



EUROPE AND
CENTRAL ASIA

WESTERN BALKANS 6

World Bank Group

COUNTRY CLIMATE AND DEVELOPMENT REPORT

October 2024

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Acknowledgments

This Country Climate and Development Report (CCDR) is a collaborative effort of the World Bank, the International Finance Corporation (IFC), and the Multilateral Investment Guarantee Agency (MIGA), produced by a core team led by Katharina Gassner, Megha Mukim, and Christos Kostopoulos. Pablo Andres Salas Bravo led the IFC work and Gabisile Ndlovu and Seonyeong Son led the MIGA inputs. The climate adaptation work was coordinated by Solene Dengler, Luc Marius Jacques Bonnafous, Danielle Monsef Abboud and Giuseppe Rossitti. The mitigation work was coordinated by Claudio Protano, Elena Merle-Beral, Luiz Gabriel Sucrmont Rodrigues Simoes and Talis Mabito Tebecis. The macroeconomic aspects of the report were coordinated by Priscilla Kandoole with significant input from the macro modeling team and the country economists mentioned below. The core team also included Celestinah Temilade Odebunmi, Enock Seth Nyamador, Joni Baboci, Mustafa Copelj, Nerali Patel, Pavlina Zdraveva, Tianyu Zhang, and Varnitha Kurli.

This CCDR is underpinned by substantial modelling work that involved coordination among multiple teams. Energy modelling was conducted by Amit Kanudia, George Giannakidis and Rocco De Miglio from MRC Consultants, with support from Szilvia Doczi. Claire Nicolas, Maelle Baronnet and Thomas Nikolakakis conducted power sector modelling. Important contributions were received from Luis Blancas, Eduardo Espitia Echeverria and Raimund Mair on transport. New data and modelling was commissioned to gain insights on climate-related hazards, including from JBA Risk Management for floods, the Global Earthquake Model (GEM) Foundation for earthquakes, the International Center for Environmental Monitoring (CIMA) Research Foundation for wildfires, VITO NV for extreme heat, and the International Institute for Applied Systems Analysis (IIASA) for droughts. Macroeconomic modelling work was led by Charl Jooste and Thi Thanh Thanh Bui; they used the results from the energy and transport modeling and the modeling on climate-related hazards as an input into the macroeconomic structural models. The Western Balkan countries' economists Besart Myderrizi, Hilda Shijaku, Isolina Rossi, Joana Madjoska, Lazar Sestovic, Milan Lakicevic, Natasha Rovo, Sandra Hlivnjak, Sanja Madzarevic-Sujster, and Tihomir Stucka contributed to long term growth modelling and other macroeconomic aspects of the study. Distributional impact of the decarbonization was led by Victor Mylonas using the Climate Policy Assessment Tool (CPAT). Assessment of the co-benefits of the decarbonization was undertaken by Paulina Estela Schulz Antipa, Faustyna Gawryluk, Ira Dorband with support from Weronika Celniak also using the CPAT. Penelope Ann Mealy and Esther G. Naikal led the work using the Green Transition Navigator; Euijin Jung, Aleksandar Stojanov and Pranidhi Sawhney prepared a background note on trade and climate.

In addition, essential analytical work was conducted by the following sectoral teams. Important contributions were received from Raimund Mair, Natalia Limones Rodriguez, Regassa Ensermu, Fan Zhang and Vera Kehayova for water; from Augusto Garcia, Irina I. Klytchnikova, Sergiy Zorya, Teklu Tesfaye, Fang Zhang and Xueling Li for agriculture; Neeta Hooda, Sameer Akbar, and Sasa Eichberger for environment, biodiversity, and forestry; Valerie Morrica, Sangeeta Kumari, Dianna Pizzaro, and Luiza Nora for social sustainability and inclusion; Henrike Brecht, Guillermo Siercke, Axel Baumler, Yondela Silimela, Paul Scott Prettitore, and Caleb Travis Johnson for urban, resilience and land. Private and financial sector assessments were contributed by Alper Ahmet Oguz, Milica Nikolic, Marc Schiffbauer, Ana Goicoechea, Stefka Slavova, Charis Lypiridis, Magdalena Soljakova, Gianfilippo Carboni, Bodin Bulatovic, Levent Karadayi, Gabisile Ndlovu, Susan Josefina Vasquez Plasencia, Bexi Francina Jimenez Mota, Seonyeong Son, Tatiana Skalon, Ehab Adel Samir Tawfik, Maja Andjelkovic, Vladimir Hrle, Milos Milivojevic, Thea Louise Jung and Vahe Vardanyan. On poverty, the report was supported by Zurab Sajaia, Leonardo Lucchetti, Alexandru Cojocar, and Anna Fruttero. Stefan Apfalter, supported by Francis Ralambotsiferana Ratsimbazafy, Dusko Vasiljevic, Mariem Malouche, and Antoine Coste, provided input on state-owned enterprises using the Businesses of State database. The report benefitted from six rapid Climate Change Institutional Assessments led by Kai Kaiser and contributed by Zoran Kapor. Marissa Santikarn provided inputs on carbon pricing and CBAM.

The human development (HD) work was coordinated by Indhira Santos and led by Tigran Shmis (Education), Predrag Djukic (Health), and Sarah Coll-Black, Alicia Marguerie, and Daniel Garrote Sanchez (Social Protection and Jobs). The HD team benefitted from input provided by Catherine Fitzgibbon, Renata Gukovas (Social

Protection and Jobs), Domagoj Racic (Education), Muloongo Simuzingili (Health), and HD country teams in all Western Balkan countries. The CCDR team also benefitted greatly from strategic inputs provided by Ede Ijjasz-Vasquez.

Detailed feedback and suggestions were received from peer reviewers Ani Balabanyan, Daniel Navia Simon, Ivana Fernandez Duarte, Jas Singh (with contributions from Raimund Malischek), Nancy Lozano Garcia, Wolfhart Pohl and Yue Man Lee. Helpful comments at various stages were also received from teams represented by Ahmadou Moustapha Ndiaye, Alberto Rodriguez, Carolina Monsalve, Craig Meisner, Damian Brett, Dena Ringold, Elizabeth Ruppert Bulmer, Fan Zhang, Kevin Carey, Luiza Nora, Michael Stanley, Pablo Fajnzylber, Paulo De Sa, Rhedon Begolli, Sebastian Molineus, Stephane Hallegatte, Tamara Babayan, Ulrike Lehr, Yuriy Myroshnychenko, Armin Ridzalovic, Laureta Qorlazja, Visar Perani, and many others.

The CCDR benefitted from the feedback received from the governments, private sector stakeholders, academia, and civil society organizations during the consultation events organized in each of the six countries in January - May 2024. Filip Kochan and communication teams in WB6 country offices coordinated consultation, communication, and dissemination activities.

The CCDR was prepared under the leadership of Antonella Bassani, Xiaoqing Yu, Sameh Naguib Wahba, Charles Cormier, Asad Alam, Fadia Saadah, Lalita M. Moorthy, Ary Naim, Nicolas Marquier and Rana Karadsheh. Managerial guidance was provided by Christopher Sheldon, Emanuel Salina, Massimiliano Paolucci, Nicola Pontara, Jasmin Chakeri, Sudeshna Ghosh Banerjee, Stephanie Gil, Christoph Pusch, with inputs from Ramon Munoz-Raskin, Simon Ellis, Richard Record, Indhira Santos and Nathalie Lahire. The team is particularly grateful to Thomas Farole who provided outstanding guidance and support throughout the CCDR process.

The team is grateful for excellent research support from Daniel Mayr, Eda Belgin Abedin, and Senjuty Bhowmik, as well as administrative support received from Bisera Nurkovic, Dragana Varevic, Luan Aliu, Nejme Kotere, Mjellma Rrecaj, Odeta Bulo, Paula Blanco, Sanja Tanic and Valentina Aleksic. Mary Fisk and the GCSTI English Team edited the report, and Vladimir Mirzoyev provided the graphic design.

Abbreviations

3T	Transversal, Transboundary, Targeted	EE	Energy Efficiency
AAL	Annual Average Loss	EG	Environmental Goods
AFIR	Alternative Fuels Infrastructure Regulation	EGD	Eu Green Deal
AKIS	Agriculture Knowledge And Information Innovation Systems	EMS	Elektromreža Srbije
ALB	Albania	EPI	Economic Policy Institute
APC	Air Pollution Control	ES	Executive Summary
APS	Announced Pledges Scenario	ESG	Environmental, Social, And Governance
BCR	Benefit-Cost Ratio	ETS	Emissions Trading System
BiH	Bosnia And Herzegovina	ETSAP	Energy Technology Systems Analysis Program
BOS	Businesses Of The State	EU	European Union
CAF	Cancun Adaptation Framework	EU-27	The 27 Countries of the EU
CAP	Common Agricultural Policy	€	Euros
CAPEX	Capital Expenditure	EV	Electric Vehicle
CBAM	Carbon Border Adjustment Mechanism	EWS	Early Warning Systems
CCA	Climate Change Adaptation	FCS	Fragile And Conflict-Affected States
CCDR	Country Climate and Development Reports	FDI	Foreign Direct Investment
CCGTs	Combined-Cycle Gas Turbines	GAWB	Green Agenda for the Western Balkans
CCIA	Climate Change Institutional Assessment	GDP	Gross Domestic Product
CCS	Carbon Capture and Storage	GHG	Greenhouse Gas
CEMs	Country Economic Memoranda	GSS	Green, Social, and Sustainable Bonds
C-MFMod	Macro-Structural Model with Climate Module	GW	Gigawatt
CO₂	Carbon Dioxide	ICE	Internal Combustion Engine
CP	Contracting Parties to the Energy Community	ICPDR	International Commission for the Protection of the Danube River
CPAT	Climate Policy Assessment Tool	IEA	International Energy Agency
CPRS	Climate Policy Relevant Sectors	IFIs	International Financial Institutions
CSA	Climate Smart Agriculture	IPA	Instrument for Pre-Accession Assistance
DMCSEE	Drought Management Centre for South-East Europe	IPARD	Eu-Funded Program for Pre-Accession Assistance in Rural Development
DRF	Disaster Risk Financing	IPCC	Intergovernmental Panel on Climate Change
DRM	Disaster Risk Management	IPPU	Industrial Processes and Product Use
DTF	Drina Task Force	IRR	Internal Rate of Return
EBRD	European Bank for Reconstruction and Development	ISRBC	International Sava River Basin Commission
EC	European Council	IWT	Inland Water Transport
ECA	Europe and Central Asia	JT	Just Transition
ECP	European Climate Pact	KINESYS-WB6	Knowledge-Based Investigation of Energy System Scenarios for the WB6

LCU	Local Currency Units
LSG	Local Self-Government
LT-LEDS	Long-Term Low-Emission Development Pathways
LULUCF	Land Use, Land-Use Change and Forestry
LURA	Land Use and Repurposing Assessment
MDP	Municipal Development Plan
MKD	North Macedonia
MNE	Montenegro
MRV	Monitoring, Reporting, and Verification (Of Ghg Emissions)
MtCO₂eq	Million Tons of Co ₂ Equivalent
MW	Megawatts
NAP	National Adaptation Plan
NAS	National Adaptation Strategies
NDC	Nationally Determined Contribution
NECP	National Energy and Climate Plan
NPV	Net Present Value
NTC	Net Transfer Capacity
NZE	Net-Zero Emissions Scenario
NZE-HG	Net-Zero Emissions Scenario with Higher Growth
OECD	Organization for Economic Co-Operation and Development
OFA	One-Off Financial Assistance
OPEX	Operational Expenditure
PISA	Programme for International Student Assessment
PM	Particulate Matter
PP	Percentage Points
PPCA	Powering Past Coal Alliance
PPP	Public-Private Partnership
PPP	Purchasing Power Parity
PSD	Privates Sector Development
PV	Photovoltaic
R2R	Ready2respond Diagnostic
RCC	Regional Cooperation Council
RCP	Representative Concentration Pathway

RE	Renewable Energy
REP	Renewable Energy Plant
RES	Renewable Energy Sources
RS	Reference Scenario
SEECAO	Central Allocation Office for Southeastern Europe
SME	Small and Medium Enterprises
SNG	Subnational Governments
SOE	State-Owned Enterprise
SP	Social Protection
SRB	Serbia
SSA	Stabilization and Association Agreements
STEM	Science Technology Engineering Mathematics
TEN-T	Trans-European Transport Network
TPP	Thermal Power Plant
TSO	Transmission System Operators
TVET	Technical and Vocational Education and Training
UHI	Urban Heat Island
UMICs	Upper-Middle-Income Countries
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
US\$	United States Dollar
VAT	Value Added Tax
WAM	With Additional Measures
WB	World Bank
WB6	Six Western Balkan Countries (Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia)
WBG	World Bank Group
WEM	With Existing Measures
WHO	World Health Organization
XKX	Kosovo

Executive Summary

The Western Balkans (WB6) comprise six upper-middle-income economies (Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia) that have performed well over the past 20 years. The six economies doubled their output from 2000–22 and raised their per capita income commensurately. The WB6 are small, open economies, with expanding trade and significant levels of foreign direct investment (FDI) and remittances. About 73 percent of the Western Balkan’s exports went to the European Union (EU), and 68 percent of their imports came from the EU.

Surrounded by EU countries, the WB6 set their sights squarely on the EU as an anchor for their future development, and they are at various stages of accession to the EU or application for membership. In November 2023, the EU announced a new growth plan for the Western Balkans, based on enhancing economic integration with the EU’s Single Market, boosting economic integration within the WB6 through the Common Regional Market, accelerating fundamental reforms, and increasing financial assistance. In the presence of climate-change related challenges, the EU’s role as an anchor for WB6 development becomes even more important, because it plays an important role in establishing the institutional foundations for greener and more resilient growth and for making resources available.

This Regional Western Balkans Countries Climate and Development Report (CCDR) stands out in several ways. In a region that often lacks cohesive regional alliances, this report emphasizes how the challenges faced across countries are often common and interconnected, and, importantly, that climate action requires coordination on multiple fronts. Simultaneously, it illustrates the differences across countries, places, and people that require targeted strategies and interventions. This report demonstrates how shocks and stressors are intensifying and how investments in adaptation could bring significant benefits in the form of avoided losses, accelerated economic potential, and amplified social and economic spillovers. Given the region’s high emission and energy intensity and the limitations of its current fossil fuel-based development model, the report articulates a path to greener and more resilient growth, a path that is more consistent with the aspiration of accession to the EU. The report finds that the net zero transition can be undertaken without compromising the economic potential of the Western Balkans and that it could lead to higher growth than under the Reference Scenario (RS) with appropriate structural reforms.

The policy recommendations in this report are ambitious, but they are realistic and realizable. This report categorizes recommended policies according to the 3T framework: transversal, transboundary, and targeted policies. **Transversal policies** can help integrate adaptation and mitigation efforts across various sectors requiring high-level coordination mechanisms, strengthened institutional capacity, and the establishment of climate-focused agencies or commissions. **Transboundary policies** are needed to foster cooperation across borders, acknowledging the interplay among climate change, trade, human security, and shared natural resources. **Targeted policies** tailor solutions to local conditions, drive technological and economic transitions, and ensure that no one is left behind in the transition.

The region is in the crosshairs of a burgeoning climate crisis

The Western Balkans have seen a surge in heat-related stressors—mainly heightened temperatures and intensified droughts—that threaten to undermine regional stability and productivity. The average temperature for the region increased by 1.2°C compared to 1961–80, while precipitation decreased by 0.2 percent. The impacts of extreme heat on health and productivity are expected to be high in the region, with heat-related deaths 5–10 percent higher by 2100.

The region will see increased volatility and unpredictability in wildfires, flash floods, and landslides. The variability in rainfall increases the potential for flash floods, which, along with other flood events, have caused significant damage and fatalities in recent years. Wildfires are on the rise, and warming temperatures, reduced precipitation, and unsustainable land management practices contribute to their frequency and intensity. Landslides are becoming more common due to melting snow, glacial retreat, heavy rains, and wildfires. The region’s geological makeup and urban expansion on steep slopes elevate the risks of landslides. The earthquake risk, although unrelated to climate change, exacerbates climate hazards and poses substantial financial threats.

The countries face a constellation of climate hazards that interact in complex and compounding ways.

Due to the interconnectedness of critical infrastructure, climate hazards risk setting off chain reactions across sectors or communities. Wildfires in agricultural regions increase urban air pollution and affect the food system, disrupting the supply and prices of essential food. The regions struggle with waste management further complicates matters, intensifying climate hazards and contributing to climate change, as exemplified by landfill fires spreading wildfires, highly toxic chemical releases, and unsustainable animal byproduct management increasing methane emissions. These complex interactions necessitate a comprehensive approach to resilience management.

The effects of climate-related shocks and stressors can be highly localized, often in vulnerable communities.

Climate hazards overlap with existing vulnerabilities such as demographic decline, isolation from economic activity, lack of urbanization, and low economic productivity. For instance, floods, landslides, and wildfires disproportionately affect declining and isolated regions. Already marginalized groups such as the Roma community in the Western Balkans might suffer disproportionately because it often faces higher exposure to climate and environmental hazards due to discriminatory practices, leading to overcrowded and underserved neighborhoods. Special attention must also be given to other vulnerable groups, such as the elderly, disabled, and children, who are disproportionately affected by the impacts of climate change due to their unique physiology.

Agriculture is particularly exposed as a major economic sector that needs modernization.

Increasing average temperatures and vulnerability to drought are significant concerns, particularly in the agriculture sector, where crops like maize and wheat face yield reductions, primarily affecting countries with a high agricultural GDP share. Droughts also strain water and food security due to yield fluctuations and deficiencies in irrigation and water management. Beyond droughts, floods, landslides, extreme heat, and wildfires all affect the sector either through impacts on crop yields and growing seasons, workers, or infrastructure and livestock.

Cities offer potential for growth, but they are squandering their potential.

Despite declining populations, urban sprawl is growing, hindering economic efficiency and increasing exposure to climate hazards. Sprawl often requires the development of previously green areas, which exacerbates the effects of urban heat islands. Sprawling cities also require longer commutes and generate increased usage of private vehicles. Sprawl also makes cities less resilient; in the region, the expansion of urban footprints has led to increased exposure to floods, landslides, and wildfires.

Climate change will bring output losses, though these are expected to vary across countries, with a disproportionate impact on Bosnia and Herzegovina and Serbia

The Western Balkan economies will be subject to varying degrees of economy-wide damages from climate hazards.

Based on an analysis of three hazards—riverine floods, droughts (via the impact on maize and wheat), and heat stress (via the impact on labor)—Serbia is expected to experience the most significant damages from climate hazards under RCP 4.5 and trend growth, followed by Bosnia and Herzegovina. Riverine floods are expected to cause the most significant damage to GDP in all countries, ranging from about 15 percent loss in 2050 GDP for Serbia and about 3 percent of GDP loss for North Macedonia under trend growth. Similarly, with a warmer climate and prolonged climate action (progressing from RCP 2.6 to RCP 8.5), the GDP impact of labor heat stress increases. The impact of droughts, modeled through their impact on maize and wheat production, appears to be small given that these crops make up a small share of the agricultural output of most of the WB6, and despite the fact that droughts are generally considered to be a significant climate risk. Higher growth can offset some of the expected damage across most of the region. The exception is Serbia, where damages from floods are stronger under the optimistic growth scenario due to greater capital intensity of that scenario relative to the trend scenario. Earthquakes, although not a climate change risk, are assessed and are expected to cause significant output damages, given historical seismic hazards in the region. For Albania, the loss in 2050 GDP is 15.7 percent of that year's GDP under trend growth. For the other WB6 countries, the losses are expected to be about one-third the size of Albania's as a percentage of GDP.

