) integration into global markets and value chains to bring in more energy efficient technology, regulations on energy efficiency, and the introduction of renewables. Implementation of a strong reform agenda is needed to meet these objectives.

**Lastly, green growth opportunities lie in better waste management and fostering a circular economy.**

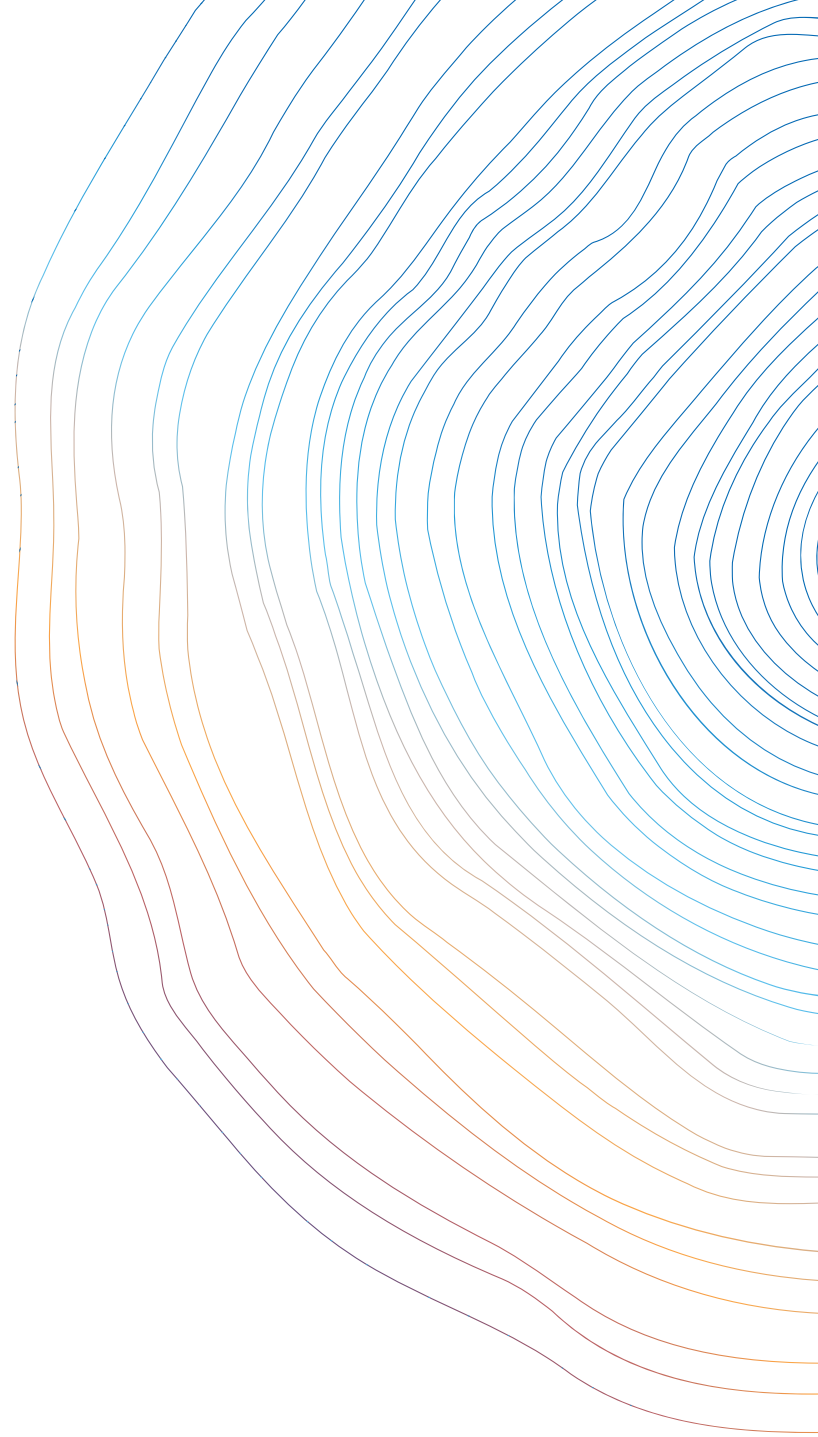
By investing in waste management and recycling, Kosovo could reduce landfill use, cut greenhouse gas emissions, and generate economic value from waste materials. And by implementing policies that encourage the reduction, reuse, and recycling of waste, Kosovo could promote a circular economy that not only conserves resources but also opens up new business opportunities.

**Kosovo's aspirations to accede to the European Union gives it some internal urgency to align with the bloc's climate and environmental policy *acquis*.**

In the near term, this includes increasing preparedness for the implementation of the EU carbon border adjustment mechanism (CBAM), and the implementation of carbon pricing more generally. The EU has recently introduced a CBAM that will initially apply to imports of certain goods whose production is carbon-intensive and at the most significant risk of carbon leakage. Since the EU is prime trading partner of Kosovo, the implementation of the CBAM could lead to near-term impacts on export competitiveness and market access for several industrial sectors. Based on Kosovo's 2021 exports structure, more than 8 percent of its exports would be covered by the implementation of the CBAM.

**Environmental fiscal reforms could provide an opportunity to raise fiscal revenues while advancing environmental goals.**

There is an opportunity to enhance the current policy framework of environmental taxes and excises, with a medium-term focus on the preparation for the introduction of carbon pricing. These reforms could incentivize a shift away from polluting technologies toward the adoption of more environmentally friendly technologies. In addition, the adoption of a carbon price would generate fiscal revenues that could be used to incentivize investments in new, more productive economic sectors with lower carbon intensity, leading to positive impacts on GDP.



## Chapter 5



# Conclusions and recommendations

The following table highlights recommended policy actions and investments, with an associated prioritization, split by policy area. The urgency and ease of implementation of actions have been marked as high (●●●), medium (●●●), or low (●●●). The EU tag highlights actions that are aligned with legal obligations, EU frameworks and additional efforts already undertaken by Kosovo within the EU accession process or based on their membership to the Energy Community.

Policy Actions	Investments	Prioritization
<b>Policy area: Resilience and adaptation</b>		
<b>RA1: Disaster risk management<sup>135</sup></b>		
<ul style="list-style-type: none"> <li>Enhance the CCA and DRM legal framework by i) establishing the legal basis that promotes the integration of climate change adaptation into local and national development processes, ii) resolving the issue of overlapping mandates and enhancing coordination between the two main DRM institutions for more efficient disaster management, and iii) improving legislation to strengthen the connection between central government, which directs emergency management, and local agencies, which carry out the operations on the ground. EU</li> <li>Promote capacity building by i) employing legal measures to enhance the training, human capital, and technical expertise of local authorities, and ii) setting out detailed guidelines to enhance the effectiveness of operations and strengthen coordination between national and local authorities for emergency response. EU</li> <li>Improve legal and institutional frameworks to better define accountabilities on DRM. EU</li> </ul>	<ul style="list-style-type: none"> <li>Readiness and preparedness for climate risks through i) Capacity building of vulnerable communities, such as farmers, women and marginalized groups, so that they can be prepared and better response to climate risks and impacts ii) Upgrade the national alert system to provide timely warning of disaster risks to the public, in particular vulnerable groups. Operationalize a public alert system that supports cell broadcasting and SMS messages to the public through the cellular network. EU</li> <li>Climatic knowledge and technology development through i) enhancing institutional knowledge and expertise on climate change ii) strengthening monitoring systems for seismic risks and impacts, especially in areas with potentials of dam collapse during an earthquake event iii) enhance resource and equipment capacity for wildfire suppression and urban search and rescuing operations iv) public awareness programs and consultations on DRM and CCA. EU</li> <li>Assess the status of all response stations to inform a development plan that outlines clear priorities for the needs to upgrade and strengthen the network of response stations. EU</li> <li>Implementation of heat adaptation measures such as shading and air circulation systems. EU</li> </ul>	Urgency ●●● Ease of implementation ●●●
<b>RA2: Urban</b>		
<ul style="list-style-type: none"> <li>Enhance climate-resilient urban planning through strengthening national planning instruments to promote sustainable urban development. EU</li> <li>Fully implement the Green Building Code to reduce urban heat island effects, and to improve the energy efficiency of new and existing buildings. EU</li> <li>Promote the incorporation of nature-based solutions into strategic planning of social infrastructure. EU</li> <li>Introduce mechanisms for obligatory alignment of strategic and spatial plans with climate policy. EU</li> </ul>	<ul style="list-style-type: none"> <li>Enhance capacities in climate change management and sustainable and climate-smart spatial planning. EU</li> <li>Increase more green space for public recreational uses. EU</li> <li>Upgrade the cities' storm water and sewage management to reduce urban flood risk.</li> <li>Invest in a network of shelters in major cities that is accessible to all residents. EU</li> </ul>	Urgency ●●● Ease of implementation ●●●