Damages from climate risks can be alleviated through adaptation investments and early interventions.

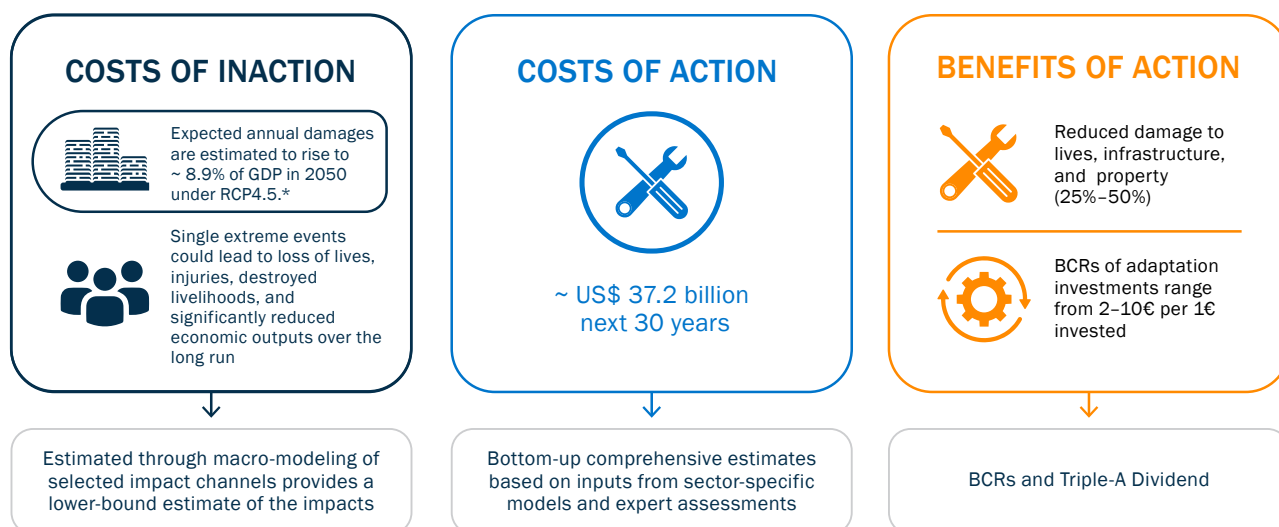
Modeling the impact of adaptation investments for the three hazards (riverine floods, droughts via the impact on maize and wheat, and heat stress) showed that annual investments averaging 1.3 percent of GDP across the region for 2025–50 could yield an average annual benefit of 1.7 percent of GDP and a benefit to cost (BCR) ratio of 1.6. The total investment for the three hazards comes to \$76.4 billion (in 2020 US\$) undiscounted or

\$34.9 billion discounted at 6 percent. This assessment accounts for the direct impacts on GDP, but it excludes impacts linked to loss avoidance, labor market transformation, or indirect benefits from follow-up investments or social and environmental co-benefits. In the modeling, some countries obtain larger BCRs, while others have ratios less than one; this finding suggests a need to finetune the investment package used in the modeling as well as, from a practical perspective, to exercise caution on project selection. The costs of adaptation investments are high, and if borne by governments alone, these costs lead to large increases in public debt. Thus, households and firms must also make adaptation investments. Crucially, frontloading investments is associated with larger payoffs in the outer years of the projection horizon.

Adaptation measures come with the triple dividend of avoided losses, accelerated economic potential, and amplified co-benefits

The costs of adaptation are high—although the benefits are even higher.¹ To counter the growing risks linked to climate change, WB6 countries will need to consider large investments in adaptation—investments that will come with significant benefits (Figure ES-1). An analysis of an initial, comprehensive multi sectoral adaptation investment package was completed based on data gathered from local documents, literature, and expert knowledge.² The undiscounted costs (expressed in 2020 US\$) of proposed policy actions and investments for an initial adaptation package following this approach in the six Western Balkan countries include, US\$6.0 billion (Albania), US\$6.8 billion (Bosnia and Herzegovina), US\$2.8 billion (Kosovo), US\$5.7 billion (Montenegro), US\$6.4 billion (North Macedonia), and US\$9.5 billion (Serbia). Multiple sources of information were used to estimate the needs of each country. The total for the region comes to \$37.2 billion (in 2020 US\$) undiscounted. A literature search revealed BCRs ranging from 1 to more than 100. It is important to note that modeling the economic impacts of climate change is highly complex, as explored in Box ES1-1.

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 8.9 percent of GDP under RCP 4.5 in 2050 for the Western Balkans, based on the simple average of the combined damages for each of the six countries. An alternative approach reflecting the weighted average of climate damages for the six countries (using 2050 GDP as weights) and also the impact of earthquakes yields expected damages from climate change and earthquakes of 16.8 percent of GDP in 2050.

¹ To both use the capacity of macro modelling to inform policy making on adaptation, and ground this report in reality, a double effort was made to assess to adaptation needs. First, adaptation needs for selected impact channels and related impacts and costs for riverine floods, drought and heat were modelled, and used as inputs to the macro modeling. This exercise provided a lower bound for impacts without adaptation (due to uncertainties and the inclusion of only selected impact channels), a lower bound estimate of the benefits and benefit-cost ratio of action on adaptation (not accounting for growth impacts beyond risk reduction, or co-benefits. Second, an effort was made to gather precise adaptation needs for an initial package from an exercise based on national policy documents and expert knowledge. This enabled the team to estimate somewhat exhaustively initial adaptation needs, in an undiscounted manner.

² Country/sector investment need assessment by CCDR team.

BOX ES-1: DO MODELS DO JUSTICE TO CLIMATE SHOCKS?

The business of modeling the effects of climate change on the economy is tricky because of data limitations and because modeling of climate impacts, biophysical and economic, is evolving. The impacts of a changing climate are nonlinear, and aggregate measures mask the full extent of impacts from single events. Also, impact channels are often not well understood. This complexity means that modeling quickly becomes prohibitively computationally expensive. Further, climate hazards compound and interact, causing events that may not have been observed historically. Even with these caveats, modeling remains a major tool to guide policy making. Current efforts to bridge the gaps between climate science and this discipline—to which CCDRs will participate as a co-benefit—are already leading to clarity that no single perspective can provide alone.

Embracing the challenges of a changing climate can open a world of opportunities, neatly captured by the Triple Dividend of Resilience, suggesting that investing in adaptation could lead to transformation.

The triple dividend encompasses three returns: avoided losses, accelerated economic potential, and amplified social and environmental spillovers.

- 1. The avoided losses dividend** refers to the fact that investing in climate adaptation saves lives, minimizes property losses and damage, protects human capital investments, and curtails productivity and financial losses resulting from climate change and natural disasters. Structural adaptation measures in Bosnia and Herzegovina show positive BCRs, ranging from 1.06 to 14.15, and illustrating the profound impact that such investments can have. This perspective encourages a view of climate adaptation as an intelligent, life-saving investment rather than an expense.
- 2. The accelerated economic potential dividend** refers to unleashing economic growth, job creation, and development from adaptation investments. By reducing climate risks, these investments stimulate business activity, facilitate human capital development, attract capital investment, and bolster labor productivity. In the Western Balkans, adaptation measures in key sectors such as forestry and tourism yield high BCRs, indicating the potential for substantial economic returns and new business opportunities. Adaptation investments can be a precursor to employment growth, improvement of skills, and increased trade opportunities, further bolstering the case for a proactive approach to climate resilience.
- 3. The amplified social and environmental co-benefits dividend** refers to benefits beyond economic or financial returns. These co-benefits include improvements in energy efficiency, aesthetics, agricultural sustainability, and ecological diversity. Nature-based water and forest management measures have consistently shown favorable BCRs. Urban adaptation strategies can also enhance the well-being of communities and create more sustainable and climate-resilient cities. Green and climate-smart urban designs, like green roofs and public parks, often yield high net benefits, due to their capacity to reduce greenhouse gas emissions (GHGs), enhance energy efficiency, and promote biodiversity. In the Western Balkans, investments in critical infrastructure and retrofitting of public buildings for climate-resilience and energy efficiency yield substantial positive returns.

WB6 countries need to equitably share the burden of adaptation across their economies and societies.

Equitable sharing of the cost of adaptation within each Western Balkan economy would encourage risk sharing and avoid moral hazard problems. Transparent policies will be required to allocate responsibility for adaptation among governments, households, and firms. Financing mechanisms will be required to match needs and affordability. Importantly, financing from international donors and the EU will also be essential to alleviate domestic financing constraints.

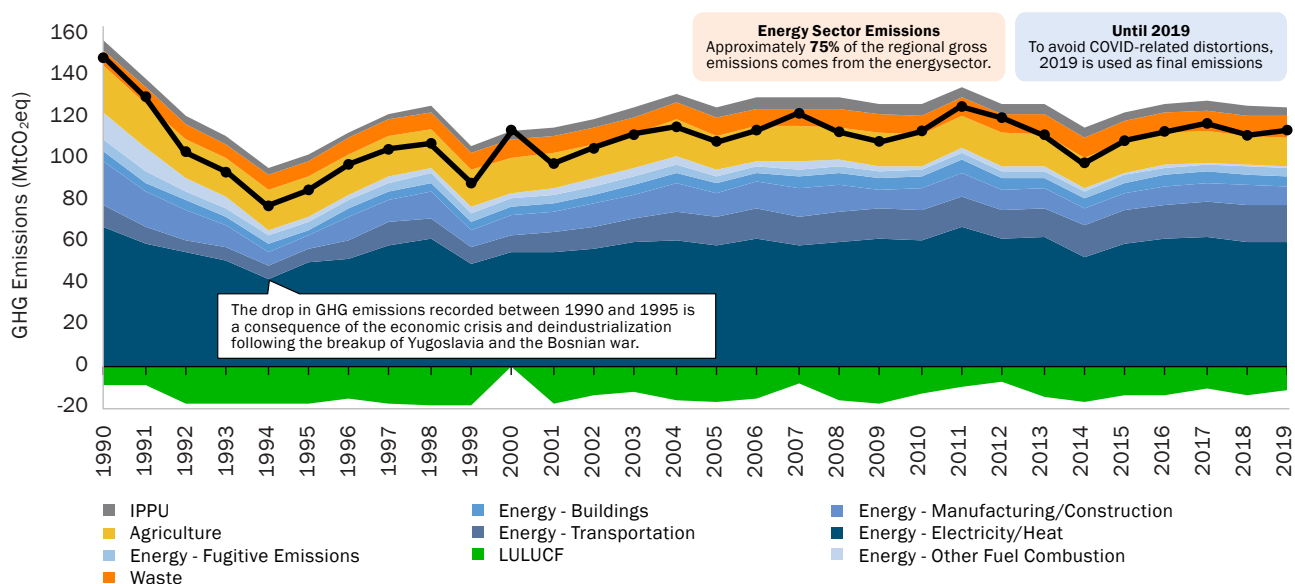
Decarbonization is required to meet emissions commitments, seize the opportunity for greener growth, reduce environmental pollution, and enhance energy security

The green transition offers an opportunity to counter some of the challenges posed by climate change.

The global economy and the EU are investing in green technologies that reduce the cost of energy, increase energy efficiency, improve public health from lower pollution (and bring productivity gains), and create large investment opportunities in burgeoning sectors. For the Western Balkans, the opportunities to adopt and diffuse these technologies and to benefit from them are significant because (1) there are substantial opportunities to reduce emissions and (2) because the EU offers financing and investment opportunities to Accession and pre-Accession countries.

In fact, as revealed by the GHG emissions profiles, the Western Balkans face the challenge of high emission and energy intensity and the need for decarbonization in the energy sector. Approximately 75 percent of regional GHG emissions come from energy supply and use (refer to Figure ES-2), which highlights an opportunity for significant decarbonization, particularly in the power/heat and transport sectors. In addition to reducing emissions and mitigating climate change, decarbonization has the potential to improve air quality, enhance energy security, and create long-term economic benefits. The Western Balkans maintain some explicit subsidies (averaging 1 percent of GDP in 2020) and very large implicit subsidies (coming mainly from the impact of coal production on local pollution and the climate, amounting to more than 6 percent of GDP).

FIGURE ES-2: WB6 GHG EMISSIONS BETWEEN 1990 AND 2019



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

If the WB6 continue with current plans, they would achieve only limited progress on climate change mitigation under the RS.³ According to detailed energy modeling, by 2050, the WB6's GHG emissions would remain stubbornly high, as their economies would still rely heavily on fossil fuels. Economy-wide GHG emissions for the WB6 countries would plateau at about 126 MtCO₂eq by 2050, about 10–15 percent higher than today. The energy mix would remain relatively unchanged until 2050, with limited penetration of renewable energy (RE) sources. The RS, however, is not a viable scenario for a sustainable development of the WB6 countries' energy sectors, because it does not take into account the negative environmental and health externalities of a continued reliance on coal and other fossil fuels, the financial and energy security risks of a lack of diversification

³ 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.

in the energy supply mix, the negative impacts on the competitiveness, and the foregone productivity gains of the WB6 economies and the EU integration process.

Achieving economy-wide, net zero GHG emissions by 2050 would require a complete transformation of the power system (refer to Figure ES-3). In the least-cost, net-zero emissions scenario (NZE),⁴ the power sector would have to undergo radical changes, with a shift to renewable energy sources and the phaseout of coal plants. In 2050, solar and wind would represent 68 percent of total installed capacity and 61 percent of total generation across the WB6; battery storage and hydro would account for 25 percent of capacity and 31 percent of generation. Combined-cycle gas turbines and biomass-fired plants with and without carbon capture and storage (CCS) would be responsible for the rest. Coal generation would be almost fully phased out already by 2040 in all countries. Coal phaseout should happen gradually, starting from the assets that are financially unviable or fully depreciated, and will require a careful management of a broader set of environmental, social, and economic issues. Carbon pricing mechanisms can play a pivotal role in the energy transition, incentivizing clean energy investments while raising revenue that can be used to support vulnerable communities.

Scaling up renewable energy investment in the Western Balkans requires coordinated action on several fronts. As the region moves toward EU integration, key upcoming reforms include the adoption of an ETS, carbon pricing coordination to limit the impact of the Carbon Border Adjustment Mechanism (CBAM), and harmonization of the power sector legal and regulatory frameworks for integration with the pan-European electricity market. In addition, the region needs a coordinated green finance strategy aligned with the EU Sustainable Finance Framework. Consequently, having a clear, coordinated, and consistent financial and energy markets reform plan will be crucial for boosting confidence among investors to scale-up renewable energy investment in the region.

Higher levels of regional power sector integration within the WB6 would allow the six countries to reduce total power system costs and integrate higher amounts of RE capacity into their grids, while reducing the need for gas-fired capacity and battery storage. Analysis showed that by sharing capacity and operational reserves and allowing higher levels of import from neighboring countries, the WB6 could reduce total discounted power system costs by about US\$2.7 billion (or 3.4 percent) and integrate an additional 4 GW of RE to 2050, compared to an NZE scenario without regional integration. Achieving this would require strengthening cross-border transmission capacity, as well as stepping up efforts to harmonize power sector legal and regulatory frameworks and overcome existing political barriers.

For energy end-use sectors, achieving net zero would require significant energy efficiency improvements and the large-scale use of electricity and zero carbon energy carriers. Although a large share of electricity generation in WB6 still comes from coal, accelerating the electrification of end-use sectors would be a sensible policy choice because it would allow the WB6 to reap the benefits of the rapidly growing share of renewables, as well as more energy efficient technologies. More specifically:

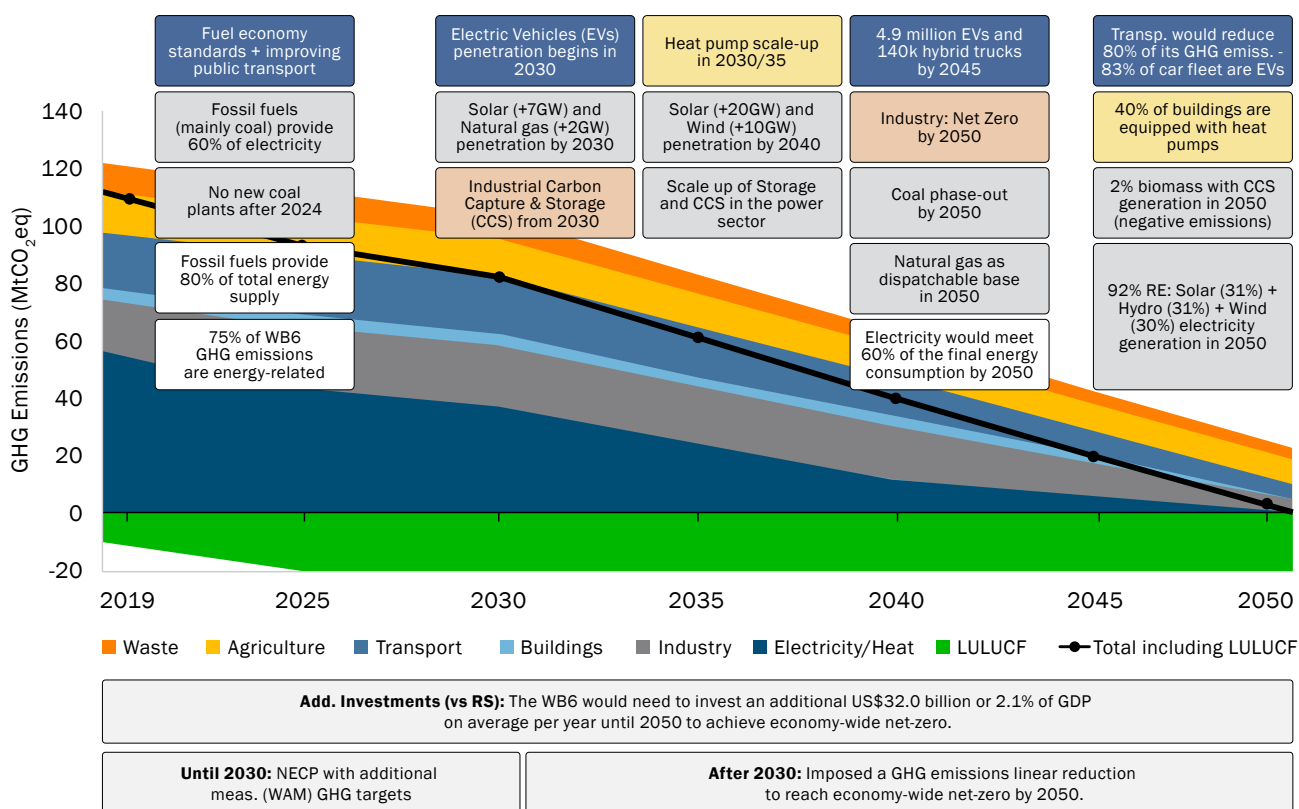
- **Decarbonization in the transport sector** would involve the following: (1) reducing demand for motorized transport (*Avoid*); (2) shifting to more sustainable modes (*Shift*) through the scale-up of investments in rail networks, regional rail integration, and public transit systems; and (3) adopting more energy-efficient vehicles that run on cleaner fuels (*Improve*), especially electric vehicles, both for passenger and freight transport.
- **Decarbonization in the buildings sector** would require further energy efficiency improvements combined with electrification of heating and the switch to cleaner heating sources. In the NZE, building insulation measures would help reduce final energy demand for space heating by almost 30 percent by 2050, compared to projected consumption trends.

⁴ Quantity-constrained least-cost scenario that assumes that the WB6 countries will achieve economy-wide, net zero GHG emissions by 2050.

- **Decarbonization in the industrial sector** would involve efficiency enhancements, the substitution of coal and oil with natural gas, the electrification of low-temperature processes, and the adoption of CCS solutions. The implementation of energy efficiency measures could reduce energy demand in this sector by almost 10 percent in 2050 in the NZE, compared to the RS. After 2035, in the NZE, CCS would become economically viable and would be implemented to capture GHG emissions coming from industrial and fermentation processes.

Stepping up GHG emissions reduction efforts in the non-energy sectors could reduce the need to resort to decarbonization solutions with a higher abatement cost in energy-related sectors. The WB6 countries should focus on reducing direct methane emissions from agriculture and improving the carbon sink potential of forests. The establishment of a well-performing waste management system would be essential to curb methane emissions and to make the waste sector more resilient to climate-related shocks.

FIGURE ES-3: KEY ENERGY SECTOR MILESTONES TO ACHIEVE ECONOMY-WIDE, NET-ZERO BY 2050



Source: World Bank analysis.

The transition to net zero will bring economic benefits, but financing needs are significant

The Western Balkans can transition to net zero without compromising their economic growth potential.

The net economic costs of this transition vary by country and by the forecast cut-off date, namely 2030, 2040, or 2050. In terms of GDP per capita growth, half of the countries have a small positive growth rate difference between the net zero and the RS in 2030 and in 2040, and most have a small negative difference in 2050. North Macedonia has the largest negative difference in 2040 and 2050: its GDP per capita growth rate under net zero is almost 1 percentage point lower than under RS. The levels of GDP per capita under net zero are smaller than under the RS by less than 1 percent of GDP for all countries for 2030, 2040, and 2050, except for Bosnia and Herzegovina in 2050, where it is smaller by just over one percent. The results are similar under the trend and optimistic growth scenarios (see Annex 2 for details). In the net zero scenario, GDP per capita in 2050 drops by an average of 0.5 percent for the WB6 in 2025-2050 under trend growth and 0.6 percent under optimistic growth.

The Western Balkans could increase their economic potential as part of their net zero transition by undertaking appropriate structural reforms. Under the net zero scenario, countries can be expected to leverage additional benefits from trade, investment, and finance, based on their lower emissions when considering the incentives and disincentives presented in the EU policy framework, such as the EU Green Deal, the Western Balkans Growth Plan, or CBAM. The net zero transition could result in higher GDP growth, provided that the prerequisite structural reforms are made to increase productivity, raise the quality of human capital, and increase labor force participation.

The net zero transition can deliver substantial benefits to the Western Balkans through a significant reduction in air pollution, which is expected to decrease air pollution mortality rates by 2 percent by 2030 and 15 percent by 2050. This shift is also likely to result in fewer road accidents and lower road maintenance costs, including through the increased use of public transport. The economic value of reduced air pollution mortality as the result of reduced use of fossil fuels and biomass is estimated at US\$2.7 billion; additional savings would stem from reduced road accidents and maintenance costs.

The investments required to meet net zero by 2050 should be predominantly made by the private sector, with government playing a complementary role. Compared to the RS, in the NZ, the WB6 would need to invest an additional \$89.4 billion (in 2020 US\$) undiscounted or \$31.9 billion discounted at 6 percent. This comes to 1.9 percent of GDP on average per year until 2050 to achieve economy-wide net-zero. The lion's share of this investment is channeled into scaling up solar, wind, and hydro generation capacities. The transition will necessitate attracting private sector financing beyond current levels while advancing sectoral reforms to entice private capital and bridge the climate mitigation investment gap. Public resources must also be strategically employed, dependent on the sector's investment risk and commercialization level. It is estimated that about 85 percent of the total investment required to achieve the net zero goal by 2050 could be made by the private sector under adequate enabling conditions.

Modeling the net zero transition suggests that households could lose around 3 percent of total consumption from 2025–50 if embedded energy prices prevail, but revenue recycling can soften this impact. The net zero transition will have a distributional impact on household consumption due to changes in the prices of energy and non-energy products; households are expected to experience an average loss of around 3 percent in total consumption from 2025–50. As a policy experiment, if some of the revenues from higher electricity and natural gas prices were used as targeted transfers, often referred to as revenue recycling, they could mitigate some of the impact on poorer households. Such an exercise suggests that for 2030, as an average for the WB6, 0.6 percentage points of GDP would allow the bottom 40 percent of households to keep their consumption basket unchanged during the net zero transition.

The energy transition will require a Just Transition for coal-affected communities; it will need to be part of the transition to a greener economy. 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. Governments can provide retraining programs, income support, and opportunities for alternative employment, which can help mitigate the social and economic impacts of the energy transition on affected communities. This approach not only facilitates a smoother shift to a greener economy but also promotes social inclusion and sustainable development by addressing the needs of those most affected by the changes in the energy landscape.

An enabling Just Transition, based on effective human development policies, is a prerequisite for the green transition

Capitalizing on the green transition requires an enabling human transition, based on effective human development policies. As countries shift to cleaner energy sources, implementing policies that support affected communities becomes crucial to mitigate the projected social and economic impacts. Skills development plays a pivotal role in shaping a Just Transition to a greener future. Investing in retraining and upskilling is essential to avoid unemployment risks and ensure that firms have an adequately skilled workforce.

The green transition will transform the skills requirements in many occupations beyond brown industries—requiring around one out of six current workers to upskill or retrain in the medium run. Across the Western Balkan countries (excluding Montenegro), 417,000 people already are in occupations with a high risk of being impacted by the green transition. Our estimates show that the cost of retraining and reskilling those workers most at risk may reach €700 million if they were to be retrained into alternative occupations that are not likely to be impacted by the green transition, and €2.4 billion if they were to be retrained into alternative green jobs. Missing the required investments in retraining and upskilling will put individuals at risk of unemployment and firms at risk of missing growth opportunities due to lack of adequate workforce.

The transition to net-zero GHG emissions by 2050 requires major investments in infrastructure, health and social protection systems, and new job skills, coupled with attitudes and behaviors. Retraining and upskilling offer short-term solutions to the change in skills needs; in the longer-term, more structural changes in the education system will be needed so that workers have the required skills for the green transition. This includes the development of educational material from preschool up to higher education, with a focus on green skills development. Taking advantage of green growth opportunities, the education systems in all WB6 countries must provide students with the skills and competencies needed in the current and future labor market. This will require engaging in reforms that cover quality of teaching, foundational skills, and skills adapted to the content of greener job (including STEM and digital) and practical training, curricula modernization, financing, and governance. Preparing all teachers in these countries for green education may cost from US\$25 to US\$76 million.

Reducing the risks and uncertainty of the green transition on people's income, consumption, health and human capital investments requires increased coverage and adequacy of social protection and health systems, as well as increased flexibility to protect households from climate shocks. Social protection systems in the Western Balkans are comprehensive and are underpinned by digital delivery systems. However, they do not always effectively support workers to transition between jobs; and the support provided to households negatively affected by climate shocks tends to be limited, because few programs can expand when disasters occur or energy prices rise. Reforms to legislation would allow governments to harness their social protection systems to better protect workers and vulnerable households; investments in dynamic delivery systems and linkages with early warning systems and dedicated funding would enable a timely response to reach these people. Health systems need to be agile enough to adapt to climate change and green transition-related migrations to provide adequate health support when and where necessary. Evidence from COVID-19 pandemic provides insights of the challenges faced in addressing such emergencies, including issues with surveillance and data systems, inadequate operationalization of emergency structures and shortages of specific medical equipment. Existing regional collaboration should be further strengthened.

Incremental investment needs for adaptation and mitigation are high, requiring a structural change in the economies of the WB6

Investments in programs to facilitate adaptation and mitigation will result in structural shifts in the economies of the Western Balkans. The average annual incremental adaptation and mitigation investment through 2050 comes to 1.3 percentage points of GDP and 1.9 percentage points of GDP respectively; these estimates emerge from parallel modeling exercises. The estimates are sizable, considering that the 20-average total investment rate for the region is about 27 percent of GDP and the public investment rate is about 7 percent of GDP. The largest incremental investment needs for the public sector will come in 2025–35; the largest incremental investment needs for the private sector will come after 2036, when they will average around 3 percent of GDP (under trend growth). The region's low savings rate (19 percent in 2022) provides an opportunity for encouraging more savings activity in the long term. The Western Balkans will need to rely on foreign savings in the interim.

Countries' ability to capitalize on the investment opportunities and get on a higher growth trajectory will depend on progress with structural reforms and availability of external resources. Adaptation and

mitigation investments will compete for domestic resources against other investment needs and potentially bid up interest rates in a constrained setting of labor force participation, human capital quality, productivity levels. Reducing these constraints requires economy-wide structural reforms to increase the economy's potential growth and to alleviate pressure on domestic resources (via rising wages, interest rates and prices). External resources, in the form of foreign investment and external financing, will be critical to alleviate some of this stress. The lower import bill that comes from lower fuel imports will alleviate some of the pressure on the current account.

Fiscal policy will need to respond to new priorities and to preserve fiscal space. Several sources of stress will emerge for fiscal policy on both the investment and recurrent spending sides. On the investment side, the needs in both mitigation and adaptation will be substantial. On the recurrent side, there will be a need to balance emerging spending needs—including social protection, social assistance, Just Transition, and other programs to support households and firms to make good adaptation and energy transitions decisions—with traditional spending priorities in such areas as social security, education, health, and national security. Prudence in managing the aggregate level of public spending will be needed if governments want to preserve fiscal sustainability and be able to respond to unforeseen damages from climate change. Revenue mobilization opportunities will come from existing revenue mobilization programs, as well as the potential implementation of carbon taxes and the elimination of explicit subsidies. A prudent fiscal position will also improve borrowing terms and access to markets.

To preserve fiscal space, policy makers will need to prioritize incentivizing households and firms to respond to adaptation and mitigation challenges. Governments' own capacities will need to be strengthened substantially, including by developing their institutional readiness. Policy makers will need to: (1) realign incentives to ensure households and firms take adaptation actions and reduce demand for high-carbon energy systems, while also supporting the scale up of low carbon alternatives; and (2) build the capacities for planning, budgeting, implementation, coordination, and accountability of both national and local governments, as well as that of SOEs.

Structural reforms and realigned incentives are necessary to drive the creation of competitive markets to attract private investment. The need for large scale investment for adaptation and mitigation, as well as the need for the adoption and diffusion of new technologies across sectors, require the private sector to take the lead in investing in adaptation and mitigation. In turn, this requires structural reforms and fiscal incentives to (i) develop contestable markets and (ii) to overcome market failures. For adaptation, an adjustment in incentives is needed to ensure adequate investments and adjust behaviors to mitigate the impact of physical risks. In addition, innovation in financing mechanisms will also be required. For mitigation, the purpose of reforms would be to encourage investment in the energy system through the introduction of carbon pricing instruments, green subsidies, and industrial policies, while also reducing fossil fuel subsidies and ensuring SOEs contribute to decarbonization. In addition, a higher skilled labor force will be necessary to respond to the needs of such an evolving private sector.

Financing needs mandate access to EU and partner funding and also developing new in-country financial products and services

The Western Balkans can supplement limited public resources with diverse funding sources, including EU funds and private investment, but progress is needed in critical areas. EU pre-accession funds are important to supplement the limited public resources in these countries. The European Commission's 2020 Economic and Investment Plan allocates up to €9 billion in EU funds for 10 investment flagships, addressing various needs such as transport, renewable energy, and youth employment. Additionally, the EU Western Balkan Guarantee Facility aims to mobilize up to €20 billion in investments, thereby reducing financing risks. However, EU funds can only cover a minor part of the total investment needs described. The vast majority of the investment is expected to come from the private sector through different mechanisms, including domestic and foreign investment. Banks and non-bank financial institutions, including institutional investors, can play a critical role in providing long-term green financing through equity and debt channels. The issuance of Green, Social, and Sustainability (GSS) bonds can be an effective way to attract private

investment in mitigation and adaptation projects. However, although the EU has taken the lead on the issuance of GSS bonds, the Western Balkan region's progress has been uneven. Public-private partnerships (PPPs) are another mechanism that can play an important role in crowding-in private sector investment, but improvements are needed in their underlying governance structures to reach internationally established benchmarks.

The private sector needs a cultural shift, supported by policy stability, and a level playing field

Small and medium enterprises (SMEs) are the backbone of the WB6 economies, but they often lack awareness of the latest eco-friendly technologies, a situation that hinders sustainability efforts. The 2019 World Bank Enterprise Survey indicated that most SMEs do not actively monitor or manage their environmental impacts or even their use of electricity. Rapidly evolving and expensive green technologies can deter SMEs from investing in sustainability. A comprehensive effort is therefore required to align SMEs with initiatives such as the EU Green Deal, including supporting climate action from young innovators and entrepreneurs.. It is imperative to address information gaps, raise awareness about the necessity and long-term benefits of going green, and ensure an adequate provision of skills training.

Energy entrepreneurs and investors cite regulatory uncertainty as a major obstacle in the Western Balkans, as it hinders innovation and investment needed for the green transition. Challenges include a lack of transparent data on grid capacity, price fluctuations, and non-tariff barriers affecting equipment availability and prices of solar panels. The EU's regulatory framework for green investments presents a solution. To access the EU market, aligning with EU environmental and climate standards is essential, a step already underway in most Western Balkan countries. Achieving this alignment involves adopting and enforcing air quality, emissions, energy efficiency, renewable energy, waste management, and biodiversity conservation standards.

The state continues to play a significant role in the WB6 economies, including in mitigation and adaptation-related sectors, where state-owned enterprises (SOEs) are in a weak financial position and unlikely to contribute constructively to the green transition. In the Western Balkans, a substantial portion of SOEs (23 to 53 percent depending on the country) are in high-emission sectors; according to the Business of State Database, about 67 percent are unprofitable, which makes it unlikely for them to secure funding for necessary mitigation investments. These enterprises provide employment for many, particularly in power generation, where most WB6 countries still heavily rely on fossil fuels. In terms of adaptation, a large portion of SOEs operates in highly vulnerable sectors, notably higher than the global and regional averages. At the same time, the burden of financing SOEs poses a risk to fiscal consolidation efforts and may compromise fiscal and debt sustainability. To make a positive contribution to adaptation and mitigation, SOEs need to be on a stable financial footing, obtain clear policy direction—through legislative documents, ownership policies, SOE mandates, shareholder actions, and/or have access to other programs to encourage the adoption of technologies, increase productivity, or maintain accountable management practices — and have access to skills and financial resources without burdening the state. SOEs may have access to private sector support programs for efficiency upgrades, renewable investments, and R&D, where relevant. However, such support should not carry the risk of impeding the entry of other market competitors, and it should not crowd out funding or innovation from private sector-led initiatives.

Enabling the private sector to capitalize on the green transition will allow the Western Balkan countries to make additional inroads to EU markets. The region's geographical proximity to European markets can offer access to investment, technology, and know-how, and greening the product and export mix will be an important pre-condition for growth during the green transition. This strategy would allow entrepreneurs, investors, and firms to scale up innovation and financing that are critical for the green transition.

There is strong commitment to climate action in the region, but institutional challenges need to be addressed

The Western Balkan countries have actively embraced green trade opportunities, and trade in environmental goods experienced exponential growth within a decade until 2022. This growth has been primarily driven by products related to renewable energy plants. As these countries embark on the path

to a green transition, they can further capitalize on their promising export strengths and explore growth opportunities in green product markets and value chains related to decarbonization technologies. Notably, analyzing the trade patterns of the WB6 reveals that diversification in exports—particularly in the wind, solar, and electric vehicle value chain—can be advantageous. Additionally, the EU already serves as the main trading partner for the WB6, acting as both the primary market and source for over two-thirds of their exports and imports.

In the Western Balkans, the drive to ambitious climate objectives is rooted in international obligations and national priorities, all integrated into their development plans. These countries are signatories to international climate agreements like the United Nations Framework Convention on Climate Change (UNFCCC) and the 2015 Paris Agreement, which set ambitious targets to limit global temperature rise. They have submitted their nationally determined contributions (NDCs), outlining their commitments to reduce greenhouse gas emissions and enhance climate resilience.

The EU accession process and the obligations of the WB6 countries under the Energy Community Treaty drive the development of climate change related policies and legislation in the region. As Contracting Parties to the Energy Community Treaty, the WB6 countries have legally binding commitments to adopt core EU legislation (the *acquis communautaire*), including the EU Clean Energy for All Europeans Package (2019), which requires countries to submit their National Energy and Climate Plans (NECPs) that reflect the efforts of the countries to achieve energy and climate objectives. All of the WB6 countries have set GHG reduction targets for 2030; several have adopted long-term, low-emissions development strategies, demonstrating their commitment to long-term planning. Additionally, they are collaborating at the regional level, recognizing that climate events transcend borders and require transboundary cooperation for more effective adaptation and disaster risk management.

However, there remain challenges in institutional capacity, public awareness, and financial readiness. Climate policies need more extensive legal frameworks and implementation mechanisms, and there is a need for better alignment between national and local authorities. The countries' ability to deliver on their climate change ambitions is hindered by multiple barriers, including political dynamics, challenges related to regional cooperation, economic considerations, technological hurdles, a lack of leadership, coordination, independent scientific advice, and insufficient technical capacities and poorly developed climate finance mechanisms. The social and economic implications of transitioning away from coal necessitate a Just Transition approach and engagement with stakeholders and affected communities is vital to ensure a fair and inclusive shift.

Climate policy must be ambitious, and this report provides realistic and realizable recommendations

Effective climate change policies require a transversal approach, integrating adaptation and mitigation efforts across sectors. To succeed, the WB6 must establish high-level coordination mechanisms and enhance institutional capacity, including the creation, connection, and coordination of climate-focused agencies or commissions. The integration and alignment of adaptation and mitigation policies are necessary for priority sectors like agriculture and energy, as current strategic documents do not fully address climate challenges. Cross-sectoral approaches can optimize synergies and minimize trade-offs, including strengthening social protection systems to respond to climate shocks to align energy prices with cost-recovery levels and introduce carbon pricing.