<sup>135</sup> Disaster risk management and urban climate adaptation measures are mostly linked to the following EU legislation and strategies: Legislation: European Climate Law ([https://climate.ec.europa.eu/eu-action/european-climate-law\\_en](https://climate.ec.europa.eu/eu-action/european-climate-law_en)), Directive on the resilience of critical entities (<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022L2557>), Eurocode building codes <https://eurocodes.jrc.ec.europa.eu/policies-standards/en-eurocodes-and-related-standards#the-european-standardisation-system>, and other relevant construction laws (such as the revised Energy Performance of Buildings Directive EU/2024/1275 and the revised Energy Efficiency Directive EU/2023/1791), Floods directive (<https://www.eea.europa.eu/themes/water/interactive/by-category/floods-directive>) UCPM legislation ([https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/eu-civil-protection-mechanism\\_en](https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/eu-civil-protection-mechanism_en)). Strategies, frameworks, programs and best practice networks: EU Adaptation Strategy ([https://climate.ec.europa.eu/eu-action/adaptation-climate-change/eu-adaptation-strategy\\_en](https://climate.ec.europa.eu/eu-action/adaptation-climate-change/eu-adaptation-strategy_en)), EU Disaster Resilience Goals ([https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/european-disaster-risk-management/european-disaster-resilience-goals\\_en](https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/european-disaster-risk-management/european-disaster-resilience-goals_en)), EU Mission Adaptation to Climate Change ([https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/adaptation-climate-change\\_en](https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/adaptation-climate-change_en)), EU level technical guidance for adaptation of buildings (<https://susproc.jrc.ec.europa.eu/product-bureau/sites/default/files/2023-04/Technical%20Guidance%20adapting%20buildings.pdf>). The measures particularly support progress on areas presented in Chapter 27 Environment of the acquis ([https://neighbourhood-enlargement.ec.europa.eu/enlargement-policy/glossary/chapters-acquis-negotiating-chapters\\_en](https://neighbourhood-enlargement.ec.europa.eu/enlargement-policy/glossary/chapters-acquis-negotiating-chapters_en)). The EU tag indicates that these measures are directly or indirectly linked or go beyond requirements included in EU legislation or strategies.

Policy Actions	Investments	Prioritization
<b>RA3: Water</b>		
<ul style="list-style-type: none"> <li>Implement the 2017–2036 Kosovo National Water Strategy .</li> <li>Complete the development of integrated River Basin and Flood Risk Management Plans, including comprehensive Programs of Measures with concrete infrastructure investment plans.</li> <li>Develop a formal sector financing strategy for the water sector as a whole and for its subsectors.</li> <li>Continue the process of the regionalization in water services and irrigation services.</li> </ul>	<ul style="list-style-type: none"> <li>Invest in the sustainability and expansion of water and wastewater treatment facilities to reduce the high levels of Non-Revenue Water in the water supply systems to increase resilience, and to increase the levels of wastewater treatment.</li> <li>Invest in the revitalization and expansion of a more economically, environmentally, and financially sustainable irrigation sector.</li> <li>Invest in Kosovo's water storage capacity to increase overall water security.</li> <li>Invest in developing proper management and operation of existing and future water storage capacities.</li> <li>Invest in the renovation and extension of the flood risk management schemes.</li> </ul>	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>
<b>RA4: Forestry and biodiversity</b>		
<ul style="list-style-type: none"> <li>Strengthen the legal framework and governance of illegal logging.</li> <li>Establish afforestation and reforestation initiatives and their legal framework.</li> </ul>	<ul style="list-style-type: none"> <li>Promote sustainable and adaptive forest management.</li> <li>Enhance institutional expertise and public awareness of forest and biodiversity conservation and ecotourism.</li> <li>Invest in information and communication technology and remote surveillance tools to enhance forest monitoring.</li> </ul>	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>
<b>RA5: Agriculture</b>		
<ul style="list-style-type: none"> <li>Develop local climate change scenarios and consider them in the strategic documents for the agriculture sector.</li> </ul>	<ul style="list-style-type: none"> <li>Continue supporting investments in the irrigation rehabilitation and modernization in line with the action plan included in the Irrigation Master Plan (considered as the primary adaptation measure).</li> <li>Promote diversification of the local agricultural production (toward high value agriculture such as fresh or processed fruits and vegetables).</li> <li>Promote CSA technologies adoption and digital transformation in agriculture and rural development.</li> </ul>	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>
<b>RA6: Transport</b>		
<ul style="list-style-type: none"> <li>Update road asset management practice with climate hazard considerations to inform multiyear programs of preventive maintenance.</li> <li>Develop integrated, low-carbon public transport corridors.</li> </ul>	<ul style="list-style-type: none"> <li>Address current vulnerabilities in existing road network as a priority.</li> <li>Implement green or smart mobility solutions including railways, non-motorized transport (NMT) and mass transit.</li> </ul>	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>
<b>RA7: Education, skills and labor markets</b>		
<ul style="list-style-type: none"> <li>Reform education and training systems to prepare the flow and stock of workers who have the skills needed for new jobs, by strengthening the links between the education and training system and the labor market, including through greater involvement of the private sector.</li> <li>Develop national plans to foster green values, attitudes, and behaviors into children from an early age and throughout their education and training years.</li> <li>Decarbonize education delivery, adapt school infrastructure to climate change, and create modernized learning environments.</li> <li>Promote science and R&amp;D to adapt to climate change.</li> <li>Reform the financing and design of upskilling and reskilling programs to expand opportunities for lifelong learning, including on-the-job learning.</li> <li>Assess how well current labor regulations and tax and benefit systems to balance the need to be flexible to allow firms to adapt to economic changes, and the need to protect workers.</li> </ul>	<ul style="list-style-type: none"> <li>Invest in the conditions needed for more labor-market-responsive and larger-scale training (curricula, teachers/instructors, infrastructure, equipment).</li> <li>Invest in green school infrastructure—energy efficient buildings, compact structures, and embed energy efficient technology in the curriculum to foster climate education [as part of DRM and Urban Policies].</li> <li>Invest in R&amp;D and innovation to facilitate adaptation to green economy.</li> <li>Establish mechanisms (e.g., skills development funds) co-led by the private sector to support reskilling and upskilling at a larger scale.</li> <li>Develop tools for labor market observatory to identify on a regular basis change in skills demand associated with the greening of the labor market.</li> <li>Invest in labor mobility schemes to support the geographical reallocation of jobs and workers.</li> </ul>	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>

Policy Actions	Investments	Prioritization
<b>RA8: Social Protection systems</b>		
<ul style="list-style-type: none"> <li>▪ Modify legislation to (i) allow social protection programs to expand coverage to additional people in response to disasters and climate impacts; and (ii) establish mechanisms to respond to localized shocks rapidly and transparently through the social protection system.</li> <li>▪ Align social protection, DRM, and climate change legislation to (a) recognize the role of social protection in supporting adaptation, (b) strengthen the use of early-warning systems to inform a scaling up of social protection programs, and (c) enable disaster risk financing or pre-positioned resources [term used elsewhere in the report should be used here] to be channeled through these programs to reach affected-people directly.</li> <li>▪ Strengthen labor income protection systems, including for informal workers, to respond to a likely increase in job-related shocks.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Support dedicated outreach by the social protection systems to poor and vulnerable communities to ensure their understanding of the benefits that are available to support climate adaptation.</li> <li>▪ Invest in social protection delivery systems to enable a quick identification of people in need of support, their enrollment and payment, supported by robust complaints and grievance mechanisms. This includes (a) investments in the interoperability of social protection information systems with other government databases to allow for rapid identification of eligibility; (b) investments in (integrated) social registries, where appropriate, and (c) establishment of standard operating procedures to ensure system capacity during disasters, supported by capacity building and staff training.</li> <li>▪ Establish and finance a contingency budget that will fund the expansion of social protection systems when shocks occur.<sup>136</sup></li> <li>▪ Invest in social protection delivery systems to enable a quick identification of people in need of support, their enrollment and payment, supported by robust complaints and grievance mechanisms. This includes (a) investments in the interoperability of social protection information systems with other government databases to allow for rapid identification of eligibility; (b) investments in (integrated) social registries, where appropriate, and (c) establishment of standard operating procedures to ensure system capacity during disasters, supported by capacity building and staff training.</li> <li>▪ Establish and finance a contingency budget that will fund the expansion of social protection systems when shocks occur.<sup>137</sup></li> <li>▪ Establish and finance a contingency budget that will fund the expansion of social protection systems when shocks occur.<sup>138</sup></li> <li>▪ Invest in social protection delivery systems to enable a quick identification of people in need of support, their enrollment and payment, supported by robust complaints and grievance mechanisms. This includes (a) investments in the interoperability of social protection information systems with other government databases to allow for rapid identification of eligibility; (b) investments in (integrated) social registries, where appropriate, and (c) establishment of standard operating procedures to ensure system capacity during disasters, supported by capacity building and staff training.</li> <li>▪ Establish and finance a contingency budget that will fund the expansion of social protection systems when shocks occur.<sup>139</sup></li> <li>▪ Invest in social protection delivery systems to enable a quick identification of people in need of support, their enrollment and payment, supported by robust complaints and grievance mechanisms. This includes</li> </ul>	<p>Urgency  </p> <p>Ease of implementation  </p>

<sup>136</sup> For budgeting purposes, the maximum amount per year would be allocated, with the assumption that it is triggered every year; although, in practice, disbursements would be needs-based.