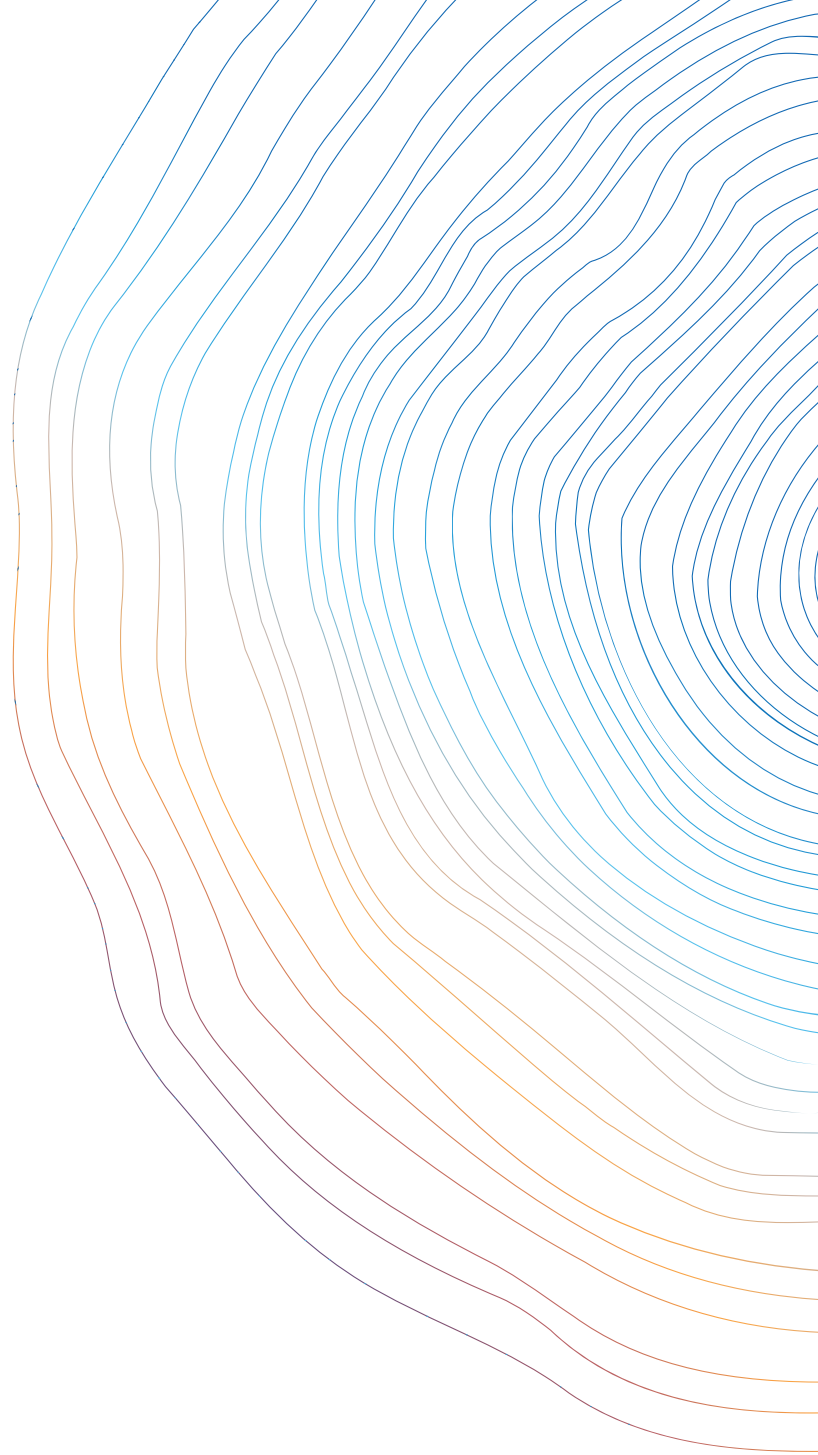
To address climate risks that transcend borders and capitalize on opportunities for synergy in the energy transition and adaptation efforts, WB6 governments and regional organizations should strengthen trans-boundary cooperation. Collaboration across borders is essential to harness the interplay between climate change and trade policies, human security, national finances, regional cooperation, and shared natural resources like rivers and clean air. The establishment and enhancement of regional institutions are crucial for facilitating cross-border coordination. This includes such projects as establishing regional early warning systems, collaborative management of shared resources, harmonized energy systems, and modernizing regional train networks.

Finally, to achieve concrete and ambitious policy solutions, targeted policies and place-based reforms are imperative to ensure that they follow high social, health and environmental standards. Recognizing that local characteristics influence capabilities, it is crucial to design policies that address localized impacts and conditions, aligning with the region's climate and development goals. Place-based programs tailored to the specific needs of vulnerable communities, such as the elderly, disabled, and children, play a pivotal role in driving policy implementation. Sector-specific actions are also essential, such as increasing the agricultural sector's adaptive capacity through modernization, irrigation improvements, climate-smart practices, and insurance schemes. In the power sector, specific policies are needed to boost private investments in renewable energy sources and facilitate the coal phaseout, including legal and regulatory framework enhancements and skills development. Decarbonizing the power sector must be accompanied by market liberalization and SOE reform efforts, paired with policies to scale up energy efficiency and electrification in end-use sectors, encompassing stricter standards, financial support, and incentives. The transport sector requires measures like fuel efficiency standards and clean vehicle adoption incentives, all of which necessitate effective enforcement of requirements, norms, and standards.

Structure of the report

This CCDR consists of a regional report covering all Western Balkan countries, as well as six country notes with country-specific findings, conclusions, and recommendations. The regional report has the following structure:

- **Chapter 1** sets the context and describes the region's development plans, as well as the risks and opportunities related to adaptation and mitigation.
- **Chapter 2** provides a brief overview of WB6 countries' climate commitments and evaluates their readiness to implement policies and attract the investments necessary to effectively respond to the risks and opportunities associated with climate change.
- **Chapter 3** focuses specifically on what can be done to ensure adaptation to climate risks and to mitigate climate change impacts using policy.
- **Chapter 4** concludes by discussing the macroeconomic impact of climate change and of the policies analyzed in Chapter 3. It also discusses the role of cross-cutting economic policies, such as fiscal, financial sector, investment, and trade policies.
- **Chapter 5** provides conclusions and recommendations intended to help policy makers in the region to choose and prioritize across the wide array of policy actions. It lays out a systematic approach to policy formulation via the 3 Ts: Transversal, Transboundary, and Targeted policies.



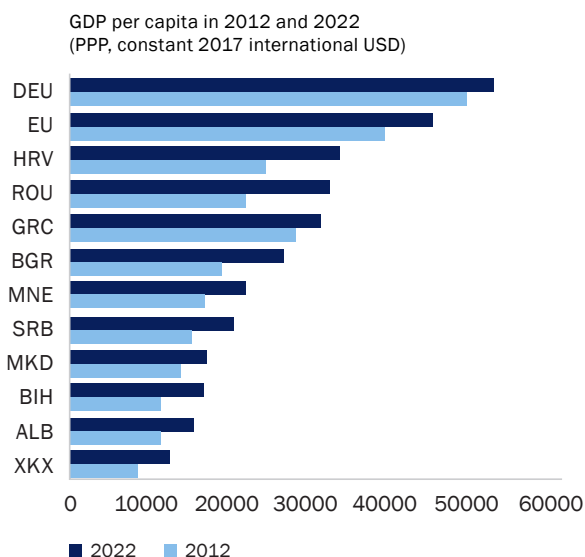
Chapter 1

Climate and Development Context

1.1. Current Development Plans and Objectives

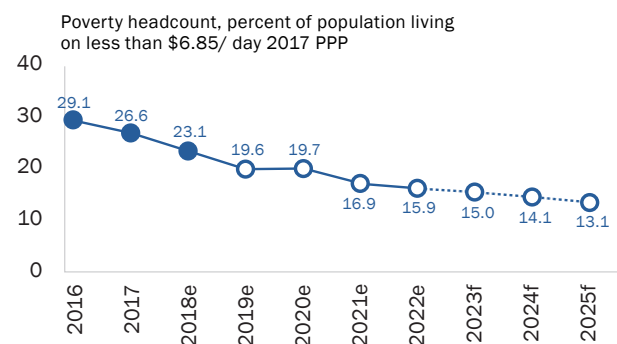
The six Western Balkan (WB6) countries of Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia are upper-middle-income economies (UMICs) that have made considerable development progress since 2000. These economies saw an expansion in output that led to a rise in per capita incomes, which by 2022 ranged from US\$12,469 in Kosovo to US\$22,081 in Montenegro (in constant 2017 international dollars) (Figure 1-1). Average annual GDP growth stood at about 2.7 percent between 2012 and 2022, compared to the European Union (EU) average of 1.4 percent over the same period. The WB6 have also increased their trade with the EU; exports grew from US\$25.4 million in 2010 to around US\$72.5 million in 2022. This increase is equivalent to a rise in GDP from 14.2 percent to 26.6 percent. Market liberalization, trade and financial opening, and a commitment to structural reforms supported growth and poverty reduction in the region. The share of people living below the middle-class poverty line of US\$6.85 per day in 2017 purchasing power parity (PPP) has been declining, averaging about 10 percentage points from 2016–19 (Figure 1-2). Life expectancy at birth increased across all six countries from as low as 72 years in 2000 to as high as 77 years in 2021. These are against average ages in 2021 of 75 years for UMICs, 77 years for the Europe and Central Asia (ECA), and 80 years for the EU.

FIGURE 1-1: PER CAPITA INCOME IS STILL A LONG WAY FROM EU PEERS, AND THE GAP IS NOT CLOSING



Source: World Bank staff based on WDI data

FIGURE 1-2: POVERTY IS LIKELY TRENDING DOWNWARD, BUT MANY CHALLENGES LIE AHEAD



Sources: World Bank estimates and projections based on 2018 income data from the Survey of Income and Living Conditions (SILC) for Montenegro; 2019 for Albania and North Macedonia, 2020 Serbia, and 2017 Household Budget Survey (HBS) for Kosovo. Note: Income measures in the SILC and consumption measures in the HBS are not strictly comparable. Welfare is estimated in U.S. dollars using 2017 PPPs. The regional estimate excludes Bosnia and Herzegovina (BiH) due to a lack of comparable data. Forecasts are based on GDP per capita in constant local currency units. e = estimate; f = forecast; PPP = purchasing power parity.

Over the past three years, the six countries saw their resilience tested. Despite a slowdown in poverty reduction after the pandemic, the countries were able to rebound and reduce poverty by about 2.8 percentage points in 2021. This deterioration is against a backdrop of Human Capital Index scores of 0.68 for Serbia, 0.63 for Albania and Montenegro, 0.58 for Bosnia and Herzegovina, 0.57 for Kosovo, and 0.56 for North Macedonia. The 2022 results of OECD Programme for International Student Assessment (PISA) for participating Western Balkan countries show the significant impact of COVID-19 and declining learning outcomes in most of them. Moreover, inequalities in human capital outcomes persist across the Western Balkans. For example, poorer self-reported health outcomes are observed among individuals with lower levels of education, among people who are unemployed, and among those from lower-income households.⁵ Pupils from a lower socioeconomic status perform worse in standardized tests.⁶ After the economic activity bounced back in 2021, economic performance has been buffeted by the challenging external environment stemming from the consequences of Russia's invasion of Ukraine, higher energy and food prices, unfavorable weather conditions, tightening financial conditions, and significant uncertainty. Despite slowing growth and rising prices due to the invasion, the economies surpassed pre-pandemic levels. This finding reflects, in part, the proximity to the EU that offers

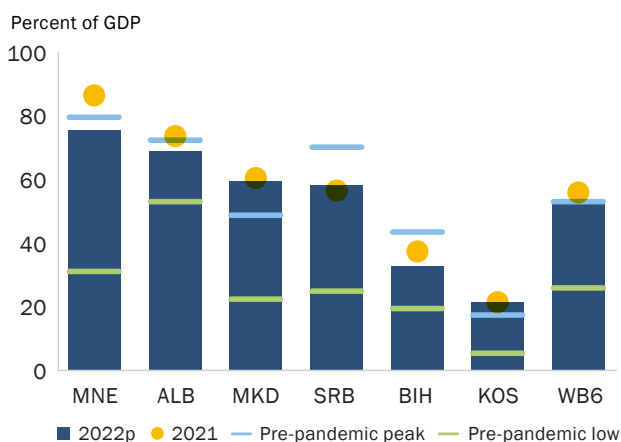
⁵ Radevic, S., S. Kocic, S., and M. Jakovljevic. 2016. "Self-Assessed Health and Socioeconomic Inequalities in Serbia: Data from 2013 National Health Survey." *Frontiers in Pharmacology* 7: 140.

⁶ Shahini, A. 2021. "Inequalities in Albanian Education: Evidence from Large-Scale Assessment Studies." *Kultura i Edukacija* 4 (134): 40-70.

trade, investment, and emigration opportunities. At the end of 2020, 70 percent of WB6 trade was with the EU, and remittances averaged more than 10 percent of GDP. At the same time, a series of shocks that included climate-related natural disasters, earthquakes, the pandemic, and the energy crisis have severely limited the fiscal space of these countries and led to elevated debt levels (Figure 1-3). Despite the progress, per capita income for the WB6 countries measured in PPP terms was 38 percent of the EU average.

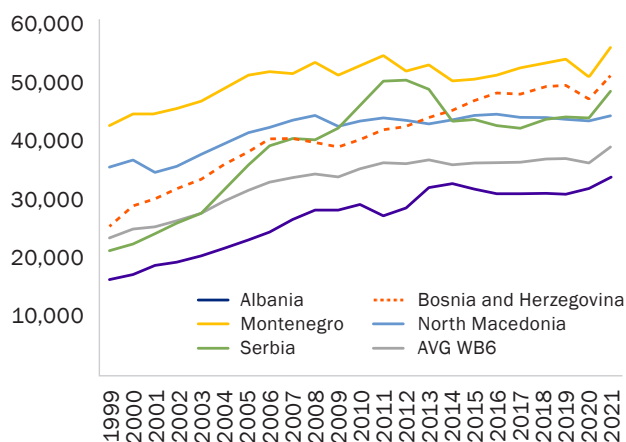
Focusing on structural constraints, rebuilding buffers for macroeconomic and climate-related shocks, and addressing supply-side reforms pose challenges for the higher, more sustainable, and greener growth that would narrow the income gap with the EU. Labor productivity plateaued around the early 2010s, except for Bosnia and Herzegovina, where it continued to rise (Figure 1-4). Countries' growth patterns have varied over the past decade; in general, growth has frequently been of low quality (consumption-based, lower value-added jobs), and reforms have not been sufficient to place countries on a higher growth path. High labor informality persists, and, with a few exceptions, jobs are growing faster in low-productivity sectors. The education system falls short in delivering the skills demanded by the labor market, and large numbers of workers need retraining for the green transition. The WB6 also have significant governance gaps vis-à-vis the new EU member states: lags in the business environments; gaps in quality infrastructure; pollution in many cities; low labor force participation rates, especially for women; and significant state sectors (either in budgetary terms or in the presence of state-owned enterprises [SOEs]). Overcoming these challenges requires recapturing reform momentum; greater reliance on the private sector; and a rationalized, more efficient, and more sustainable approach to government. This approach is particularly relevant in the context of the limited fiscal space available to the governments in the region and the rising pressure that is amplified by demographic changes, outmigration, and population aging. Improving the efficiency and effectiveness of fiscal policy will be critical to make progress in achieving development objectives, as well as in making fiscal space for finance investments and programs geared to climate change, while maintaining adherence to fiscal discipline.

FIGURE 1-3: MULTIPLE SHOCKS HAVE DEPLETED FISCAL SPACE AND LEFT PUBLIC DEBT ELEVATED



Source: World Bank Western Balkans Regular Economic Report N. 23. Spring 2023, p. 18.

FIGURE 1-4: LABOR PRODUCTIVITY GDP PER PERSON EMPLOYED (CONSTANT 2017 PPP \$)



Source: World Bank staff based on WDI data

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, WB6 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 plans to accelerate reforms via the €6 billion Reform and Growth Facility (€2 billion in grants and €4 billion in loans) in 2024-2027. The Carbon Border Adjustment Mechanism (CBAM), however, poses a tangible risk for the WB6 because the EU is the main trading partner, and the region has carbon-intensive modes of production (refer to Section 1.3.2).

Achieving higher growth means addressing the sources of volatility, while balancing the need to contain emissions. In the past, this balance came at the cost of volatility in cases of limited investment to address

the sources of risks, such as natural disasters and climate change-related risk. This volatility is because of the exposure of sectors such as agriculture and water. It also came at the cost of rising emissions (refer to Section 1.3.1), posing a challenge going forward to the goal of transiting to a high-income status.

The analytical and diagnostic work by the World Bank suggests that higher growth needs to come from productivity improvements and better governance, although individual modifications are needed in each country's case. These modifications include the Country Economic Memoranda (CEMs) and Systematic Country Diagnostics (SCDs) that identify different reform paths for each country. For instance, for Albania and Kosovo, investing in human capital and skills development are critical priorities. For Bosnia and Herzegovina, Kosovo, Montenegro, and North Macedonia, improving the business environment, the competition framework, and the rule of law are critical reform areas. Analyses for Montenegro and Serbia emphasize infrastructure, connectivity, and SOE reforms. SOE reforms are important for the energy sectors for most countries. In all cases, however, World Bank analysis recognized that the WB6 economies are small individually; and trade with neighbors, especially the EU, provides critical opportunities to extend aggregate demand, import knowhow, and provide an impetus for reforms when the momentum is lacking.

This CCDR adopts a regional approach to cover the WB6 countries. The WB6 economies share several factors, such as their geography and shared ambition to join the EU. However, climate-related risk and resilience differ, as a function of the individual country's climate finance strategies, use of fossil fuels, contribution to greenhouse gas (GHG) emissions, and level of vulnerability through a social, economic, and spatial lens. Box 1-1 summarizes the key common elements across WB6 countries, as well as the key differences.

BOX 1-1: WB6 COUNTRIES: WHAT IS COMMON AND WHAT IS NOT?

What is common?

Due to geography and a common ambition to join the EU, the WB6 economies' development trajectories are closely associated with the EU. Proximity to a large and high-income bloc of neighbors provides significant opportunities for convergence in incomes, investment, trade, and remittances. Advanced European economies are also leaders in the energy transition and key sources of technology, finance, and innovation for the region. Integration within the WB6 region presents opportunities to capitalize further on this access to technology, finance, and innovation, as a larger region presents greater opportunities for investment. Further, the WB6 economies also have a common socialist legacy and are at various stages of reforming their institutional and legal frameworks in line with the EU acquis. At present, the state remains an important actor in all six WB6 economies, and SOEs retain a significant share of jobs and GDP.

WB6 countries face some common risks that are compounded by the impacts of a fast-changing climate. Population and economic activity are more dispersed than in several other European countries,⁷ and shrinking cities in the region pose unique challenges. The region's human capital base is diminishing due to emigration by younger, often more skilled, populations. This challenge has implications for the existing social infrastructure, which may not be well-suited to meet the needs of those left behind. Urban and rural areas are increasingly exposed to more intense and more frequent extreme weather events—including storms, floods, landslides, wildfires, droughts, and heatwaves—that cause substantial material and financial losses, as well as human casualties.

All WB6 countries (except for Albania) have significantly higher energy and carbon intensities than the EU average, due to aging and obsolete energy infrastructure and vehicle fleets, limited energy efficiency improvements, and coal dependency. Low energy prices in all WB6 economies are delaying investment in cleaner energy sources and efficiency improvements. The high level of reliance on dirty fuels and old, polluting energy sources has significant local impacts in terms of poor air quality and negative health impacts. In fact, air pollution, particularly from PM2.5, represents the most significant environmental health risk for children under five in the Western Balkans,⁸ responsible for more than three-quarters of years of healthy life lost due to premature mortality and disability from environmental risks.⁹

⁷ World Bank Group. 2019. "Western Balkans and Croatia Urbanization and Territorial Review."

⁸ UNICEF. 2021. "Children's Climate Risk Index". <https://www.unicef.org/media/105376/file/UNICEF-climate-crisis-child-rights-crisis.pdf>.

⁹ Disability-adjusted life year (DALY) per 100,000 is a metric that incorporates both the number of years of life lost due to premature mortality (YLLs) and years of healthy life lost due to disability (YLDs) to estimate the number of years of full health lost due to disease per 100,000 individuals. <https://www.who.int/data/gho/indicator-metadata-registry/imr-details/158>.

Despite a strong rebound from the COVID-19 pandemic, WB6 countries have been adversely affected by the economic implications of Russia's invasion of Ukraine, arising from high inflation, energy, and food prices; tightening financing conditions; and slowing trade and investment.¹⁰

What is different?

Although all WB6 countries are classified as upper-middle income, a wide gap remains between Montenegro and Serbia, on the one hand, which are both looking toward a high-income transition, and Albania and Kosovo, on the other hand, which have transitioned from lower-middle-income classification comparatively recently. Bosnia and Herzegovina and North Macedonia fall somewhere in between. These differences in income levels are also broadly reflected in the levels of institutional effectiveness, private sector sophistication, and human capital quality. Kosovo is classified as a fragile and conflict-affected state (FCS).

Country-level differences in quality of life and access to basic services related to health, education, and social safety nets remain critical challenges to build a more robust social infrastructure. Gender gaps in formal employment are particularly high for women. Significant differences exist in labor market participation and well-being between women and men among WB6 countries.

Most significantly, there are key differences across the WB6 countries in terms of security of energy supply and import dependency. The recent energy shock exposed those countries importing gas and electricity (Kosovo, North Macedonia, and Serbia) to exceptionally high import costs, which strained fiscal balances and utility balance sheets. This impact has been exacerbated by the high historical costs for fossil fuels. In contrast, excess thermal power-generating capacity has provided Bosnia and Herzegovina with a temporary opportunity to export power.

1.2. Risks and opportunities related to the impacts of climate change

The costs of inaction are high. The Western Balkans are already highly exposed to multiple natural hazards and the situation is expected to worsen considerably. The incidence and intensity of shocks, that is, of unpredictable extreme events and of slow-onset stressors, are expected to increase. Wildfire, drought, extreme heat, landslide, and flash flood hazards will worsen.¹¹ Moreover, these climate hazards will continue to occur simultaneously or in sequence, resulting in compounding overall risk and risks cascading across sectors and regions. Impacts interact with and exacerbate underlying local vulnerabilities, often disproportionately affecting people who are poor and vulnerable; this topic is explored in detail in Chapter 3 under the People & Places Deep Dive. A detailed assessment of the treatment of adaptation in the CCDR is provided in the adaptation background note.

Yet a changing climate will also bring opportunities. Notably, investments in climate change adaptation could yield substantial benefits across various dimensions. This potential is evidenced by estimated net benefits ranging from US\$2 to US\$7.1 trillion, according to global studies in low- and middle-income countries depending on the studies' scope and time horizon, with returns typically estimated to be around US\$4 for every US\$1 invested for adaptation measures.¹² The Triple Dividend of Resilience framework offers a comprehensive approach that highlights the benefits encompassing disaster prevention, economic stimulation, and broader socioenvironmental advantages.¹³

¹⁰ World Bank Group 2022. Western Balkans Regular Economic Report, No. 22, Beyond the Crises.

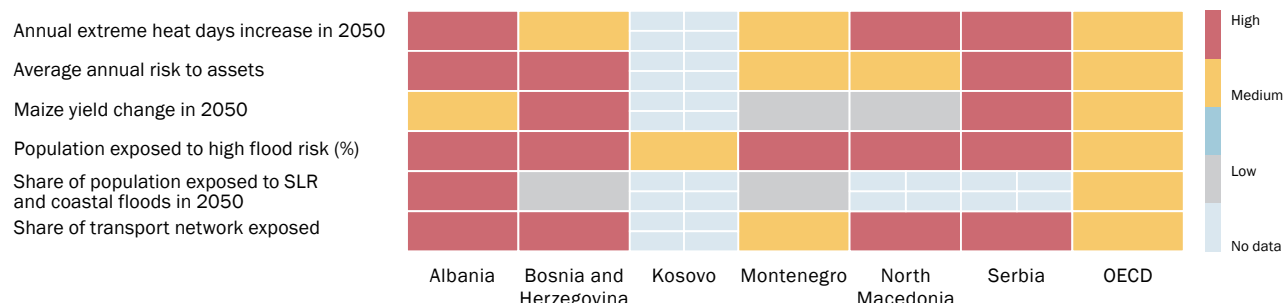
¹¹ Although future risk cannot be quantified for hazards such as landslides and wildfires, both underlying hazard factors and exposure are expected to grow. Modeling work performed by JBA and GEM for 2050 shows that floods AAL could increase by 51 percent under RCP 4.5, and that earthquake AAL is expected to increase by 86 percent.

¹² NIBS (National Institute of Building Sciences). 2019. "Natural Hazard Mitigation Saves: 2019 Report." NIBS, Washington, DC. <https://www.nibs.org/projects/natural-hazard-mitigation-saves-2019-report>; Hallegatte, S., J. Rentschler, and J. Rozenberg. 2019. Lifelines: The Resilient Infrastructure Opportunity. Washington D.C., World Bank, <https://openknowledge.worldbank.org/entities/publication/c3a753a6-2310-501b-a37e-5dcab3e96a0b>; 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; 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>; Global Commission on Adaptation. 2019. "Adapt Now: A Global Call for Leadership on Climate Resilience." https://gca.org/wp-content/uploads/2019/09/GlobalCommission_Report_FINAL.pdf?_gl=1*_1gronxf*_ga*MTYwMzUzMjU2My4xNjk2NTgwOTA3*_up*MQ.

¹³ Tanner et al. 2015. "The Triple Dividend of Resilience." Research Report. ODI and World Bank. <https://odi.org/en/publications/the-triple-dividend-of-resilience/>; World Bank. 2021. "Economics for Disaster Prevention and Preparedness: Investment in Disaster Risk Management in Europe Makes Economic Sense." Summary Report, World Bank, Washington, DC. <https://www.worldbank.org/en/region/eca/brief/economics-for-disaster-prevention-preparedness-europe>.

The Western Balkans are a hotspot in Europe in terms of climate and other natural hazards. On average, they are ranked as highly vulnerable in most of the critical dimensions of climate resilience (refer, for example, to Figure 1-5). The differences in risk among the countries are due to a combination of climate factors, geographic features, population exposure, and socioeconomic factors, as discussed in the following section and Chapter 3 P&P).¹⁴

FIGURE 1-5: CLIMATE RISK AND VULNERABILITY IN THE WESTERN BALKANS, COMPARED TO EU AND OECD COUNTRIES



Source: World Bank Climate Change Group

A wide range of interventions will be required to ensure that the triple dividend of investing in adaptation will be captured. These interventions could range from localized or sectoral measures, such as incentivizing climate-smart agriculture, to transversal and regional policies, such as setting-up regional early warning systems and response mechanisms that avoid duplicating efforts and minimize transboundary risks. Although targeted country-specific interventions can come with regional benefits (for example, strengthening critical transport links), this report focuses on regional solutions (refer to Chapter 5 and Annex 3), as well as investments.

A climate change-induced surge in heat-related stressors – heightened temperatures and intensified droughts – threatens to undermine regional stability and productivity

Temperatures have risen in every country in the region in the past 50 years, and this trend has accelerated in recent decades.¹⁵ The average temperature for the region increased by 1.2°C with respect to the past climate period from 1961–80, while precipitation decreased by 0.2 percent.¹⁶ The impacts of extreme heat on health and workers’ productivity are expected to be high in the region;¹⁷ heat-related deaths could be 5–10 percent higher by 2100. As an example, outdoor workers engaged in high-intensity jobs in the city center of Skopje experience an estimated 140 hours of reduced work annually due to heat stress. This number is expected to increase between 25–65 percent under climate change.¹⁸

The urban heat island effect is a palpable phenomenon across WB6 cities. The lack of green areas in cities in middle-income countries (for example, refer to Figure 1-6) overlaps with higher PM_{2.5} concentrations. Particulate matter is consistently elevated throughout the day in some areas of Shkodra, Tirana, and Vlora. Poorer neighborhoods tend to experience more elevated heat exposure.¹⁹ In Western Balkan cities, life expectancy is reduced by 13–16 months due to air pollution; premature deaths of individuals under age 65 years account for approximately 20 percent of years of life lost due to air pollution exposure.²⁰ Moreover, the urban heat

¹⁴ UNEP (United Nations Environment Programme). 2015. “Outlook on Climate Change Adaptation in the Western Balkan Mountains.” <https://www.grida.no/publications/162>

¹⁵ Cramer et al. 2018. “Climate Change and Interconnected Risks to Sustainable Development in the Mediterranean.” *Nature Climate Change* 8: 972–80. Lionello, P., and L. Scarascia. 2018. “The Relation between Climate Change in the Mediterranean Region and Global Warming.” *Regional Environmental Change* 18: 1481–93.

¹⁶ Regional Cooperation Council. 2018. “Study on Climate Change in the Western Balkans Region.” <https://www.rcc.int/pubs/62/study-on-climate-change-in-the-western-balkans-region>.

¹⁷ Mueller, D., and M. Hofmann. 2022. “Impacts of Climate Change on Agriculture and Recommendations for Adaptation Measures in the Western Balkans.” <https://lsg.jamo.de/microsites/lsg.jamo.de/fileadmin/Dokumente/Western-Balkan-08.07.2022.pdf>

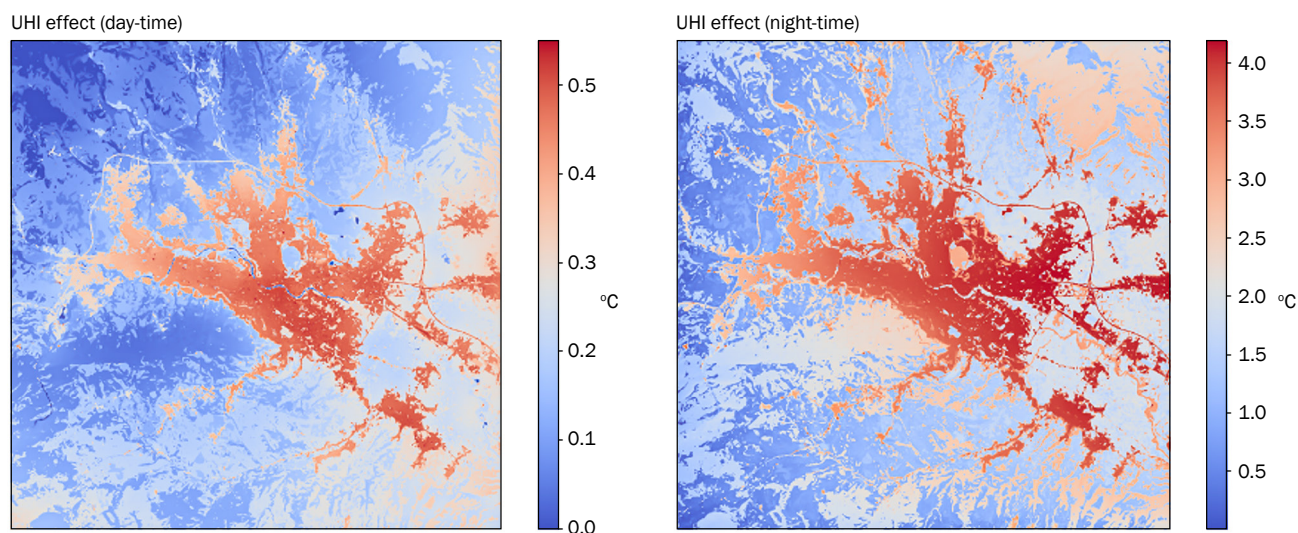
¹⁸ Vito UrbClimb analysis for World Bank. “Southern European Regions Are Not Only Subjected to Greater Heat Stress but Also Featuring an Occupational Composition of Its Labor Force That Makes Them More Susceptible to Heat.”

¹⁹ Chakraborty, T., A. Hsu, D. Manya, and G. Sheriff. 2019. “Disproportionately Higher Exposure to Urban Heat in Lower-Income Neighborhoods: A Multi-City Perspective.” *Environmental Research Letters* 14 (10): 105003.

²⁰ UNEP. 2021. “Air Pollution in the Western Balkans: Key Messages for Policymakers and the Public.” <https://zoinet.org/wp-content/uploads/2022/02/Pollution-Balkans-EN2.pdf>

exacerbates health risks for children, with young infants more vulnerable due to their smaller body size, higher ratio of body surface area to mass, and the immaturity of their bodies' temperature regulation.²¹ Climate change is also likely to increase the spread and intrusion of new vector-borne diseases; there is an increased risk of West Nile Virus in Serbia due to a rise in temperature.²² Accordingly, adaptation will require rethinking urban planning and building standards to put urban form and nature-based solutions at the core of strategic documents and practices to mitigate these heat impacts and increase living conditions, particularly in poor neighborhoods.

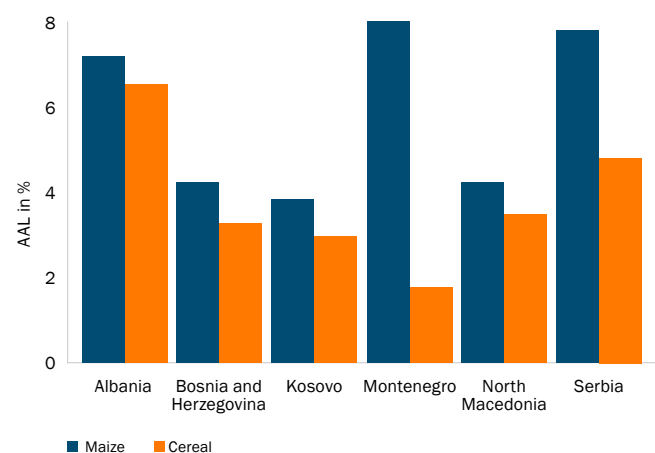
FIGURE 1-6: AVERAGE DAYTIME (LEFT) AND NIGHTTIME (RIGHT) URBAN HEAT ISLAND EFFECT IN SKOPJE



Source: World Bank, VITO UrbClimb analysis.

Note: The Urban Heat Island effect is defined as temperature difference of urban locations vis-à-vis a rural reference location. The UHI effect is modeled based on historical climate data for the period 2001–20.

FIGURE 1-7: DROUGHT IMPACTS ON YIELDS IN THE WB6



Source: World Bank analysis (IIASA, EDORA project)

WB6 countries are highly vulnerable to droughts and shifts in growing seasons, particularly certain sectors, and subregions. In May 2014, catastrophic floods hit the region; BiH faced damages equivalent to 15 percent of GDP, and Serbia had 12,000 ha of land made unusable, pushing an estimated 125,000 people into poverty.²³ Droughts have become more frequent; they significantly affect the agriculture sector, with impacts on crop yields of maize and wheat (refer to Figure 1-7). The region faces a rising risk of food security due to yield fluctuation²⁴ and deficiencies in irrigation and water management that will need to be fixed, in part through the use of climate-smart agriculture innovation and incentivization and large-scale water distribution infrastructure rehabilitation.²⁵

²¹ Tsuzuki-Hayakawa, Kazuyo, Yutaka Tojihara and Tadakatsu Ohnaka, 'Thermoregulation during heat exposure of young children compared to their mothers', *European Journal of Applied Physiology and Occupational Physiology*, 72(1), January 1995, pp.12-17.

²² Mihailovic D. 2020. "Assessment of Climate Change Impact on The Malaria Vector Anopheles Hyrcanus, West Nile Disease, and Incidence of Melanoma in the Vojvodina Province (Serbia) Using Data from a Regional Climate Model"; Jan C. Semenza and Jonathan E. Suk. 2018. "Vector-Borne Diseases and Climate Change: A European Perspective." *FEMS Microbiology Letters* 365 (2): January. Second National Communication of the Republic of Serbia under the United Nations Framework Convention on Climate Change; Bouzid, M., F. J. Colón-González, T. Lung, et al. 2014. *Climate Change and the Emergence of Vector-Borne Diseases in Europe: Case Study of Dengue Fever*. *BMC Public Health* 14 (781).

²³ This resulted in an increase of nearly 7 percent over the previous year's poverty headcount. Source: Government of Serbia. 2014. "Serbia Floods 2014," Recovery Needs Assessment.

²⁴ USDA 2022. "Serbia: Serbia Grain Summer Update 2022". <https://www.fas.usda.gov/data/serbia-serbia-grain-summer-update-2022>.

²⁵ World Bank. 2018. "Exploring the Potential of Agriculture in the Western Balkans: A Regional Report." World Bank, Washington, DC. <https://openknowledge.worldbank.org/server/api/core/bitstreams/dc6bd2f3-5fa2-5f04-9a86-5e8e439ba250/content>.

Under different climate scenarios, annual average loss (AAL)²⁶ is expected to increase in all countries, particularly under RCP 8.5 (refer to Box 1-2). These hazards also contribute to soil degradation and long-term water scarcity, impacting other sectors, such as power generation, forestry, and ecosystems. In 2022, droughts led to €100 million in losses for hydroelectric power generation in Montenegro,²⁷ and 11 out of 13 electricity turbines had to be halted in Albania.²⁸

BOX 1-2: ECONOMIC REPERCUSSIONS OF CLIMATE IMPACTS ON AGRICULTURE

Climate change impacts exacerbate existing weaknesses in the agriculture sector in the Western Balkans, posing a threat to food security and economies. Floods, landslides, and wildfires can have significant impacts on agriculture, in part because of the destruction of livestock. For instance, floods in Albania in 2017 flooded 15,000 ha of crops and affected thousands of families through livestock losses.²⁹ Given the rainfed nature of most agriculture in the region, a changing climate is expected to have substantial macroeconomic repercussions, because agriculture represents a high share of GDP and employment in some countries.

Public spending in agriculture, which displays significant variations in size and efficiency, should be more focused on the green transition. From 2010–15, total budgetary transfers to agriculture as a proportion of GDP ranged between 0.26 percent in Albania and 1.14 percent in North Macedonia. However, in recent years, WB6 agricultural public expenditures from national budget, as well as from the EU-funded Program for Pre-Accession Assistance in Rural Development (IPARD) and other development partners, have been substantial and are still growing, providing readily available funding to finance the green transition in the region. Despite the increasing budget, the actual spending on agri-environmental measures or climate smart agriculture has remained modest.³⁰ The new agreement on the New Common Agricultural Policy (CAP) supports agriculture in making a much stronger contribution to the EU Green Deal (EGD) goal to become climate neutral in 2050.³¹

The future will be marked by increased volatility, as the region grapples with escalating repercussions.