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Policy Actions	Investments	Prioritization
	<p>(a) investments in the interoperability of social protection information systems with other government databases to allow for rapid identification of eligibility; (b) investments in (integrated) social registries, where appropriate, and (c) establishment of standard operating procedures to ensure system capacity during disasters, supported by capacity building and staff training.</p> <ul style="list-style-type: none"> <li>▪ Establish and finance a contingency budget that will fund the expansion of social protection systems when shocks occur.<sup>140</sup></li> <li>▪ Establish and finance a contingency budget that will fund the expansion of social protection systems when shocks occur.</li> <li>▪ Invest in efforts to better understand the individual- and household-level impacts of disasters and climate change, including through the tracking of damage and losses.</li> </ul>	
<b>RA9: Health system</b>		
<ul style="list-style-type: none"> <li>▪ Improve data exchange information systems to support management and to foster good governance.</li> <li>▪ Develop a National Action Plan to address air pollution in the country.</li> <li>▪ Make strategic investments to strengthen the response to climate-related hazards and other health emergencies.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Develop an integrated information system for robust connections between the public health disease surveillance and monitoring system and veterinary and food agency information systems.</li> <li>▪ Strengthen the air-quality monitoring network to provide robust geographical coverage and time series data on pollutants.</li> <li>▪ Strengthen the capacity to conduct health risk assessments.</li> </ul>	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>
<b>Policy area: Decarbonization and mitigation</b>		
<b>DM1: Energy pricing</b>		
<ul style="list-style-type: none"> <li>▪ Complete the liberalization of the electricity market and strengthen regulatory institutions. <sup>EU</sup></li> <li>▪ Converge toward cost-reflective electricity tariffs to ensure the financial viability of the power sector. <sup>EU</sup></li> <li>▪ Increase fuel levies and other environmental taxes to EU levels. <sup>EU</sup></li> <li>▪ Strengthen targeted social protection measures in parallel with price reforms, combined with targeted energy efficiency improvements for vulnerable households. <sup>EU</sup></li> <li>▪ Deploy carbon pricing instruments, together with revenue recycling to help vulnerable and low-income groups. <sup>EU</sup></li> </ul>		<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>
<b>DM2: Power sector</b>		
<ul style="list-style-type: none"> <li>▪ Develop spatial plans for identifying priority zones for RE development. <sup>EU</sup></li> <li>▪ Prepare a pipeline of RE projects with clear timelines and support schemes. <sup>EU</sup></li> <li>▪ Ensure the sustainability of RE support schemes for RE investors. <sup>EU</sup></li> <li>▪ Strengthen planning capacity for grid integration of RE, both at the transmission and at the distribution levels. <sup>EU</sup></li> <li>▪ Develop the legal and regulatory framework for battery storage. <sup>EU</sup></li> </ul>	<ul style="list-style-type: none"> <li>▪ Develop and implement national transmission grid modernization programs to enable the grid to integrate renewable electricity. <sup>EU</sup></li> <li>▪ Support investments in hydropower rehabilitation and expansion.</li> <li>▪ Support investments in battery storage and in the power transmission network.</li> <li>▪ Support investments led by the private sector based on competitive selection processes (e.g., renewable energy auctions) in solar and wind capacities.</li> </ul>	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>

<sup>140</sup> For budgeting purposes, the maximum amount per year would be allocated, with the assumption that it is triggered every year; although, in practice, disbursements would be needs-based.







Policy Actions	Investments	Prioritization
<b>DM3: Transition away from coal</b>		
<ul style="list-style-type: none"> <li>Develop a framework for the repurposing of coal mines and other infrastructure assets that may be decommissioned (with social protection and land rehabilitation measures).</li> <li>Adopt a Just Transition framework and strategy for coal mine closures and for repurposing, including labor and social mitigation measures and land rehabilitation, and taking into account local communities affected by the closure.</li> </ul>	<ul style="list-style-type: none"> <li>Provide support to projects for the rehabilitation of closed mines and the reskilling of workers.</li> <li>Launch pilot projects to support job creation in select coal communities, ahead of the closure of the coal mine.</li> <li>Strengthen public employment services, expand upskilling/retraining programs for occupations that are in demand, and invest in ALMPs in coal-affected areas.</li> </ul>	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>
<b>DM4: Transport sector</b>		
<ul style="list-style-type: none"> <li>Transition to concession-based models for public transport where providers are paid based on indicators of service delivered (performance-based contracts), with the aim of improving service and accelerating the transition to e-buses. Increase the bankability of bus concessions through standardization at the national and regional levels.</li> <li>Improve the coordination of rail freight traffic at the corridor level. <sup>EU</sup></li> <li>Introduce fuel efficiency standards for vehicles and tighten second-hand import regulations. <sup>EU</sup></li> <li>Introduce carbon-differentiated vehicle taxation to incentivize the adoption of cleaner vehicles.</li> <li>Improve the governance and enforcement of emission testing in roadworthiness inspections. <sup>EU</sup></li> <li>Introduce regulatory requirements for the early electrification of highly utilized fleets (buses, taxis, ride-sharing, and public fleets).</li> <li>Establish a clear policy framework for the deployment of charging infrastructure, in a way that incentivizes and facilitates private sector participation.</li> <li>Prioritize collective and active mobility (bussing, biking, walking) over private motorized transport in urban and metropolitan areas.</li> </ul>	<ul style="list-style-type: none"> <li>Finance pilot projects to start developing EV-charging infrastructure along main corridors.</li> <li>Support low-interest finance for the early e-mobility transition of highly-utilized fleets.</li> <li>Introduce dedicated infrastructure for the exclusive circulation of public transport vehicles along key urban corridors.</li> <li>Invest in continuous, integrated, and safe non-motorized transport infrastructure (for example, bicycling).</li> </ul>	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>
<ul style="list-style-type: none"> <li>Introduce minimum regulatory requirements for the rollout of publicly accessible EV charging points, gradually converging with those of the EU alternative fuels infrastructure regulation (AFIR) for both light- and heavy-duty vehicles. <sup>EU</sup></li> <li>Introduce low-emission zones with gradual and growing levels of restriction over time.</li> <li>Introduce parking management strategies to discourage private car use and recover public space (including controlled parking zones and parking charges).</li> <li>Explore alternative financing schemes for urban mobility, such as land value capture for transformative projects.</li> <li>Expand private sector participation in infrastructure, services, and emerging transport modes (e.g., Mobility as a Service (MaaS) and urban logistics) through PPPs.</li> <li>Improve the market orientation of transport operators and encourage private participation.</li> <li>Reform state-owned transport enterprises, enable their access to finance, appoint professional boards of directors, and divest state-owned enterprises of noncore business activities. <sup>EU</sup></li> </ul>	<ul style="list-style-type: none"> <li>Invest in improved public transport and pedestrian and cycling accessibility to low-emission zones.</li> <li>Support, with decreasing participation over time, the roll-out of publicly available charging infrastructure for electric mobility.</li> <li>Upgrade and expand infrastructure at border-crossing points on critical transport corridors within WB6 to achieve fully functioning one-stop shops, and between WB6 and EU neighbours. <sup>EU</sup></li> </ul>	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>



Policy Actions	Investments	Prioritization
<ul style="list-style-type: none"> <li>Gradually phase out internal combustion-engine vehicles among new registrations.</li> </ul>	<ul style="list-style-type: none"> <li>Revitalize and expand rail infrastructure through investment, and improve service quality and competitiveness for both passenger and freight transport. If core rail network were to be compliant with Trans-European Transport Network standards by 2035 as per the Western Balkans Sustainable and Smart Mobility Strategy (e.g., the railway connecting Montenegro with Albania and Serbia), it would enable a gradual shift from private road transport to rail for both passengers and freight.</li> </ul>	Urgency Ease of implementation 
<b>DM5: Residential and commercial sector</b>		
<ul style="list-style-type: none"> <li>Ensure that legislation and building codes include energy-efficiency measures, and that enforcement mechanisms are established. </li> <li>Enhance EE standards for buildings and reinforce compliance. </li> <li>Introduce the use of energy performance certificates for buildings.</li> <li>Develop a roadmap for sustainable heating.</li> </ul>	<ul style="list-style-type: none"> <li>Provide incentives for EE and distributed RE in private buildings, including the electrification of heating through heat pumps and installation of rooftop solar PV systems.</li> </ul>	Urgency Ease of implementation 
<b>DM6: Industry</b>		
<ul style="list-style-type: none"> <li>Enhance EE standards for industry and reinforce compliance. </li> </ul>		Urgency Ease of implementation 
	<ul style="list-style-type: none"> <li>Provide incentives to selected pilot investments for industrial carbon capture and storage, and for green hydrogen production.</li> </ul>	Urgency Ease of implementation 
<b>DM8: Agriculture and Food Systems</b>		
	<ul style="list-style-type: none"> <li>Introduce and implement cross-compliance measures in terms of good environmental practices in agriculture programs (Manure management, wastewater treatment from milk processing plants, and waste /animal byproducts), toward alignment with EU.</li> <li>Run awareness campaigns and training programs promoting adoption of good practices for increasing soil organic matter/carbon sequestration.</li> <li>Enable opportunities in the circular economy and bioeconomy (agriculture and forest-based biomass, biofuels).</li> </ul>	Urgency Ease of implementation 
<b>DM9: Education, skills and labor markets</b>		
<ul style="list-style-type: none"> <li>Retrain current workers to help them adapt to the transition.</li> <li>Support mitigation studies and research activities, including scientific research on decarbonization, absorption, forestry, nature preservation, and so on.</li> <li>Implement the measures listed in RA7 above: many of them will facilitate not only adaptation but also mitigation and decarbonization.</li> </ul>	<ul style="list-style-type: none"> <li>Implement the investments listed in RA7 above: many of them will facilitate not only adaptation but also mitigation and decarbonization.</li> </ul>	Urgency Ease of implementation 