Climate change in the region is expected to lead to increased volatility in precipitation patterns and temperature extremes, which, in turn, interacts and creates worsening feedback loops with changing soil dynamics, shifting ecosystems and growing seasons, altered wind patterns, and aggravated environmental conditions. Accordingly, the complexity, intensity, and unpredictability of climate-related shocks is expected to increase, with floods, wildfires (refer to Box 1-3), and landslides at the forefront.

The increased variability of rainfall is likely to worsen the incidence of flash floods in the region. From 2000–22, at least 131 people died, 92 were injured, and over 2 million were affected in the Western Balkans due to floods.³² Due to an expected decrease in the availability of water and overall drying in the region, overall flood hazard may decrease under more intense climate change (RCPs 4.5 and 8.5).³³ However, this finding

²⁶ AAL represents the expected average loss based on probabilistic analysis.

²⁷ Todorovic, Igor. 2022. "Drought to Cost Montenegro's EPCG Utility EUR 100 Million in Third Quarter." <https://balkangreenenergynews.com/drought-to-cost-montenegros-epcg-utility-eur-100-million-in-third-quarter>.

²⁸ Reuters. 2022. "Albania Dims Lights as Drought, Price Spike Spark Energy Crisis." <https://www.reuters.com/world/europe/albania-dims-lights-drought-price-spike-spark-energy-crisis-2022-03-21/>.

²⁹ Reliefweb, IFRC, December 2017

³⁰ Western Balkans Regional Economic Report. Fall 2023. <https://documents1.worldbank.org/curated/en/099101623051741490/pdf/P50064801939bc0a00a0d2077a3883b52c9.pdf>.

³¹ https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en. There is a higher share of eco-schemes that target organic farming, animal welfare, and other areas; these account for at least 25 percent of direct payments. Rural development measures need to include climate, biodiversity, animal welfare, and environmental targets (at least 35 percent of rural development funds). Forty percent of the budget will have to be climate-relevant and support biodiversity. Companies in the agricultural sector will have to adapt to the new CAP, which supports farmers who practice sustainable and climate-friendly agriculture.

³² CRED (Centre for Research on the Epidemiology of Disasters). 2023. EM-DAT database. <https://www.emdat.be/>.

³³ IPCC. 2021. Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. <https://www.ipcc.ch/report/ar6/wg1/>.

distracts from the increase in asset exposure and the incidence of flash floods, resulting from more volatile and more extreme rainfall events, particularly in the winter months.³⁴ The share of total flood damage caused by flash floods could almost double under RCP 8.5. Coastal flooding and sea level rise are expected to worsen in Albania and North Macedonia.³⁵

Wildfires are a growing threat for the Western Balkans, and their incidence and intensity has grown substantially. In 2021, 1,552 fires were recorded in the region, a 21 percent increase in the span of a decade³⁶ that burned a total of 144,379 ha of land. Climate change-linked increasing temperatures during summer months and reduced precipitation, unsustainable land use practices, and changing forest ecology are some of the main causes of increasing wildfires. Bosnia and Herzegovina saw a staggering 17-fold increase in wildfires from 2011–21; 31 percent of its forest area, 67.5 percent of major roads, and 21.3 percent of the 5-km area around the border with Montenegro were exposed to high and/or very high wildfire risks. This hazard can affect transboundary areas, requiring regional coordination in monitoring, early warning and response mechanisms, and coordinated training exercise for first responders.

BOX 1-3: AVERAGES HIDE THE EXTREME: WILDFIRES AS A CASE IN POINT

Focusing on the average number of wildfires or the extent of area under very high wildfire risk does not adequately capture the severity of the situation in certain places. For example, 7.2 percent of the forest area in Bosnia and Herzegovina is under very high wildfire risk; however, in municipalities such as Eastern Mostar, Jablanica, and Nevesinje, on average, 25 percent of the forest area is at very high wildfire risk. In Montenegro, 16.14 percent of the crop area is under very high wildfire risk; this number jumps to 27.3 percent, on average, in Mojkovac, Petnjica, and Šavnik. At the same time, 11.6 percent of the area in a 20-km buffer at the country borders is under very high wildfire risk, with 18.6 percent for the Kosovo-Serbia border and 16.3 percent for the Bosnia and Herzegovina-Montenegro border.

A changing climate is expected to increase the incidence of landslides. Contributing factors are the melting of snow and glaciers, heavy rains that result in greater soil erosion and more sediments in rivers and streams, and frequent wildfires. High slopes and soil composition increase localized landslides. Albania has the highest proportion of land area at risk of landslides (66 percent) (refer to Figure 1-8).³⁷ Some cities are susceptible to elevated landslide risk due to poorly planned urban expansion on steep slopes.³⁸

Earthquake risk is also high in the region; although seismic hazard is not related to climate, it interacts and compounds with other hazards and has substantial financial impacts. From 2000–22, at least 55 people died and 1,347 were injured due to earthquakes.³⁹ In Albania, the 2019 earthquake impacted more than 200,000 individuals, inflicted loss and damages of nearly €1 billion, and increased poverty in affected areas.⁴⁰ Earthquake risk is unevenly distributed across the region.⁴¹ Certain countries (Albania, Bosnia and Herzegovina, and Serbia) have regions at very high risk⁴² due to high exposure. Cities are often most at risk, given the concentration of people and assets and the potential for far higher financial losses.

³⁴ Ibid.

³⁵ UNDP GEF GoA. 2010. "Protected Area Gap Assessment, Marine Biodiversity and Legislation on Marine Protected Areas." <https://www.undp.org/sites/g/files/zskgke326/files/migration/al/Albania-Protected-Area-Gap-Assessment.pdf>.

³⁶ EFFIS. "Annual Fire Reports." <https://effis.jrc.ec.europa.eu/reports-and-publications/annual-fire-reports>.

³⁷ The European Landslide Susceptibility Map version 2 (ELSUS v2).

³⁸ Based on overlapping European Landslide Susceptibility Map version 2 (ELSUS v2) with Global Human Settlement Layer (GHSL) dataset-GHS-SMOD R2023A and GHS-POP R2023A -GHS population grid. 2020 and 2030.

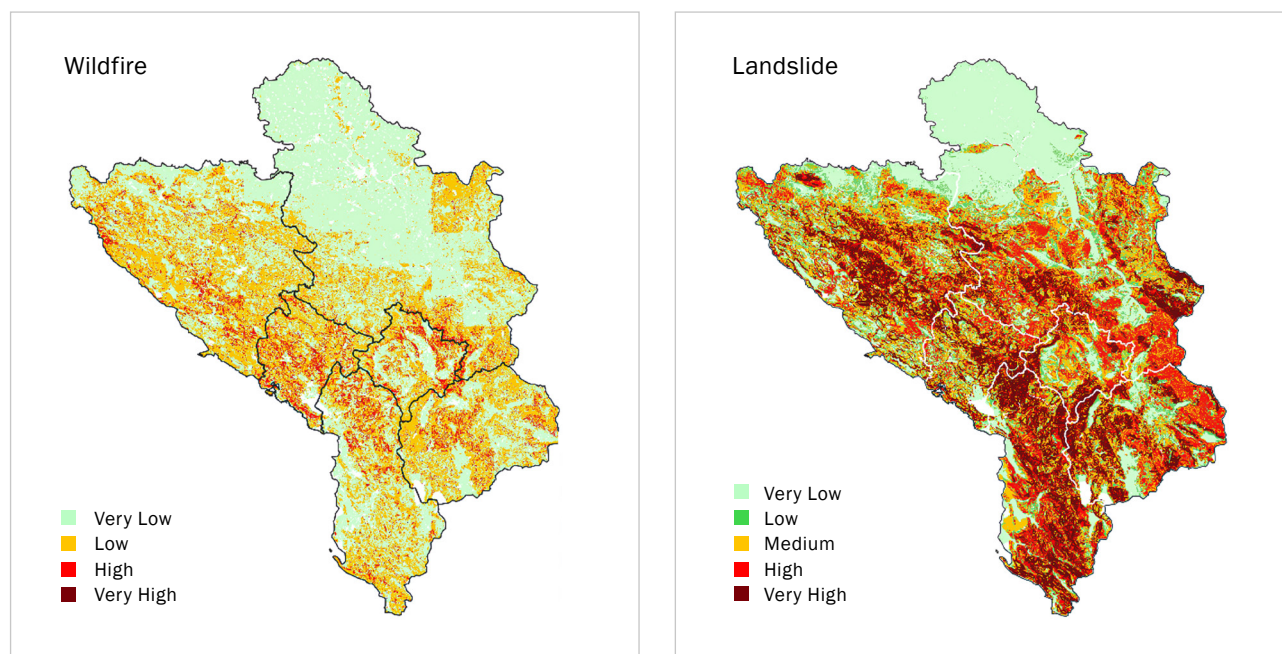
³⁹ CRED (Centre for Research on the Epidemiology of Disasters). 2023. EM-DAT database. <https://www.emdat.be/>.

⁴⁰ Survey of Households due to the Earthquake conducted by INSTAT showed that severe material deprivation increased to 41.6 percent post-earthquake, compared to 33.2 percent recorded in 2018.

⁴¹ World Bank data 2023. Global Economic Monitor.

⁴² Measured here by Annual Average Loss (AAL) indicator.

FIGURE 1-8: HIGH WILDFIRE AND LANDSLIDE RISKS IN CROSS-BORDER, MOUNTAINOUS REGIONS



Source: World Bank analysis (CIMA data) and European Land susceptibility (ELSUSV2)

The effects of climate change in the region are deadly, and often poorly understood, because these impacts can compound and cascade across hazards and space.

Climate-related shocks and stressors do not occur in isolation, making their impacts uncertain and potentially disastrous.⁴³ Removal of urban trees can multiply the effects of heatwaves and floods. Food supplies will be affected by production losses from heat and drought, compounded by heat-induced reduction in the productivity of workers. Risks can be transmitted across populations, places, and sectors, leading to cascading impacts. Critical infrastructure elements, such as transportation systems and power grids, are generally interdependent; the failure of one element or node can result in a cascade of adverse events. In the Western Balkans, 46 percent and 69 percent of major roads and power lines, respectively, are highly exposed to one or more hazards. Wildfires can increase air pollution that is already above average in WB6 countries (refer to Box 1-5), while disrupting the supply, and thus the prices, of essential food items. Damages to major economic and transport infrastructure ultimately impact people's lives, with temporary income losses through the impacts on jobs.⁴⁴

Recent disasters and studies have shown that critical infrastructure is often at risk. The power sector is at risk from extreme heat and wildfires; for instance, utilities design transmission lines to withstand a certain temperature level (typically, 30°C average over a month and 40°C for a day). Furthermore, numerous legacy hazardous sites, for instance, at the border between Kosovo and Serbia, are exposed to floods and other hazards; they serve as significant contributors to methane emissions and air pollution (refer to Box 1-4). Dealing with such events would require clear sources of financing, agency collaboration, and response mechanisms decided on ex ante, particularly in transboundary areas to avoid ensuing disputes. Another example of critical infrastructure is educational facilities, exposed to extreme weather events that affect learning outcomes.⁴⁵ The lack of climate financing⁴⁶ also hinders the country's ability to handle climate-health emergencies.

⁴³ IPCC. nd. Working group 2, AR6, Impacts, Adaptation and Vulnerability. <https://www.ipcc.ch/report/ar6/wg2/chapter/summary-for-policymakers/>.

⁴⁴ The 2014 floods in Bosnia and Herzegovina and in Serbia offer two examples of that, as documented in Recovery Needs Assessment reports. In Bosnia and Herzegovina, 33,500 wage workers were directly affected by the floods, leading to job losses, as shown by the recorded drop in pension contributions. In Serbia, 51,800 jobs were temporarily lost in the affected municipalities.

⁴⁵ UNICEF. 2019. "It is Getting Hot: Call for Education Systems to Respond to the Climate Crisis. Perspectives from the East Asia and the Pacific." Bangkok: UNICEF East Asia and Pacific Regional Office.

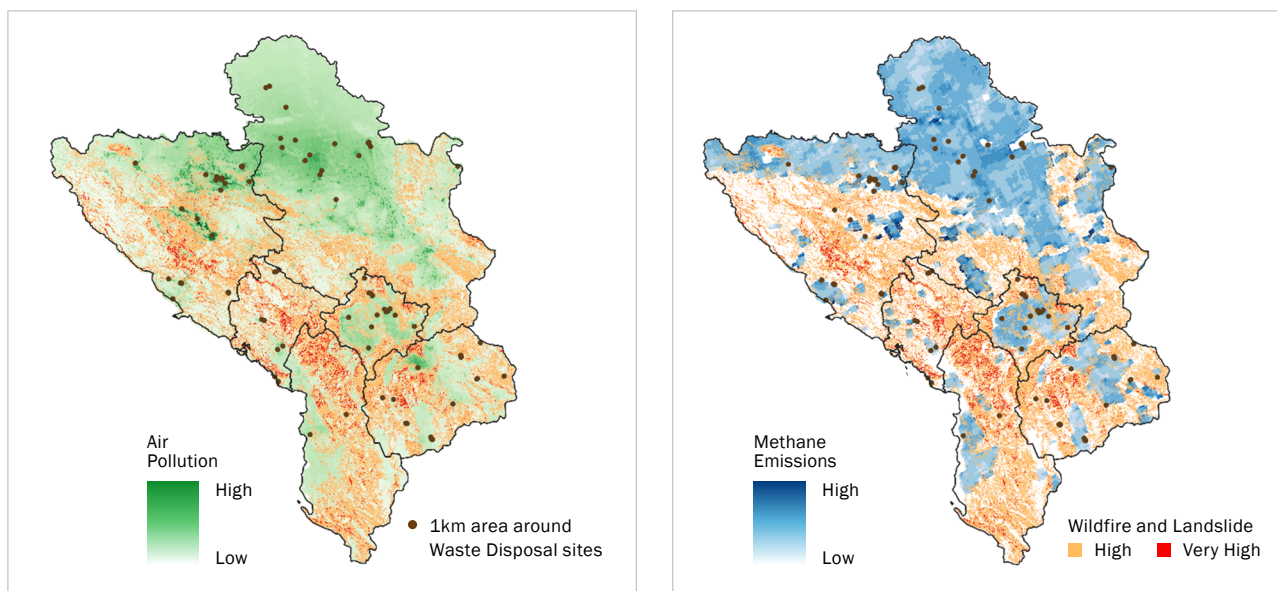
⁴⁶ Stockholm Environment Institute. 2023. "Climate Finance Is Lacking in the Western Balkans, Eastern Europe and the Caucasus." <https://www.sei.org/features/climate-finance-is-lacking-in-the-western-balkans-eastern-europe-and-the-caucasus/>.

BOX 1-4: POORLY MANAGED WASTE EXACERBATES HAZARDS AND CONTRIBUTES TO CLIMATE CHANGE

Landfill fires are both causing and spreading wildfires in the region, largely due to the widespread open burning of waste practices. In the Western Balkans, 22.2 percent of dumpsites measured within a 1-km radius⁴⁷ are in areas with very high risk of wildfires (refer to Figure 1-9). When landfill fires occur, highly toxic chemicals are released into the air. In addition to wildfires, 18.18 percent of waste disposal sites are in very high landslide risk areas. Mitrovica in northern Kosovo has 2,529 illegal dumpsites; many of them are in high landslide risk regions and often next to densely populated regions.⁴⁸ The landfills near Obrenovac Municipality in Belgrade city, Serbia, are known to contain over 20 tons of dangerous illegal waste (consisting of organic waste and hazardous chemicals such as benzene, toluene, and xylene. These are the very landfills that were flooded during the 2014 floods, dumping their contents into neighboring towns.⁴⁹

Poorly managed waste disposal is also actively leading to warming and pollution by emitting significant amounts of methane into the atmosphere. Methane is the most powerful driver of climate change among the short-lived substances. With an atmospheric lifetime of roughly a decade, methane is responsible for around 16 percent of global emissions and is more than 28 times as potent as carbon dioxide at trapping heat in the atmosphere.⁵⁰ In addition, methane also contributes to the formation of ground-level ozone, a dangerous air pollutant. As one of the largest emitters of methane, the waste sector is responsible for around 20 percent of global methane that stems from human activity. Within the waste sector, methane is generated mainly when organic waste decomposes in anaerobic conditions (such as in waste dumps and landfills) and is released into the atmosphere in the absence of proper landfill gas management systems. Average concentration of PM10 is almost 10 times higher than the WHO standard at the Sharra solid waste dump located near Tirana.⁵¹ Per capita methane emissions have been increasing in the regions.⁵²

FIGURE 1-9: WASTE DISPOSAL SITES EXPOSED TO HIGH WILDFIRE AND LANDSLIDE RISK AREAS AND ASSOCIATED AIR POLLUTION AND METHANE EMISSIONS



Sources: CORINE Land Cover (CLC) 2018; European air quality maps for 2019; CIMA Analysis, European Landslide Susceptibility Map version 2 ELSUS V2.

⁴⁷ Waste disposal sites from CLC (CORINE Land Cover). 2018.

⁴⁸ "Report on Municipal Waste Management in Kosovo," Reporting Year 2018.

⁴⁹ Nikolic, A, M. Mikic, and Z. Naunovic. 2017. "Broadening the Urban Sustainable Energy Diapason through Energy Recovery from Waste: A Feasibility Study for the Capital of Serbia." *Renewable and Sustainable Energy Review* 69: -1-8. ISSN 1364-0321.

⁵⁰ EPA. 2023. "Importance of Methane." <https://www.epa.gov/gmi/importance-methane#:~:text=Methane%20is%20the%20second%20most.trapping%20heat%20in%20the%20atmosphere>.

⁵¹ Besnik, Baraj, and Merita Mansaku. Hotspot: Sharra Dumpsite in Tirana, Albania. Meksi EDEN Center.

⁵² Ibid.

BOX 1-5: ADAPTATION AND MITIGATION EFFORTS ARE INTERLINKED: AIR POLLUTION IS A CASE IN POINT

Air pollution is a major public health threat that also has important implications for local warming. Cities in the Western Balkans are European hotspots for air pollution. The three-year PM_{2.5} average (2016–18) is above the exposure concentration obligation, and ozone levels are well above the EU Air Quality legislation limits across several cities. Of the premature deaths from air pollution, 93 percent are associated with PM_{2.5} and ground-level ozone (O₃). These findings underscore the need to build the capacity to mitigate the impacts of polluted air in cities. Yet unlike other natural hazards, local air pollution has local causes. Toxic PM_{2.5} and ozone emissions are mainly from diesel-fueled vehicle emissions, biomass burning for domestic heating, and outdated coal power plants.⁵³ In addition, O₃ and black carbon, a key component of particulate matter (PM_{2.5}), have well-documented effects on local warming. Black carbon in PM_{2.5} particles and O₃, when deposited on ice and snow, cause local warming and increased melting, thereby contributing to climate change.⁵⁴

Appropriate and effective water management is pivotal for climate adaptation efforts in the region to mitigate the impacts of both floods and drought

Water management is a key component of adaptation efforts in the WB6. Countries in the region face the dual challenge of having to effectively contain abnormal water surges due to the increase in frequency and magnitude of extreme flood and flash flood events, while also managing increasing water scarcity that will threaten food security and effective delivery of basic services in urban and rural areas alike.