Policy Actions	Investments	Prioritization
<b>Policy area: Macroeconomy and financing</b>		
<b>MF1: Macro Stability</b>		
<ul style="list-style-type: none"> <li>▪ Maintain adequate fiscal buffers to better manage uncertainty while balancing support to priority policies and investments.</li> <li>▪ Manage fiscal risks to contain impact on public debt.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Strengthen economic modeling and climate modeling capacities.</li> <li>▪ Enhance the quality and accuracy of the medium-term macroeconomic framework to better reflect climate considerations.</li> <li>▪ Conduct fiscal risk assessments that include climate impacts assessments.</li> <li>▪ Incorporate climate considerations in debt sustainability analysis.</li> <li>▪ Include climate-related contingent liabilities (explicit and implicit) in budgets and fiscal projections.</li> </ul>	Urgency  Ease of implementation 
<b>MF2: Fiscal Reforms (mix of support programs and taxes to incentivize adaptation and mitigation)</b>		
<ul style="list-style-type: none"> <li>▪ Remove explicit subsidies in the energy system.</li> <li>▪ Develop a permanent program to support vulnerable consumers in the energy sector during the energy transition.</li> <li>▪ Reduce tax expenditures and increase broad-based revenue mobilization to create fiscal space for adaptation and mitigation needs (support programs, investments).</li> <li>▪ Develop policies and support programs to mitigate the impact of climate shocks and stressors by incentivizing resilience in investment, urban and municipal planning, and behaviors.</li> <li>▪ Develop policies and support programs to facilitate the energy transition by incentivizing research and development (including adoption) of green technologies.</li> <li>▪ Invest in public infrastructure to support the integration of new technologies in electricity grids, public transport, broadband, recycling, planning of cities, etc.</li> <li>▪ Introduce carbon pricing mechanisms, such as carbon taxes or cap-and-trade systems, to internalize the costs of emissions and drive businesses to reduce their carbon footprint; along with recycling mechanisms to ensure sustainable funding for climate change mitigation and adaptation programs.</li> <li>▪ Use part of carbon tax revenues to support social and economic programs for those affected by climate change or to incentivize changes (revenue recycling).</li> <li>▪ Develop risk sharing/reduction programs through guarantees, long-term contracts based on the government's convening power for co-financing.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Enhance analytical capacity and strengthen institutions to deliver fiscal reforms that incorporate a climate perspective.</li> <li>▪ Enhance institutional capacity in revenue administration.</li> </ul>	Urgency  Ease of implementation 
<b>MF3: Public finance management</b>		
<ul style="list-style-type: none"> <li>▪ Introduce financing mechanisms for climate change adaptation.</li> <li>▪ Introduce a carbon tax and recycle the revenue for climate financing.</li> <li>▪ Introduce green public procurement.</li> <li>▪ Re-evaluate the role of SOEs with a focus on aligning price incentives correctly, especially in competitive markets.</li> <li>▪ Systematically integrate climate risk assessments in budgeting procedures to ensure public sector actively prepares for challenges posed by future climate change impacts.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Develop and implement robust climate budgeting and tracking mechanisms to monitor the effectiveness of climate-related spending and enhance transparency in resource allocation.</li> <li>▪ Prioritize investments in low-carbon and resilient infrastructure projects to promote sustainability and climate resilience.</li> <li>▪ Introduce and implement climate budget tagging.</li> <li>▪ Develop a disaster risk financing plan, which considers risk layering and regional pooling, to manage contingent liabilities and protect.</li> </ul>	Urgency  Ease of implementation 

Policy Actions	Investments	Prioritization
<ul style="list-style-type: none"> <li>Introduce public financial management systems for climate budgeting to identify, allocate, and track spending-related climate mitigation and adaptation efforts.</li> <li>Conduct periodic reviews of social policies to ensure that new needs emerging from physical risks and transition risks are met.</li> <li>Strengthen public investment appraisal and implementation to include assessment of physical and transition risks from climate change.</li> <li>Improve the utilization of public funds for agricultural development by learning from the EU's green transition and Common Agricultural Policy (CAP).</li> </ul>		
<b>MF4: Climate Financing</b>		
<ul style="list-style-type: none"> <li>Develop an enabling environment for green finance. Adopt a Sustainable Finance Framework, in alignment with the EU regulation. Develop a green taxonomy, implement financial disclosure standards, and adopt international benchmarks for the issuance of GSS bonds.</li> <li>Mobilize green financing through the issuance of debt instruments.</li> <li>Promote green financing by creating incentives for both private and public investments in green projects, sustainable technologies, and climate-resilient businesses.</li> <li>Promote the adoption of climate insurance across multiple sectors.</li> <li>Strengthen the public-private partnerships and concession policy framework to facilitate and streamline investments in green and climate-resilient projects.</li> <li>Develop the market for green bonds.</li> <li>Develop the Green Equity Fund.</li> <li>Consider mechanisms that allow quick financial response to disasters and access to social protection payments.</li> </ul>	<ul style="list-style-type: none"> <li>Invest in green bonds issued by governments, municipalities, and corporations to finance environmentally friendly projects.</li> <li>Invest in measures to mitigate climate change impact on the financial sector to increase resilience and reduce risk premiums associated with climate related events.</li> <li>Develop green finance principles, standards, and guidelines for both corporate bonds and loans. With green finance expanding toward sustainability-linked instruments, robust key performance indicators for these instruments need to be developed. Financial sector regulators could also consider disclosure requirements for large corporates, establishing minimum entry requirements for private entities that provide green assessments, ratings, or verification services to ensure quality.</li> <li>Develop and deepen local capital markets to support the issuance GSS bonds and trading in secondary markets.</li> </ul>	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>
<b>MF5: Financial Sector Regulatory and Supervision Framework</b>		
<ul style="list-style-type: none"> <li>Employ event or scenario-based stress tests to evaluate climate-related risks comprehensively to assess their potential impact on financial institutions and the broader financial system.</li> <li>Develop guidelines for integrating climate risk into risk management, governance structures, disclosure practices, and supervisory scoring models and approaches to ensure consistent and thorough assessments.</li> <li>For financial sector and private sector update accounting and auditing legislation to capture exposure to climate risks.</li> </ul>	<ul style="list-style-type: none"> <li>Invest in the development and deployment of advanced risk assessment and compliance monitoring tools that can identify potential violations and emerging climate-related risks in financial institution. Close data gaps.</li> <li>Establish a comprehensive national strategy and roadmap for green finance.</li> <li>Set up capital requirements for climate risks to ensure that financial institutions maintain adequate capital buffers to absorb potential losses stemming from climate-related events.</li> </ul>	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>
<b>MF6: Resilient and Sustainable Growth</b>		
<ul style="list-style-type: none"> <li>Provide policy certainty for investors in climate responsive sectors, by regularly updating them on adaptation and mitigation policies and plans.</li> <li>Strengthen contestability in the economy, especially for sectors that are critical to respond to climate change; ensure regulatory frameworks are in place.</li> <li>Capitalize on policies and support programs to incentivize investment in adaptation and mitigation (see EF2).</li> </ul>	<ul style="list-style-type: none"> <li>Mainstream national climate goals into national and sectoral plans. Develop and promote training programs for green jobs to prepare the workforce for employment opportunities and the transition to a green economy.</li> <li>Enhance the EV supply chain by developing skills, improving regulations, and supporting SMEs through targeted programs.</li> <li>Support R&amp;D and the commercialization and transfer of technologies specifically aimed at climate change solutions.</li> </ul>	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>

Policy Actions	Investments	Prioritization
<ul style="list-style-type: none"> <li>Re-evaluate the role of SOEs to ensure they actively contribute to country climate goals, by strengthening governance and management practices, removing subsidies, and fostering participation in competitive markets or contestable markets. Support SOEs in programs where private sector is supported (i.e. for technology adoption or diffusion) but ensure SOEs do not inhibit entry or contestability, or benefit from unfair advantages.</li> <li>Adopt an economy-wide approach to the Just Transition ensuring reforms are in place (i.e. human capital improvement, market contestability, business environment) to capitalize on adaptation and the green transition.</li> <li>Prepare in advance for the advent of CBAM through the use of cleaner energy.</li> <li>Identify and leverage areas where Western Balkan economies have a comparative advantage in environmental goods and green product manufacturing and could become part of the green global value chains.</li> <li>Ensure policies for skills development, regulatory improvements, and SME capabilities are aligned to supporting green growth (see DM8).</li> </ul>		
<b>Policy area: Institutional/Regulatory Readiness for Climate Action</b>		
<b>IR1: Institutional framework</b>		
<ul style="list-style-type: none"> <li>Set up a permanent body with a clearly defined mandate for coordinating climate actions, and ensure overarching coordination from the Prime Minister's office.</li> <li>Strengthen vertical coordination and capacities on the local level for climate action.</li> <li>Introduce obligatory measures that require SOEs to act on climate change.</li> </ul>	<ul style="list-style-type: none"> <li>Allocate enough resources to the designated administrative structures responsible for climate change action, ensure that they have adequate staff to manage climate change, and continually increase their technical capacities. <sup>EU</sup></li> <li>Set up a capacity building/training plan and introduce climate change training modules for public administration staff.</li> </ul>	Urgency  Ease of implementation 
<b>IR2: Planning</b>		
<ul style="list-style-type: none"> <li>Approve the National Energy and Climate Plan, including a coal phase-out date and action plan.</li> <li>Draft and approve the Long-Term Strategy for Decarbonization, and the Strategy and Action Plan for Adaptation to Climate Change.</li> <li>Develop and publish national and local hazard risk maps.</li> <li>Set up an MRV system aligned with the Energy Community acquis. <sup>EU</sup></li> <li>Introduce mechanisms for the obligatory alignment of municipal strategic and spatial plans with climate policy.</li> </ul>		Urgency  Ease of implementation 
<b>IR3: Accountability and citizen engagement</b>		
<ul style="list-style-type: none"> <li>Introduce mechanisms for independent expert advice.</li> <li>Enable executive oversight of local and central-level action or inaction.</li> <li>Improve public consultation processes and facilitate community and citizen engagement and participation in the development of climate-related policy and legislation. Ensure transparent discussions of a just decarbonization path.</li> </ul>	<ul style="list-style-type: none"> <li>Establish instruments to enable public access to reliable information on climate change.</li> </ul>	Urgency  Ease of implementation 

## Annex A. Climate Change Institutional Assessment: Main findings

### BOX A.1: CLIMATE CHANGE INSTITUTIONAL ASSESSMENT (CCIA) METHODOLOGY

**Country institutional capabilities are critical for reaching medium- and long-term climate action results.**

A Climate Change Institutional Assessment (CCIA) helps prioritize and sequence measures to enable countries to meet their climate change mitigation/de-carbonization and Adaptation and Resilience (A&R) objectives. The institutional performance is assessed by examining the suitability of the institutional framework to plan, implement, and sustain a credible and long-term commitment to increasing ambitious climate change policies over multiple political cycles. The assessment covers the functional pillars for organization, planning, public finance, subnational governments (SNG)/state-owned enterprises (SOE), and accountability.