Improving water management practices represent the first layer of defense against flood-related impacts. Yet, local tensions and diverging national interests make it harder to coordinate on river basin management efforts. Also, much of the drainage and pumping infrastructure was built in the 1960s and not sufficiently dimensioned for the current distribution of agricultural land and urban settlements.⁵⁵ Thus, agricultural, forestry, and urban uses have expanded to floodplain areas, increasing exposure and potential damages.⁵⁶

Improving water management practices requires a combination of transversal, transboundary, and targeted actions. Urban areas could be targeted, for instance, via nature-based solutions such as green roofs and walls, blue roofs with temporary storage water capacity, or improvements in urban draining infrastructure and channel systems that are often outdated or insufficient; or incremental improvements in the resilience of non-urban key transport links—such as bridges, main roads, or railways—by better identifying vulnerability and regularly investing in maintenance and asset management. Cross-sectoral action is also crucial, through combination of land-use regulation and nature-based solutions aimed at soil conservation (afforestation, agriculture), and floodplain and wetland restoration. Agro-forestry and terraced cultivation are classic examples of agriculture initiatives with flood adaptation benefits.⁵⁷ A classic example of necessary transboundary action is regional cooperation on river basin management. The World Bank has launched the Drina River Basin project to promote coordination and communication between Bosnia and Herzegovina, Montenegro, and Serbia, followed by the Sava and Drina River Corridors Integrated Development Program. Transboundary action can also be cross-sectoral, as exemplified by the cooperation between Croatia and Serbia in developing a transboundary retention forest to reduce peak flows of the Sava River under the FORRET project.⁵⁸

⁵³ Claudio A. Belis, Rita Van Dingenen, Zbigniew Klimont, and Frank Dentener, 2022. Scenario Analysis of PM_{2.5} and Ozone Impacts on Health, Crops and Climate with TM5-FASST: A case study in the Western Balkans." *Journal of Environmental Management* 319: 115738, ISSN 0301-4797. <https://doi.org/10.1016/j.jenvman.2022.115738>.

⁵⁴ UNDP. 2022. "Air Pollution in the Western Balkans: Key Messages for Policymakers and the Public." <https://zoinet.org/wp-content/uploads/2022/02/Pollution-Balkans-EN2.pdf>.

⁵⁵ Schwarz, Ulrich, Sanja Pokrajac, Kathrin Bockmühl, and Gisela Stolpe. *Nature-Based Solutions for Flood Risk Prevention in South-Eastern Europe.* Deutschland/Bundesamt für Naturschutz, 2018.

⁵⁶ In particular, in river valleys and foothills' slopes.

⁵⁷ Schwaz et al. 2018.

⁵⁸ Transboundary Forest Retention Project for Integrated Flood Risk, Environmental and Forestry Management FORRET, <http://www.voda.hr/hr/novosti/medunarodna-suradnja-hrvatske-srbije-na-projektu-forret>.

The increasing risk of drought contrasts sharply with the insufficient planning for its management, where countries predominantly pursue a reactive approach to addressing water scarcity and drought conditions. Key entry points for coordinated transboundary actions are the International Sava River Basin Commission and the International Commission for the Protection of the Danube Region, in which most Western Balkan countries are members. These aim to improve water security using an integrated river basin management approach to meet water demand and increase resilience against floods and droughts. Other important measures include the increase of the water storage capacity.⁵⁹ Also essential are integrating gray and green storage solutions, such as utilizing groundwater, wetlands, and soil moisture reserves. Modernizing outdated irrigation infrastructure would improve water use efficiency, reduce water losses, and enhance crop yields. Support could also be provided for commercially viable adoption of climate smart agriculture technologies, including investments to improve efficient use of water in agricultural production, post harvesting and processing, soil moisture management, drought-resistant varieties, access and use of agroclimatic information, and digital agriculture. These approaches, along with innovative agriculture risk management mechanisms, can be scaled up and integrated in WB6 countries' farmer support programs. There is also an urgent need to invest in the modernization of the water supply systems to improve service efficiency as a crucial measure for adapting to climate change.

Investing in adaptation can yield multiple dividends—including avoided losses, economic benefits, and social and environmental spillovers

To counter the growing risks linked to a changing climate, Western Balkan countries will need to consider large investments in adaptation—investments that may come with significant benefits. The undiscounted costs of proposed policy actions and investments for an initial detailed adaptation package in the six Western countries (expressed in 2020 USD) include US\$6.4 billion in North Macedonia, US\$9.5 billion in Serbia, US\$5.7 billion in Montenegro, US\$6.8 billion in Bosnia and Herzegovina, US\$6 billion in Albania, and US\$2.8 billion in Kosovo. The total for the region comes to \$37.2 billion (in 2020 US\$) undiscounted. Multiple sources of information were used to estimate the needs of each country.

Climate change adaptation investments, particularly in low- and middle-income countries, yield significant benefits. Climate change adaptation investments, particularly in low- and middle-income countries, yield significant benefits, with about US\$4 in benefits for every US\$1 invested and a total net benefit of up to US\$7.1 trillion, according to global studies.⁶⁰ Investments in adaptation would also be associated with loss avoidance: up to US\$3 in losses are avoided with every US\$1 spent over 20 years.⁶¹ Using the Triple Dividend of Resilience framework, a study specific for Europe found high benefits ranging from 2 to 10 for every €1 invested in Europe.⁶² The framework (refer to Figure 1-10), categorizes benefits into (1) *avoided losses*, (2) *accelerated economic potentials*, and (3) *amplified environmental and social co-benefits* emphasizing the importance of proactive adaptation.

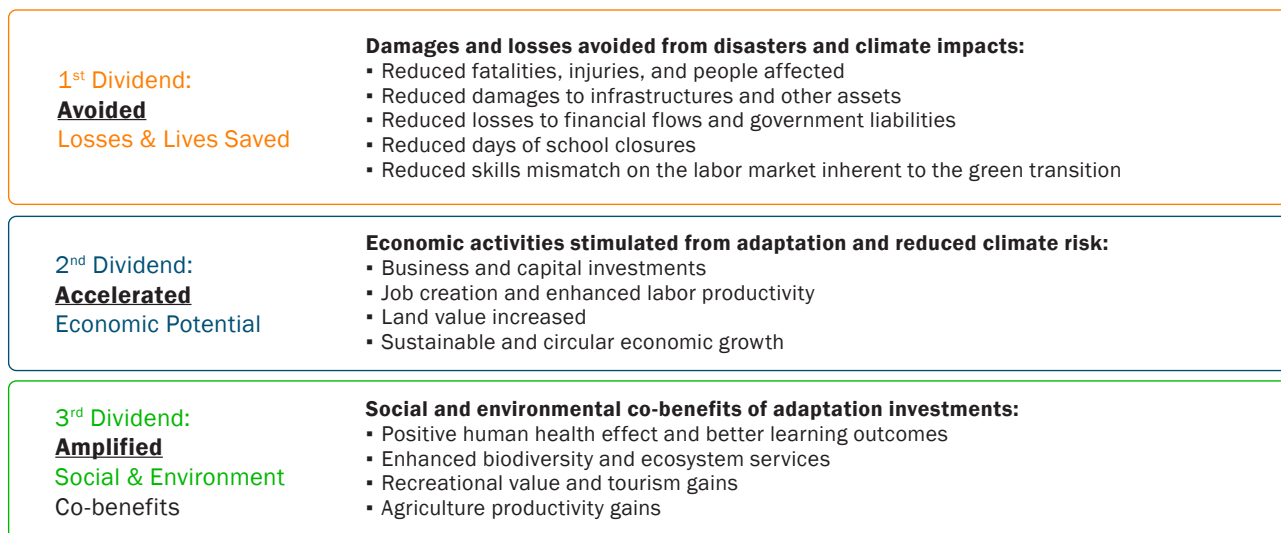
⁵⁹ Sedimentation for instance, has caused dam storage losses in Albania with an average value down to 57 percent of the original design capacity, necessitating improved sediment management and dam rehabilitation strategies.

⁶⁰ Global Commission on Adaptation. 2019. "Adapt Now: A Global Call for Leadership on Climate Resilience." https://gca.org/wp-content/uploads/2019/09/GlobalCommission_Report_FINAL.pdf?_gl=1*1gronxf*_ga*MTYwMzUzMjU2My4xNjk2NTgwOTA3*_up*MQ

⁶¹ Petkov, I. Public Investment in Hazard Mitigation: Effectiveness and the Role of Community Diversity. *EconDisCliCha* 7, 33–92 (2023). <https://doi.org/10.1007/s41885-022-00119-5>

⁶² Original term is "Triple Dividend of Resilience," modified here to "Triple-A Dividend of Resilience." The Triple Dividend framework was developed and described in Tanner, T. et al., 2015. *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.; World Bank. 2021. "Economics for Disaster Prevention and Preparedness: Investment in Disaster Risk Management in Europe Makes Economic Sense." Summary Report, World Bank, Washington, DC. <https://www.worldbank.org/en/region/eca/brief/economics-for-disaster-prevention-preparedness-europe>

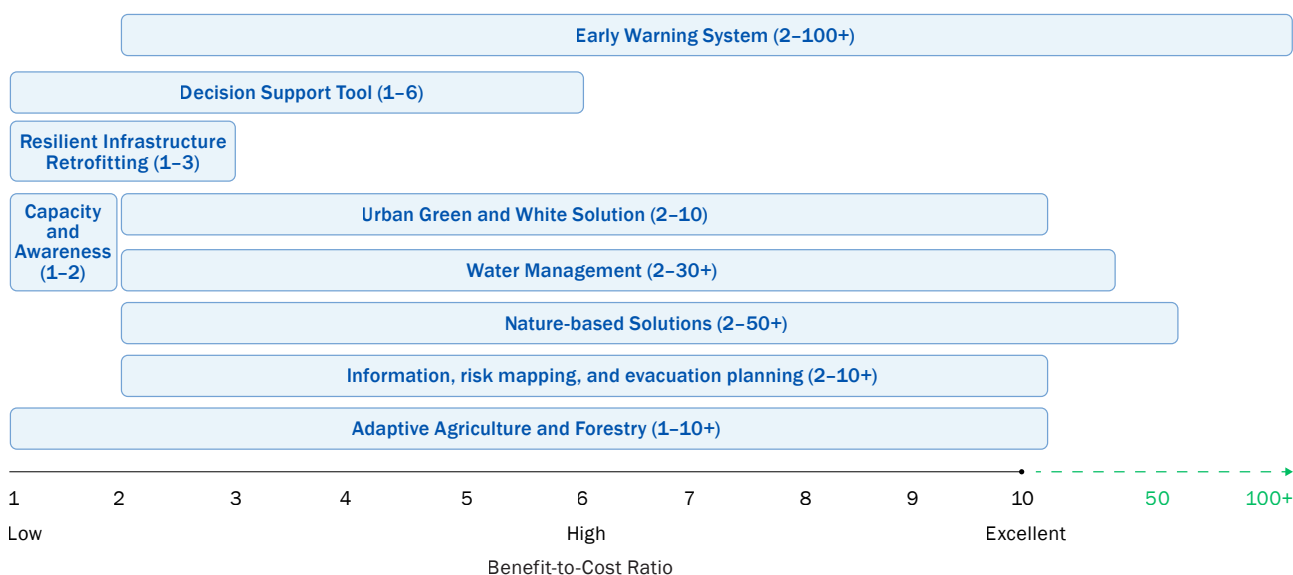
FIGURE 1-10: “TRIPLE-A” DIVIDEND FRAMEWORK



Source: Authors, adapted from original figure from Tanner, T. et al., 2015.

The substantial benefits identified by the Triple Dividend Framework justify the economic sense of investing in adaptation (see Figure 1-1). Benefits were found to be particularly high for practices such as sustainable land and soil management or weather and climate forecasting services.⁶³ A year of education increases pro-climate beliefs, behaviors, most policy preferences, and green voting, with voting gains equivalent to a substantial 35 percent increase.⁶⁴ Figure 1-11 presents BCRs for selected disaster risk management and adaptation measures across the globe found in 120+ studies, including several covering WB6 countries.⁶⁵

FIGURE 1-11: BENEFIT-COST RATIOS OF SELECTED DRM AND ADAPTATION MEASURES IN LITERATURE



Source: Authors based on a literature review of 120+ studies.

⁶³ UNEP. 2021. Adaptation Gap Report 2021. <https://www.unep.org/resources/adaptation-gap-report-2021>

⁶⁴ Angrist, N., K. Winseck, H. A. Patrinos, and J. S. Graff Zivin. 2023. “Human Capital and Climate Change.” NBER Working Paper No. 31000, National Bureau of Economic Research, Cambridge, Massachusetts. <https://www.nber.org/papers/w31000>

⁶⁵ It should be noted that BCRs of adaptation measures are highly site- and context-specific, and there is high uncertainty about the scale and type of climate change impacts. They must consider (1) the differences in types of benefits that can be generated; (2) the ranges of benefits based on factors such as location, design of projects, and methodological approaches to measure benefits; (3) the overall uncertainty on climate change impacts, additionality of benefits, consideration of non-monetarized elements such as social cohesion or ecosystem value; and (4) the costs and potential adverse effects of CCA investments and risk of maladaptation. Also, BCRs should not be considered as a single criterium for decision-making but should be considered alongside a multitude of criteria and analysis, because not all aspects are captured in monetary terms.

Avoided losses: Investing in adaptation saves lives and reduces physical damage and financial losses. In Bosnia and Herzegovina, a benefit-cost analysis of structural adaptation measures in agriculture, forestry, and tourism shows positive BCRs ranging from 1.06 to 14.15.⁶⁶ A World Bank assessment showed net benefits up to €422 million for upgrading and retrofitting educational infrastructure across Europe for seismic resilience and energy efficiency.⁶⁷ In Albania, climate resilient measures for road assets yielded benefits amounting to €6.7 million and BCRs up to 1.1 for landslide prevention and BCRs ranging from 1.4 to 2436 for flood protection;⁶⁸ capacity building against seismic risks was associated with a BCR of 1.9.⁶⁹ Evidence from the literature shows extremely high BCRs for Early Warning Systems (EWS)⁷⁰ that are generally greater than 2 and sometimes up to hundreds.⁷¹ The Albanian NAP mentions that based on an economic assessment by the World Meteorological Organization, the average BCR for flood forecasting and hydro metrological services in terms of reduced economic losses for the country is about 7.⁷² In North Macedonia, the implementation of national health action plans under a two-year WHO program enhanced public preparedness and response to health risks,⁷³ while building structural flood protection measures and anti-erosion measures yields a BCR of 7.83.⁷⁴

Accelerated economic potential: Reductions in background climate and disaster risks can stimulate economic activities via an increase in business and capital investment, labor productivity, and land values.

According to the Economic and Investment Plan for the Western Balkans developed by the European Commission, taking actions in climate adaptation and mitigation promotes circular economic growth and provides new business opportunities related to sustainability and energy efficiency.⁷⁵ In Serbia, an assessment of investment in the restoration of sessile oak forests destroyed by wildfires shows positive returns based on wood production.⁷⁶ In Portugal, an adaptive forest and fuel management program for wildfire risk reduction yields a high BCR of 11.9 and a total benefit of €26.31 million, from which €2.63 million is generated from the economic value added to the country's economy from the sale of cork and increases in land purchases.⁷⁷ In Bosnia and Herzegovina, structural adaptation measures for the tourism sector were associated with substantial economic returns.⁷⁸

Investments in adaptation are also big multipliers of jobs, with up to 6 to 187 direct and indirect jobs, and potentially an additional 3 to 113 induced jobs for every US\$1 million in investment. This report uses

⁶⁶ Cupač, R., Trbić, G. & Zahirović, E. Cost-benefit analysis of climate change adaptation measures in Bosnia and Herzegovina. *Euro-Mediterr J Environ Integr* 5, 26 (2020). <https://doi.org/10.1007/s41207-020-00160-4>

⁶⁷ World Bank. 2021. "Economics for Disaster Prevention and Preparedness: Investment in Disaster Risk Management in Europe Makes Economic Sense." Summary Report, World Bank, Washington, DC. <https://documents1.worldbank.org/curated/en/873811622437677342/pdf/Summary-Report.pdf>

⁶⁸ Xiong, J., and E. X. Alegre. 2019. "Climate Resilient Road Assets in Albania." World Bank, Washington, DC. documents1.worldbank.org/curated/en/69643155687729366/pdf/Climate-Resilient-Road-Assets-in-Albania.pdf

⁶⁹ World Bank and European Commission. 2021. "Economics for Disaster Prevention and Preparedness: Investment in Disaster Risk Management in Europe Makes Economic Sense." Background Report, World Bank Group, Washington, DC. <http://documents.worldbank.org/curated/en/280321622578148100/Background-Report>.

⁷⁰ The BCRs associated with EWS depend on the effectiveness of the EWS, the geological context, and climate uncertainties.

⁷¹ World Bank and European Commission. 2021. "Economics for Disaster Prevention and Preparedness: Investment in Disaster Risk Management in Europe Makes Economic Sense." Background Report. World Bank Group, Washington, DC. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/280321622578148100/background-report>; Republic of Albania. 2021. National Adaptation Planning (NAP) to Climate Change in Albania. Framework for the Country Process. Chiabai, A., Spadaro, J. & Neumann, M., 2018. Valuing deaths or years of life lost? Economic benefits of avoided mortality from early heat warning systems. *Mitigation and adaptation strategies for global change*, Volume 23(7), pp. 1159-1176; Hunt, A. et al. 2017. Climate and weather service provision: Economic appraisal of adaptation to health impacts. *Climate Services* 7 (2017) 78–86. <https://www.sciencedirect.com/science/article/pii/S2405880716300346?via%3Dihub>

⁷² Republic of Albania. 2021. "National Adaptation Planning (NAP) to Climate Change in Albania: Framework for the Country Process." NAP Training unfccc.int.

⁷³ See the two-year (2009–11) WHO project, "Protecting Health from Climate Change." https://climate-adapt.eea.europa.eu/en/metadata/case-studies/implementation-of-the-heat-health-action-plan-of-the-former-yugoslav-republic-of-macedonia/#cost_benefit_anchor.

⁷⁴ World Bank and European Commission. 2021. "Economics for Disaster Prevention and Preparedness: Financial Risk and Opportunities to Build Resilience in Europe." <https://www.worldbank.org/en/news/feature/2021/06/04/economics-for-disaster-prevention-and-preparedness-in-europe>

⁷⁵ European Commission. 2020. "Economic and Investment Plan for the Western Balkans." economic-and-investment-plan-brochure.pdf wbif.eu.

⁷⁶ Ratknic, T., et al. 2021. "An analysis of the Profitability of the Restitution of Sessile Oak Forests Affected by Wildfires in Serbia" *Notulae Botanicae Horti Agrobotanici Cluj-Napoca* 49 (2): 12260. <https://notulaebotanicae.ro/index.php/nbha/article/view/12260/9177>.