**The Climate Change institutional capabilities of the Western Balkans have been assessed by applying a maturity benchmarking framework.**

The quantitative benchmarking covers 74 indicators across the five CCIA pillars. The indicators can be read in both level terms, as well as relative to comparator countries (including EU-27 illustrations, such as Austria). The indicators are measured in overview terms of nascent, emerging, and established); and they are further detailed within the bands of innocent/aware, developing/competent, and optimizing/excellent. These maturity scores should not be read as objectives in their own right but rather in terms of how they contribute to climate change action outcomes.

**The level of ambition in terms of climate mitigation or A&R is subject to a range of results metrics, including institutional abilities and actions.**

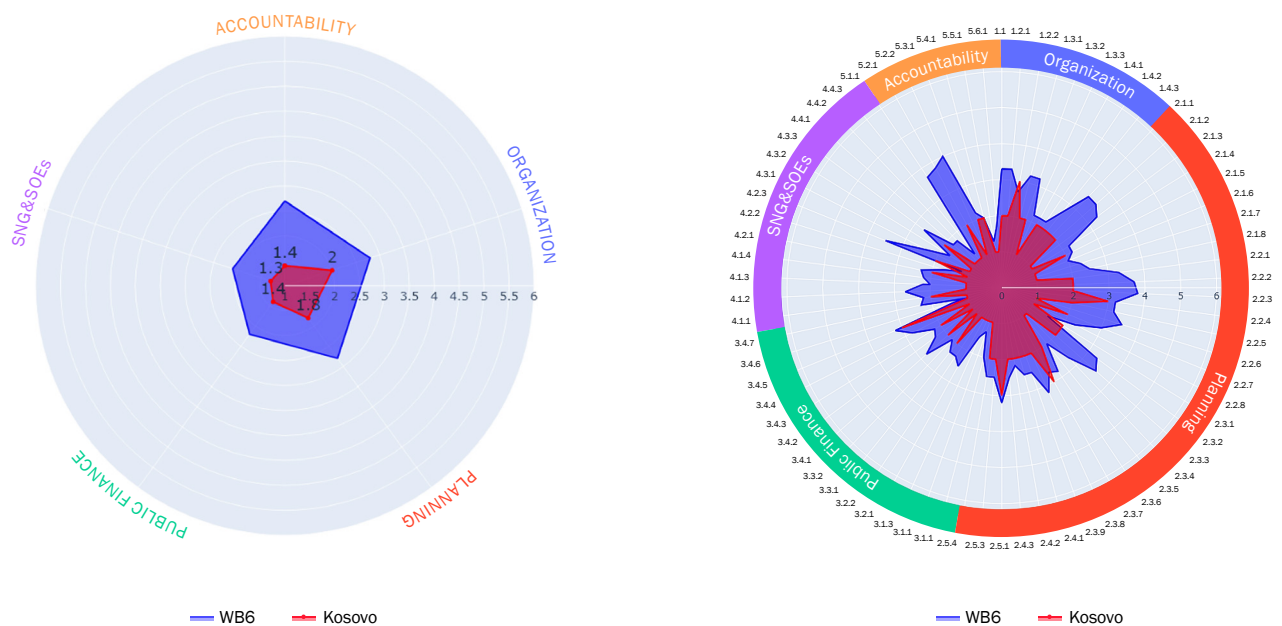
In the planning pillar, the CCIA captures the priorities and sequencing for climate action for both mitigation and adaptation. Climate change mitigation ambitions may be reflected in key climate action strategies and policy documents. These include objectives for GHG emissions reductions/net zero by 2030 and 2050, as well as shifts away from fossil fuels to low-carbon energy sources. The expectations for green transition trajectories— and consequently the institutional demands required for these whole-of-economy structure transformations—will depend on current baselines. A&R outcomes are subject to more diverse metrics, including expected changes in adverse climate exposure. In many cases, it still should be considered in terms of prospective loss and damage risks mitigated due to a range of proactive measures over time (including information, insurance and social protection measures, building standards, and land use planning).

**The CCIA Country Reports explore in more depth the institutional measures likely to enhance and sustain climate action ambitions, ability, and actions.**

The CCIA dialogues identify relative strengths and possible binding constraints to deliver climate change action across the medium (2030) and longer terms (2050). These include ambitions—both for mitigation as well as for an articulation of climate A&R risks— and revealed abilities and actions to address these credibly across regional, national, and local levels. The CCIA recommendations also note the sectoral diversity that current mitigation and A&R challenges represent across the countries' socioeconomic structures. Institutional development recommendations are consequently organized by highlights across the five CCIA pillars. Figure A.1 depicts the country institutional capacities for climate change action compared to the WB6, split by the five CCIA pillars. Table A.1 provides highlights of achievements and gaps by pillar.

**Table A.1 summarizes the key CCIA findings organized in five pillars.** Figure A.1 presents the pillar summary and CCAI indicator level results, benchmarked to the Western Balkans average. The **Planning pillar is rated nascent/aware**; while it articulates commitment and awareness of key adaptation and mitigation agenda items, a core challenge will be to realize these in practice. The ability reflected under *the Organization pillar* is also rated *nascent/aware*; the existing structures need to be strengthened to be able to implement climate policies and achieve the targets. The scores of the other pillars demonstrate less progress, with nearly all indicators rated as nascent.

**FIGURE A.1: CCIA Kosovo: Summary and benchmarking indicators, by pillar**



Sources: Country Institutional Capabilities for Climate Change Action: Western Balkans Climate Change Institutional Change (CCIA); D4C National Climate Actions Strategies and Policies Database (NCASPD).

**TABLE A.1: Kosovo CCIA highlights and gaps**

	Highlights	Gaps
<b>Organization</b>	<ul style="list-style-type: none"> <li>Law on Climate Change foresees the establishment of a National Climate Change Council and its Secretariat</li> </ul>	<ul style="list-style-type: none"> <li>Insufficient capacity in the lead ministry</li> <li>No designated structure in the lead ministry</li> </ul>
<b>Planning</b>	<ul style="list-style-type: none"> <li>Law on Climate Change (LCC)</li> <li>Midterm planning available with the 2019–2028 Climate Strategy of Kosovo</li> </ul>	<ul style="list-style-type: none"> <li>NECP not enacted</li> <li>Net zero target missing</li> <li>No climate change scenarios</li> </ul>
<b>Public finance</b>	<ul style="list-style-type: none"> <li>EE Fund established in 2023</li> </ul>	<ul style="list-style-type: none"> <li>No climate-informed public investment management</li> <li>No green public procurement in practice</li> <li>No carbon tax</li> </ul>
<b>SNGs/SOEs</b>	<ul style="list-style-type: none"> <li>LSGs can contribute with climate data upon request of ministry</li> <li>Drafting EE programs</li> </ul>	<ul style="list-style-type: none"> <li>No specific roles assigned to SNGs for climate action</li> <li>Insufficient capacity for climate action at the SNG level</li> <li>Lack of vertical coordination mechanisms</li> <li>Lack of sustainable finance for climate action</li> </ul>
<b>Accountability</b>	<ul style="list-style-type: none"> <li>The Parliament is in process of establishment of informal Green Parliamentary Group</li> </ul>	<ul style="list-style-type: none"> <li>The access to climate information is limited.</li> <li>The stakeholder engagement mechanisms are only nascent.</li> </ul>

## Annex B. Assessment of adaptation needs

**Table B.1 provides undiscounted costing details of the adaptation measures prioritized in the policy table (refer to Section 5).** It includes the narrative to justify the cost estimates by sector, and both the policy and investment measures are denoted with an alphanumeric code corresponding to each measure in the policy table. This estimate is more comprehensive than the adaptation estimate done by hazard exercise that was part of the macro modeling (in Section 4.1), due to the limitations of that modeling exercise. Following after the table is a description of the challenges, methodological issues, and choices made in the endeavor to develop a coherent narrative on adaptation based on quantitative estimates.

**TABLE B.1: Estimate of adaptation needs**

Policy Area	Total cost (2020 US\$)	Total Cost (€)	Estimate
<b>RA1: DRM</b>	126.18 million	118.68 million	RA1.1 ~ €115,000 1) Cost inspiration from “To develop and implement policies for climate change – drafting of climate change document concept (€7,000) + drafting the law on Climate Change (€8,000)” = €15,000 in Action Plan on Climate Changes Strategy 2019-2021 2) €50,000 3) €50,000
			RA1.2 ~ €200,000
			RA1.3 ~ €100,000
			RA1.4 ~ €361,000 1) Programmes to strengthen and train communities = conceptualizing training plan (US\$15,000) + community forums + mentorship +training (US\$55,000 per year) *6 years=345,000 (from consultant’ experience) ~ €315,280 2) Multi-hazard EWS, including mobile phone alerts: Mobile phone alerts were piloted in Prespa within UNDP project, this activity cost ~ US\$50,000 ~ €45,681. Inspiration taken from North Macedonia Adaptation need costing.
			RA1.5 ~ €17.8 million 1) EU ASA 2 Bulgaria case study estimates. Integrated capacity building trainings for institutions and stakeholders—Bulgaria example (€90,000–€120,000 per year) national 2-day workshop for 150 participants: €20,000 to €30,000. NUTS-2 Regional 3-day workshops (a total of 6 events annually or 1 per NUTS-2 district) for 50 participants, including 5 hosting staff members: €70,000 to €90,000 online deep-dive trainings on technical topics: limited administrative costs for content preparation 2) Earthquake EWS—Earthquake early warning in Bucharest (€3.06 million) EU ASA 2 Bulgaria case study estimates; Public awareness raising and information campaigns—Bulgaria example (€370,000 to €680,000 per year)/ considering the highest range €680,000, mass media (TV and radio): €150,000 to €250,000 social media: €100,000 to €200,000 printed materials: €20,000 to €30,000, public events (talks/discussion groups/interactive activities) (1 per district per year): €100,000 to €200,000
			RA1.6: ~ €7.3 million
			RA1.7: Based on consultant’ analysis conducted for this CCDR ~ €92.8 million
<b>RA2: Urban</b>	4.1 million	3.82 million	RA2.2 €910,000
			RA2.4 Cost inspiration from the “Increasing of the central and local human capacities for Urban Sustainable Mobility Planning 2019, €10,000” in Action Plan on Climate Changes Strategy 2019-2021 pg. 65, €10,000
			RA2.7 €2.9 million
<b>RA3: Water</b>	1.073 billion	1.009 billion	RA3.2 €5 million
			RA3.3 3.7 million
			RA3.5 from Water Global Practice assessments: Investment needs of €1 billion to reduce non-revenue water levels from current 56 percent to EU average of 25 percent]

Policy Area	Total cost (2020 US\$)	Total Cost (€)	Estimate
<b>RA4: Forestry and diversity</b>	19.9 million	18.69 million	RA4.1 Calculated based on unit cost \$1.5 per ha in "Timber Certification: An Overview" <sup>141</sup> multiplied by 481000 ha of forests in Kosovo, then converted to ~ €670,000
			RA4.2 Based on the article <sup>142</sup> and consultation with Environment, Natural Resources, and the Blue Economy Global Practice (ENB GP) colleagues, €0.15 million
			RA4.3 Based on cost estimate for sustainable and adaptive forestry management in the Alps region. <sup>143</sup> €5 million
			RA4.4 Based on EU ASA 2 Bulgaria cost estimate for multi-level information campaigns for the public: €370,000 to €680,000 annually. Taking €500,000 (annual cost) for 25 years, ~ €12.5 million
			RA4.5 Based on consultant' experience, €370,000
<b>RA5: Agriculture</b>	628.4 million	591 million	RA5.1 World Bank Irrigation Kosovo Country Summary v 06+JAS-090220; KIMP Action Plan for capital expenditures (CAPEX) amount) pg. 14., €591 million
<b>RA6: Transport</b>	821.9 million	773 million	US\$64 million (€59 million) to reduce road network vulnerability + ~ US\$775 million (€714 million) in investments during 2024-30 to develop new resilient and green transport infrastructure. Combined total cost of ~ 1 percent of 2024-30 GDP
<b>RA7: Education, skills and labor markets</b>	32.64 million	30.7 million	RA7.7 [€2.3 million to €7 million] range provided by other Global Practice colleagues, ~ €7 million
			RA7.9 [€840,000 to €1.7 million] range provided by other Global Practice colleagues, ~ €1.7 million
			RA7.10 [€1.3 million to €8.6 million] range provided by other Global Practice colleagues, ~ €8.6 million
			RA7.11 [€2.5 million to €5 million] range provided by other Global Practice colleagues, ~ €5 million
			RA7.12 [€3.7 million to €8.4 million] range provided by other Global Practice colleagues, ~ €8.4 million
<b>RA8: Social Protection Systems</b>	114.83 million	108 million	RA8.4 Estimated by Social Protection Global Practice colleagues, €500,000
			RA8.5 Estimated by Social Protection Global Practice colleagues, €2 million
			RA8.6 Estimated by Social Protection Global Practice colleagues, €105 million
			RA8.7 Estimated by Social Protection Global Practice colleagues, €500,000
<b>RA9: Health system</b>	20.12 million	18.92 million	RA.9.1 Estimated by Health, Nutrition, and Population Global Practice colleagues, US\$100,000 ~ €89,270
			RA9.2 Estimated by Health, Nutrition, and Population Global Practice colleagues, US\$200,000 ~ €178,540
			RA9.3 Estimated by Health, Nutrition, and Population Global Practice colleagues, US\$15 million ~ €13.39 million
			RA9.4 Estimated by Health, Nutrition, and Population Global Practice colleagues, US\$800,000 ~ €714,150
			RA.9.5 Estimated by Health, Nutrition, and Population Global Practice colleagues, US\$5 million ~ €4.46 million
			RA9.6 Estimated by Health, Nutrition and Population Global Practice colleagues, US\$100,000 ~ €89,270

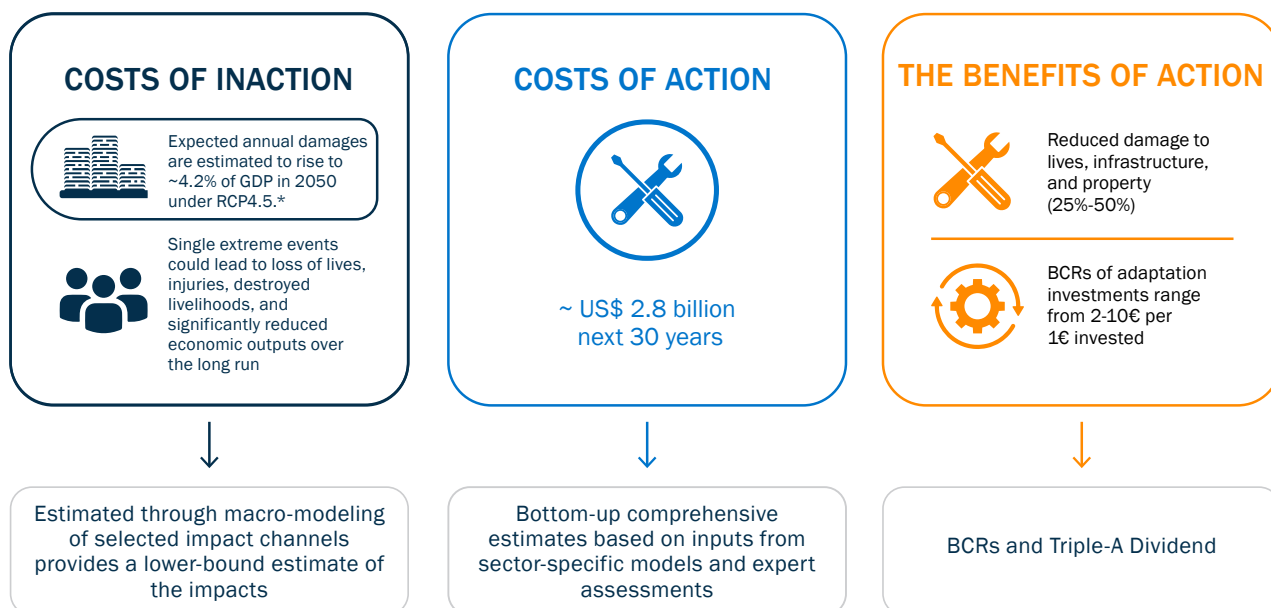
<sup>141</sup> Baharuddin Haji Ghazali. nd. Timber certification: an overview. <https://www.fao.org/3/v7850e/v7850e04.htm>.

<sup>142</sup> Edgaras Linkevičius, José G. Borges, Marie Doyle, Helga Pülzl, Eva-Maria Nordström, Harald Vacik, Vilis Brukas, Peter Biber, Meelis Teder, Paavo Kaimre, Michal Synek, Jordi Garcia-Gonzalo. 2019. "Linking forest policy issues and decision support tools in Europe." Forest Policy and Economics, Volume 103, Pages 4-16. <https://www.sciencedirect.com/science/article/pii/S1389934117304124>

<sup>143</sup> Müller M.M., Vilà-Vilardell L., Vacik H. 2020. Forest fires in the Alps-State of knowledge, future challenges and options for integrated fire management. EUSALP Action, Group 8, [https://www.researchgate.net/publication/339376546\\_Forest\\_fires\\_in\\_the\\_Alps\\_-\\_State\\_of\\_knowledge\\_future\\_challenges\\_and\\_options\\_for\\_an\\_integrated\\_fire\\_management\\_-\\_White\\_Paper\\_for\\_policy\\_makers](https://www.researchgate.net/publication/339376546_Forest_fires_in_the_Alps_-_State_of_knowledge_future_challenges_and_options_for_an_integrated_fire_management_-_White_Paper_for_policy_makers).



**FIGURE B.1. Summary of adaptation investment narrative**



Source: World Bank analysis

Note: GDP = gross domestic product, RCP = representative concentration pathway, BCR = benefit-cost ratio.

\* The macroeconomic model yields annual estimates for damages based on the expected annual loss from each climate hazard. The expected damages are projected to grow over time, reflecting increasingly unpredictable and volatile climate conditions. Combined damages from the drought impact on maize and wheat, heat stress on labor productivity, and riverine floods, are estimated to be 4.2 percent of GDP under RCP 4.5 in 2050 for Kosovo

**The business of modeling the effects of climate change—whether shocks or slower-moving stressors — on GDP is tricky.** The estimates are therefore grossly undervalued. But why is that? The channels via which impacts occur are difficult to account for in a comprehensive way. Additionally, EP (Exceedance Probability, or loss) curves carry large uncertainties that stem from uncertainties in climate and exposure data, especially when they are projected, together with the difficulty of calibrating vulnerabilities. Propagating these uncertainties through macro-modeling exercises would have been prohibitively expensive and complex for this CCDR. For instance, while overall flooding risks are expected to fall in the Western Balkans, the incidence of flash floods is expected to rise, and even though this is understood, propagating the joint uncertainty in impacts is already too expensive. More generally, modeling does not capture the impacts of certain extreme events. Wildfires are a case in point. Historical data rapidly become sparse as one goes back in time, impact channels are multifaceted and seldom well understood, and projections of the hazard in question are often yet to be tested. Modeling impacts at the annual level is next to impossible for highly nonlinear climate shifts whose dynamics are not yet fully captured in climate models—the hydrological cycle, for instance—and they yield large uncertainties, once again expensive to propagate. And finally, this CCDR demonstrates how climate hazards interact with and compound one another. Yet models, at best, capture dynamics critical to a particular climate hazard, thereby missing the complexity of the links among them. Modeling an example of a future with compound shocks is possible but capturing the breadth of uncertainty that accounts for the correlated risk is very difficult to do at the current stage. With examples from the region and a literature review that provide some information on the direction and magnitude of the uncertainties and the way certain hazards may interact, this CCDR offers some avenues to think through the enormity of the costs of inaction, and hints at solutions to the issue of uncertainty, including better data collection.

**This estimate is based on a comprehensive, bottom-up approach, with a clear (and verifiable) methodology, that brings immense value to clients grappling with similar issues.** Note that a large part of these investments are in hard infrastructure, and this cost could be reduced by developing more detailed feasibility studies, combining investments (EE and seismic), and improving building codes to higher standards to avoid retrofitting, which is generally more costly. Additionally, some of these investments—water systems efficiency,

irrigation schemes, social protection schemes, and so on—are in any case essential for the expansion of development sectors, the economy, and society. The benefits of these investments, grounded, are only very partially captured by the macro-modeling, which was estimated by hazard.

### **The benefits of action—The Triple Dividend**

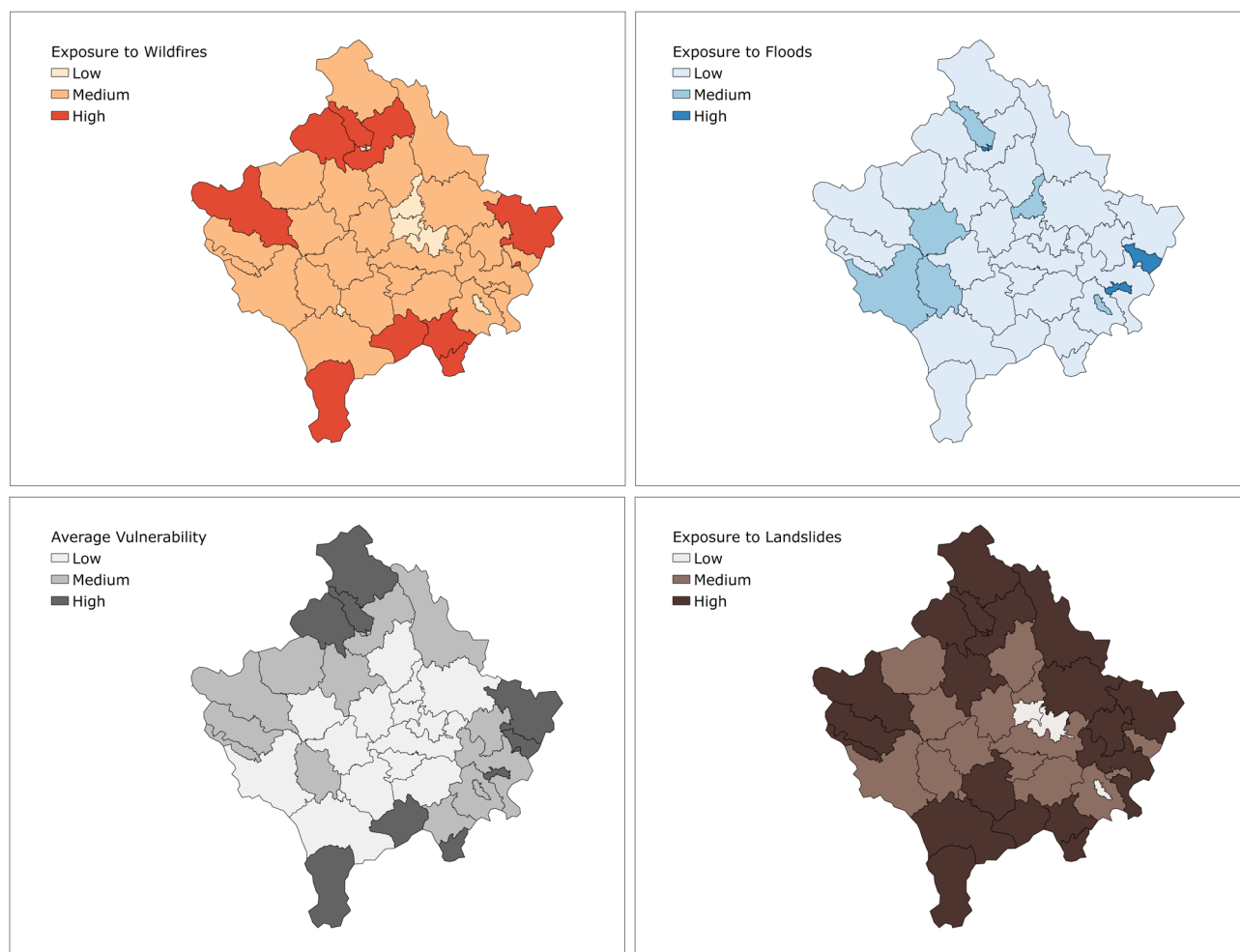
**Investing in adaptation can yield substantial social, economic, and environmental benefits that can be expressed through the Triple-A Dividend.** The Triple-A Dividend framework reconciles perspectives from the humanitarian, environmental, and economic fields (Figure B.1). It identifies three types of benefits: i) avoided losses and lives saved during a disaster or climate event; ii) accelerated economic potential as a result of stimulated investments and bolstered economic activities due to the reduction in background climate and disaster risks; and finally, iii) the amplified social and environmental co-benefits of adaptation investments.

**The urgency-of-action framework could also be applied to specific sectors, for which the costs of inaction numbers (that is, the damage done) are available and linked to specific hazards.** That exercise could be useful for sector-specific or ministry-level dialogue.

**Note that, except for costs of action that are between now and 2050, the estimates are for 2050 only, and for RCP 4.5 only.** The benefits of action in Figure B.1 are not fully captured by the macro-modeling exercise, which considers only certain channels and does not fully account for accelerated economic potential and co-benefits.

## Annex C. Exposure to hazards and socio-economic vulnerability on municipal level

FIGURE C.1: Overlapping vulnerabilities in Kosovar municipalities



Sources: World Bank, GHS-POP R2023A, OpenStreetMap, JBA, CIMA, ELSUS v2.

Note: Average vulnerability is measured as the arithmetic mean of 1–4 scores assigned to each municipality based on the quartiles of the distributions of 1. population growth/decline from 2000 to 2020, 2. access to markets. High flood exposure indicates a municipality's average raw depth of half a meter or higher for a flood event (fluvial or pluvial), with a 1 percent yearly probability of occurrence. Low flood exposure indicates a depth of less than 20 cm for a similar event. High wildfire risk represents an average municipality score of 3 or higher, based on CIMA's wildfire hazard grid, which assigns to each 100x100 m cell a score from 1 (very low) to 6 (very high). High landslide risk is similarly defined as an average municipality score of 3 or higher based on the ELSUS v2 landslide hazard grid, which assigns to each 200x200 m cell a score from 1 (very low) to 5 (very high). For both wildfires and landslides, low risk is defined as an average below 2.

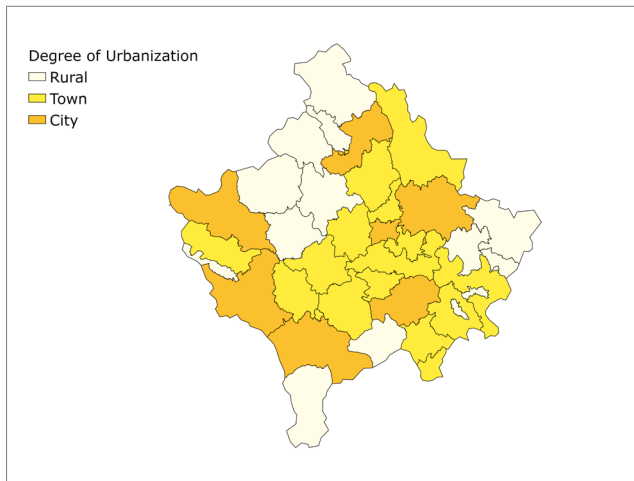
TABLE C.1: The most highly exposed municipalities ranked from highest to lowest exposure, by hazard type

Vulnerability	Kamenica, Ranilug / Ranillug, Zubin Potok, Laposavić, Štrpce, Dragash / Dragaš, Zvečan, Parteš, Elez Han
Floods	Parteš, Ranilug / Ranillug, North Mitrovica, Rahovec/Orahovac, Obiliq / Obilić, Zvečan, Klina, Gjakova, Klokot, Fushë, Kosovë / Kosovo Polje
Wildfires	Elez Han, Štrpce, Zubin Potok, Kaçanik, Zvečan, Dragash / Dragaš, Mitrovica, Kamenica, Peja, Deçan / Deçane
Landslides	Štrpce, Dragash / Dragaš, Laposavić, Zubin Potok, Junik, Prizren, Mitrovica, Zvečan, Kaçanik, Pristina

Sources: World Bank, GHS-POP R2023A, OpenStreetMap, JBA, CIMA, ELSUS v2.

Note: Includes socioeconomic vulnerability.

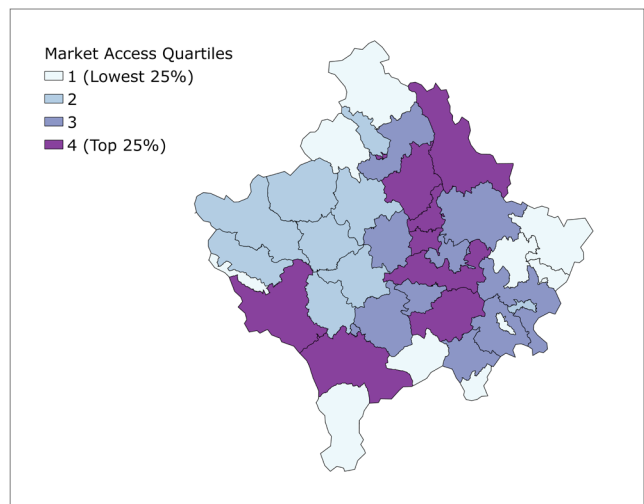
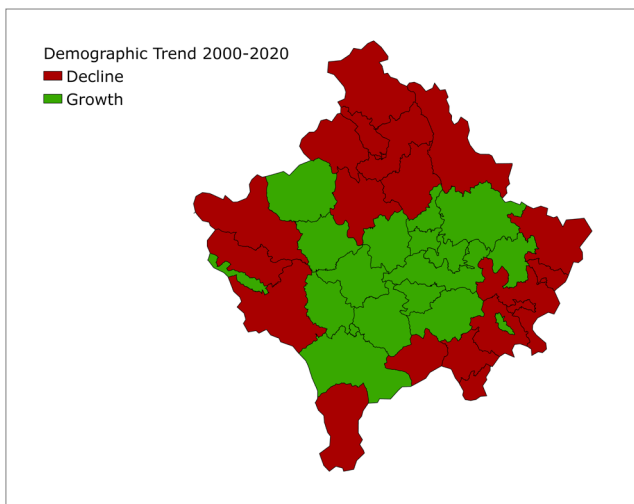
**FIGURE C.2: Degree of urbanization of Kosovar municipalities**



Sources: World Bank, GHS-POP R2023A

Note: The classification is based on the European Commission's Degree of Urbanization methodology, applied to the Global Human Settlement (GHS) 1 km<sup>2</sup> population grid. Cities are areas where more than 50 percent of the population live in an urban center (defined as a contiguous area with a minimum density of 1500 inhabitants per km<sup>2</sup> and a minimum population of 50,000 inhabitants). Towns are areas that do not meet the City classification threshold but where more than 50 percent of the population live in urban clusters (defined as contiguous areas with a minimum density of 300 inhabitants per km<sup>2</sup> and a minimum population of 5000 inhabitants).

**FIGURE C.3: The determinants of socioeconomic vulnerability**



Sources: World Bank, MONSTAT, GHS-POP R2023A, OpenStreetMap

Note: The figure shows the distribution of individual determinants of the average vulnerability measure. Market access is measured as the population potential using the routing distance in km from the centroid of the municipality to all urban areas (identified using the European Commission's definition of urban clusters) in 2020, restricted to only markets in the same country.

## Annex D. Macro model, growth scenarios and detailed mitigation results

**A structural macroeconomic model (MFMod) was used to model the impact of climate change on GDP and to assess its macroeconomic implications.** It models key variables in the economy such as national accounts, the balance of payments, labor markets variables, and financial sectors. The model estimates the economic and behavioral determinants of economic variables. The relationships are consistent with economic theory and the observed dynamics of the economy. The model traces the interactions between climate change and economic activity. The model was used to explore the impact of global climate scenarios selected (RCPs 2.6, 4.5 and 8.5) on each WB6 economy and to simulate aggregate economic effects of mitigation and adaptation investments in each economy through to 2050.

**The “Trend growth” and “optimistic growth” were two growth scenarios used to assess the impact of climate change on the Western Balkan economies.** Trend growth is a business-as-usual scenario, extending historical policy trends into the projection horizon to 2050. Growth is driven by production factors that are close to historical realizations; they ensure continuity of labor supply, investment, and productivity over the forecast horizon. Population projections are taken from the UN and follow the notion that all countries in the region face a long-term population decline due to aging and outmigration. Optimistic growth is built on the assumption that the convergence rate with EU per capita income will double by 2050 (relative to trend growth) due to accelerated structural reforms and increased access to EU funds for countries in the Western Balkan region. Structural reforms would boost productivity, close governance and institutional gaps, improve market competition and support private sector participation, and such reforms can help address labor market challenges and improve investment outcomes for the region. In addition, the transition to a low-carbon economy may itself lead to higher productivity and potential growth in the long-run. Reform efforts can be further supported with pre-accession funds that are becoming increasingly available to support the aspirations of the Western Balkan countries to join the EU. Table D.1 shows assumptions for the trend and optimistic growth scenarios for all the WB6 economies.

**TABLE D.1: Average annual GDP growth rates, 2025–50**

	Albania	Bosnia and Herzegovina	Kosovo	Montenegro	North	Serbia	WB6
<b>Trend growth</b>	1.5	2.2	2.6	1.7	1.5	1.7	1.9
<b>Optimistic growth</b>	3.2	4.4	4	4.1	4.2	4	4

**The macroeconomic impact of climate change was assessed relative to a baseline.** Each of the two growth scenarios was used to separately assess the impact of climate damages and adaptation investments, on the one hand, and mitigation efforts, on the other. For adaptation, the analysis looked at three specific damages, riverine floods, drought impact on maize and wheat production, and heat stress and its impact on GDP (and other macroeconomic variables) under the 3 RCPs, relative to historical occurrences of the damages. The historical occurrences comprised the baseline. The results in the report are presented as differences from the baseline.

**For the macroeconomic impact of mitigation, the reference scenario (RS) was used as a baseline.** For each growth scenario, a reference scenario (RS) level of energy demand was assessed, with commensurate levels of energy system investments. In addition, for the same level of energy demand, the net zero (NZE) scenario was developed, with commensurate levels of energy system investments, as output from the energy sector model. For each growth scenario, the incremental cost of the NZE scenario relative to the RS was assessed. Investment needs from the energy model were input into the macro model. The benefit of this approach is that it provides a comparison of the macroeconomic impact of the net zero transition for the same level of GDP (and energy demand) as the RS. The drawback of the approach is that it does not quantify higher order effects of a net zero transition, such as the development of new sectors or of additional exports, given the availability of the greener economy. Such higher order effects can be significant if they are accompanied by reforms that alleviate structural bottlenecks.

**Analysis of the macroeconomic impact of mitigation found small impacts of the net zero scenario on GDP per capita.** Table D.2 shows the differences in GDP per capita growth rates and the level of GDP per capita between the net zero and the RS for the six economies. Two findings are apparent. First, the differences between the two growth scenarios are small. Second, whether the impact is positive or negative for most countries depends on the year under consideration. The driver for the difference is largely the timing of the additional investments needed under the mitigation scenario and any need to replace existing capacity with new generation capacity. For the average growth rate of the WB6, one-half of the countries has a positive growth rate difference between the net zero and the RS for 2030 and 2040, although most have a negative difference in 2050. The levels of GDP per capita turn negative early in the projection horizon, but in most cases, the difference is less than one percent of GDP.

**TABLE D.2: Real GDP per capita: differences between NZE and RS scenarios 2030, 2040, and 2050**

Differences in growth rates (percentage points)						
	Trend growth			Optimistic growth		
	2030	2040	2050	2030	2040	2050
<b>Kosovo</b>	0.004	0.047	-0.002	0.013	0.043	0.030
<b>WB6 Avg.</b>	-0.013	-0.057	-0.170	-0.011	-0.125	-0.176
Differences in GDP levels (percent difference between NZE and RS)*						
	Trend growth			Optimistic growth		
	2030	2040	2050	2030	2040	2050
<b>Kosovo</b>	0.069	0.004	-0.122	-0.156	-0.459	-0.252
<b>WB6 Avg.</b>	-0.189	-0.360	-0.535	-0.352	-0.583	-0.603

Source: World Bank.

\* The changes in the level of GDP per capita are equivalent to changes in GDP or output as the population figure is the same in the NZE and RS scenarios; these terms are used interchangeably in the report when discussing the level impact of the transition.