⁷⁷ World Bank and European Commission. 2021. "Economics for Disaster Prevention and Preparedness: Investment in Disaster Risk Management in Europe Makes Economic Sense." Background Report. World Bank Group, Washington, DC. <http://documents.worldbank.org/curated/en/280321622578148100/Background-Report>.

⁷⁸ Cupač, R., G. Trbić, and E. Zahirović. 2020. "Cost-Benefit Analysis of Climate Change Adaptation Measures in Bosnia and Herzegovina." *Euro-Mediterr Journal of Environmental Integr* 5, 26 (2020). <https://link.springer.com/article/10.1007/s41207-020-00160-4>.

a simple approach based on country-level national accounts to approximate direct job impacts in each of the six countries⁷⁹ with the use of the Eora employment multipliers based on Input-Output sectoral matrices to estimate the indirect job effects.⁸⁰ Some jobs will be lost, but the net effect is expected to be positive. Moreover, there will be significant changes in the nature of many jobs, which are expected to require additional (green and other) skills.⁸¹ A World Bank assessment shows that the bridge and road resilience measures implemented in North Macedonia not only reduce flood damage; they also have a positive effect on the economic activity and labor market⁸²; the investment yields positive returns in the long run until 2041, with net present value of MKD 21.77 million and an internal rate of return of 16 percent.

TABLE 1-1: BENEFIT COST RATIO OF SOME INVESTMENTS IN THE WESTERN BALKAN COUNTRIES

Country	Investment type	Hazard(s)	Sector(s)	BCR/Net Benefit	Reference
Albania	Road resilience upgrading (implementation of retaining walls and flood-resilient culverts)	Landslide, flooding	Transport, CI	0.1–1.1 (landslide), 1.4–2436 (flood) ⁸³	Xiong, J., and E. X. Alegre 2019 ⁸⁴
Albania	Capacity and regional rescue networks	Earthquake	DRM	1.9	World Bank and European Commission, 2021 ⁸⁵
BiH	Structural adaptation measures (reconstruction of flood protection facilities), NBS (afforestation), adaptive management plans (artificial snow for winter tourism)	Flood, drought	Agriculture, forestry, tourism, water	1.11–14.15 (tourism), 0.51–9.48 (forestry), 1.13–1.51 (agriculture), 1.06–1.09 (water)	Cupac, et al. 2020 ⁸⁶
North Macedonia	Improved crop varieties, Irrigation, drainage, and fertilizer improvement	Climate change	Agriculture	Net revenue: 300-103,000 2009 USD per hectare 2009USD	Sutton, W. 2013 ⁸⁷

⁷⁹ We estimate the response of employment in the construction sector to the gross value added generated by the same sector using the longest consistent available time-series published by national statistical services. The resulting estimates are only meant to illustrate the potential for job creation and can be interpreted as overestimates of the true effect. The simple approach is assuming a linear relationship between employment and demand in the construction sector – while factors such as spare capacity and intensity of labor utilization will affect the response. The direct job multiplier is sensitive to the length of the time-series considered due to the reduced amount of datapoints. Moreover, the model fails to capture the change in labor demand that is due to changes in other supply chains. A more comprehensive approach, beyond the scope of this illustrative example, would employ monthly or quarterly data, whenever available, and include all upstream and downstream sectors weighted by their supply/demand share as per the country's Input-Output matrix.

⁸⁰ M. Lenzen, K. Kanemoto, D. Moran, and A. Geschke. 2012. "Mapping the Structure of the World Economy." *Environmental Science & Technology* 46 (15): 8374–81.

⁸¹ Sanchez-Reaza, Javier, Diego Ambasz, Predrag Djukic, and Karla McEvoy. 2022. *Making the European Green Deal Work for People: The Role of Human Development in the Green Transition*. Washington DC: World Bank.

⁸² World Bank. 2019. "Technical Assistance Preparation of Climate Resilience Design Guidelines for the Public Enterprise for State Roads in North Macedonia—Part B Climate Resilience Design Guidelines." [PartB-CLIMATE-RESILIENCE-DESIGN-Guidelines.pdf \(mcas.ms\)](https://documents.worldbank.org/curated/en/69643155687729366/pdf/Climate-Resilient-Road-Assets-in-Albania.pdf).

⁸³ The BCR range varies significantly as the CBA assessed the costs and benefits of replacement of culverts per corridor and thus is highly dependent on the geographical context and highly site-specific. The BCRs are used to prioritize CCA interventions in corridors that provide the most positive investment returns.

⁸⁴ Xiong, J., and E. X. Alegre. 2019. "Climate Resilient Road Assets in Albania." Washington, DC.: World Bank.

<https://documents1.worldbank.org/curated/en/69643155687729366/pdf/Climate-Resilient-Road-Assets-in-Albania.pdf>

⁸⁵ World Bank and European Commission. 2021. "Economics for Disaster Prevention and Preparedness : Investment in Disaster Risk Management in Europe Makes Economic Sense." Background Report. Washington, DC : World Bank Group.

<https://documents.worldbank.org/en/publication/documents-reports/documentdetail/280321622578148100/background-report>

⁸⁶ Cupac, R., G. Trbić, and E. Zahirović. 2020. "Cost–Benefit Analysis of Climate Change Adaptation Measures in Bosnia and Herzegovina." *Euro-Mediterr Journal Environ Integr* 5, 26. <https://link.springer.com/article/10.1007/s41207-020-00160-4>; http://uest.ntua.gr/adapt2clima/proceedings/pdf/ADAPTtoCLIMATE2019_%20Cupac_etal.pdf

⁸⁷ Sutton, W. 2013. "Reducing the Vulnerability of the Former Yugoslav Republic of Macedonia's Agricultural Systems to Climate Change: Impact Assessment and Adaptation Options." World Bank.

<https://books.google.fr/books?id=IVeFAQAQBAJ&printsec=frontcover&hl=zh-CN#v=onepage&q&f=false>

Country	Investment type	Hazard(s)	Sector(s)	BCR/Net Benefit	Reference
North Macedonia	Multiple short- and long-term structural adaptation measures and NBS ⁸⁸	Flood	Water, CI, DRM	NPV: 20.8 million MKD (short-term measures), 21.8 million MKD (long-term measures)	White, J., et al. 2023 ⁸⁹
North Macedonia	Structural flood protection measures (check dams, embankments, and mobile barriers), and anti-erosion measures (technical, biotechnical, and biological measures)	Flood	Water, DRM	7.83	Economic Analysis and Assessment, PointPro, 2022 ⁹⁰
Serbia	Public buildings retrofitting	Climate change	Energy, CI	1.15 (emergency center); 1.45 (kindergarten)	Dukac, M., and M. Zidar, 2021 ⁹¹
Montenegro	Structural adaptation measures (watershed protection measures), monitoring and forecasting measures (EWS and risk mapping), climate-smart designs (climate smart agriculture for high-value crops), capacity building (community-based, climate-resilient tourism programs), hazard preparedness and awareness campaigns on health impacts	Climate change	Agriculture, water, tourism, health	BCR: 2,6-4,91 (health); NPV: 529,624-1,467,761 EUR (agriculture), 9,665,057-14,997,653 EUR (water), 7,562,639-9,611,332 EUR (tourism), 1,168,011-2,265,848 EUR (health)	GoM and UNDP 2023 ⁹²

Note: CI = critical infrastructure.

Amplified social and environmental co-benefits: Adaptation investments can also yield substantial social and environmental co-benefits. Nature-based water and forest management measures often yield high net benefits in terms of reducing flood and wildfire risks and generating environmental and ecological co-benefits. BCRs are generally greater than 2 and can be up to 12 for peatland restoration and up to 18 for floodplain restoration.⁹³ In the Western Balkans, investments in critical infrastructure and retrofitting of public buildings for climate-resilience and energy efficiency yield substantial positive returns; for instance, a total energy saving of €500 million over the lifetime for public building in Albania⁹⁴ and BCRs higher than 1 (1.15-1.45) for emergency

⁸⁸ The short-term measures are designed to be easily implemented and low cost (small check dams and early warning system); the long-term measures provide a more comprehensive solution to and include a mix of interventions in addition to the short-term measures (afforestation, improved land use patterns, and river trainings).

⁸⁹ White, J. et al. 2023. 'Methodology Statement: Technical Assistance Preparation of Climate Resilience Design Guidelines for the Public Enterprise for State Roads in North Macedonia.' <https://roads.org.mk/wp-content/uploads/2023/03/PartB-CLIMATE-RESILIENCE-DESIGN-Guidelines.pdf?>

⁹⁰ Economic Analysis and Assessment, PointPro, 2022; Developed within the project "Resilience to Floods in Polog Region," financed by Swiss Government and implemented by UNDP.

⁹¹ Đukić, Mališa, and Margareta Zidar. 2021. "Sustainability of Investment Projects with Energy Efficiency and Non-Energy Efficiency Costs: Case Examples of Public Buildings" Sustainability 13, no. 11: 5837. <https://doi.org/10.3390/su13115837>

⁹² GoM, UNDP, 2023. National Adaptation Plan (NAP) Montenegro. in prep.

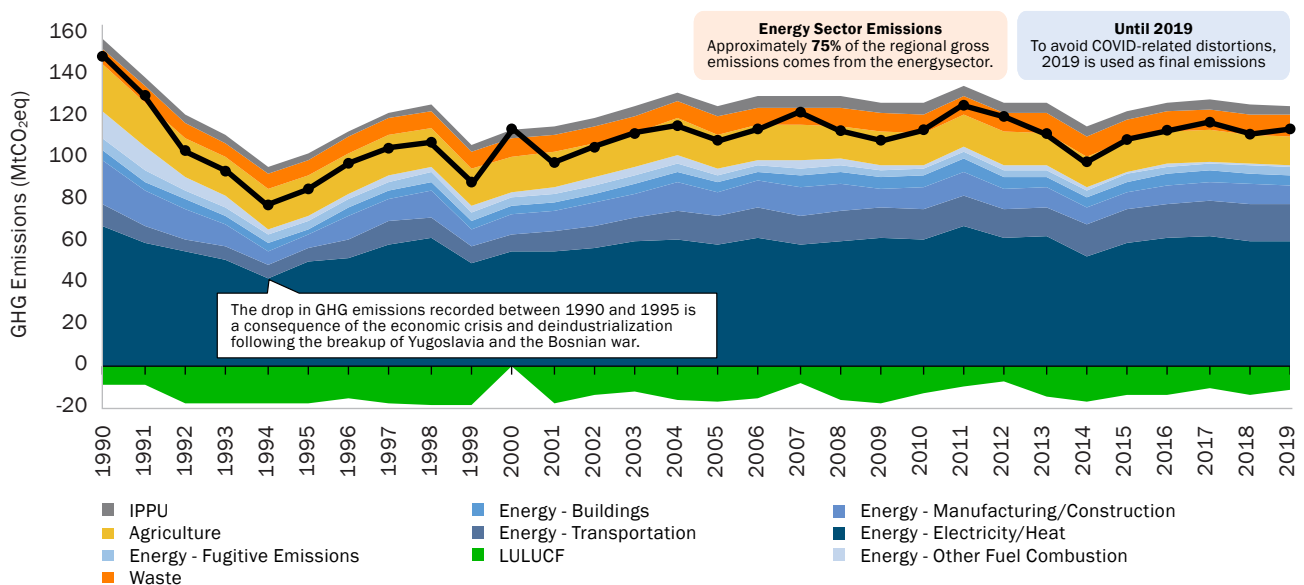
⁹³ World Bank. 2021. "Economics for Disaster Prevention and Preparedness: Investment in Disaster Risk Management in Europe Makes Economic Sense." World Bank Document. Climate Change Committee. 2021. "Independent Assessment of UK Climate Risk: Advice to Government for the UK's third Climate Change Risk Assessment (CCRA3). [UK Climate Change Risk Assessment 2022 \(publishing.service.gov.uk\)](https://www.ukclimatechange.gov.uk/publications/uk-climate-change-risk-assessment-2022).

⁹⁴ Novikova, A., Z. Szalay, M. Horváth, et al. "2020. Assessment of Energy-Saving Potential, Associated Costs and Co-Benefits of Public Buildings in Albania." Energy Efficiency 13, 1387-1407. <https://doi.org/10.1007/s12053-020-09883-3>.

centers and kindergartens in Serbia.⁹⁵ The combination of white solutions (such as albedo roofs and walls, reflective surfaces, and light-colored pavements); green solutions (such as green roofs, street trees, rain gardens and public parks); and blue solutions (wetlands, rainwater harvesting or permeable pavements) often yields higher net benefits than standalone measures. The drafted NAP of Montenegro⁹⁶ has also identified multiple co-benefits, such as biodiversity and mitigation co-benefits, for prioritized adaptation measures in agriculture, water, tourism, and health sectors. The measures are shown to be economically beneficial and yield NPVs of €0.5-14 million, while adaptation measures in the health sectors yield positive BCRs ranging from 2.6 to 4.91.

The BCRs presented refer mainly to project, program, or sectoral investments, while the BCRs presented in Chapter 4 are at the country level (refer to Table 4-1), as part of modeling the impacts of adaptation measures. The latter are limited to three hazards (floods, heat, and drought impact on maize and wheat); they do not include the positive impacts on growth of investments in adaptation or co-benefits; they are not tailored to the local context; and they focus on limited adaptation options. Alignment of adaptation strategies with sectoral plans, streamlining of the climate agenda within institutions, and regional contingency planning, early warning systems and response mechanisms, are among the no-regret solutions to set in motion that will guarantee important benefits from both societal and economic perspectives if implemented cogently, leading to higher BCRs and better living conditions.

FIGURE 1-12: GHG EMISSIONS BY SECTOR, 1990–2019



Sources: CAIT 2023; Kosovo Environmental Protection Agency 2022.

1.3. Low-carbon transition: risks and opportunities

1.3.1. GHG emissions profiles

Over 75 percent of the GHG emissions in the region are energy-related, that is, the result of fuel combustion, transport, and fugitive emissions. Gross emissions (excluding LULUCF) of WB6 countries totaled 122.2 MtCO₂eq in 2019;⁹⁷ of this total, 48 percent was related to the electricity and heat sector, followed by transportation (15 percent), agriculture (11 percent), and waste (8 percent). Fuel combustion emissions from manufacturing and construction made up 7 percent of total emissions in 2019; about 40 percent came from the non-metal industry (mainly cement), followed by iron/steel and food processing with approximately 25 and 10 percent, respectively. Carbon dioxide (CO₂) accounted for about three-quarters of

⁹⁵ Đukić, Mališa, and Margareta Zidar. 2021. "Sustainability of Investment Projects with Energy Efficiency and Non-Energy Efficiency Costs: Case Examples of Public Buildings" Sustainability 13, No. 11: 5837. <https://doi.org/10.3390/su13115837>.

⁹⁶ Government of Montenegro and UNDP. 2023. National Adaptation Plan (NAP) Montenegro.

⁹⁷ To avoid COVID-related distortions, 2019 is used as final historical emissions year.

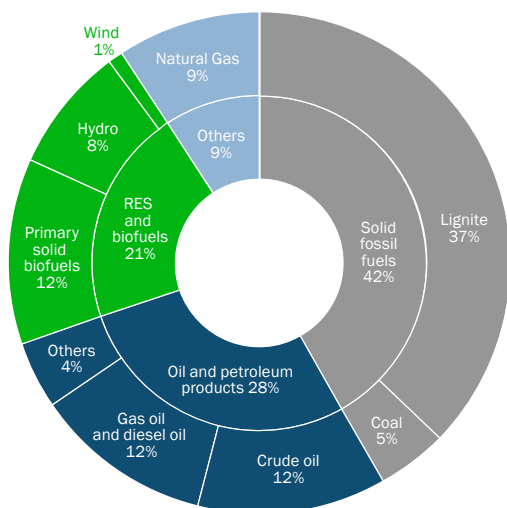
the total GHG emissions; methane (CH₄) and nitrous oxide (N₂O), mainly from agriculture and waste, accounted for about 20 and 5 percent, respectively. Methane is mainly emitted from the waste (43 percent), agriculture (37 percent), and fugitive emissions (15 percent) sectors. The region's GHG emissions have been stable in recent years because the growth in emissions has been decoupled from the increase in GDP due to the decline in carbon intensity of the economies.

Serbia accounts for one-half of the total emissions in the region, while Albania stands out as the only country where agriculture represents the largest share of emissions. Five WB6 countries (excluding Albania) have similar emissions profiles; electricity and heat account for the largest share of emissions (52 percent in Bosnia and Herzegovina and Serbia, and 63 percent in Kosovo). In Albania, however, agriculture represents the largest source of emissions (31 percent) because its hydropower-based electricity sector is quasi carbon-free. In all countries, the transport sector is the second largest emitter, accounting for 11 percent in Serbia and up to 25 percent in Albania. Serbia is responsible for more than one-half of the region's emissions, excluding LULUCF⁹⁸ (51 percent), followed by Bosnia and Herzegovina (22 percent) and North Macedonia (9 percent).

1.3.2. Implications for future decarbonization pathways

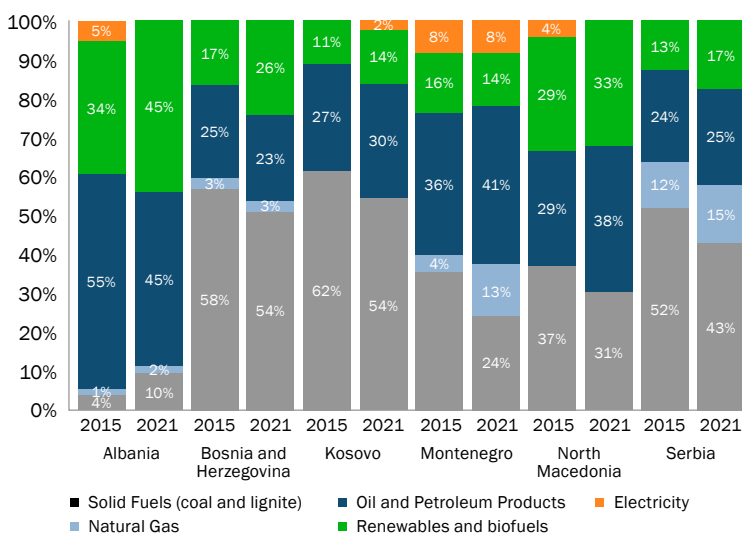
The WB6 GHG emissions profiles demonstrate significant decarbonization potential in the electricity / heat and transport sectors, which are particularly dependent on fossil fuels. Fossil fuels provide about 80 percent of the total energy supply in the region; lignite/coal and oil and petroleum products play the most significant roles (Figure 1-13 and Figure 1-14). Solid fossil fuels (primarily lignite) constitute a substantial portion of the energy mix in Bosnia and Herzegovina, Kosovo, and Serbia. Oil and petroleum products are the main source of energy in Montenegro and North Macedonia. Albania is the exception; renewables (mainly hydropower) and biofuels are the main energy source.⁹⁹ Since three-quarters of the regional GHG emissions are energy-related, the decarbonization paths will inevitably require replacement of fossil fuels by lower-carbon energy sources in all sectors, particularly in power/heat and transport.

FIGURE 1-13: TOTAL ENERGY SUPPLY IN THE WB6, 2021



Source: Eurostat 2021, Total Energy Supply.

FIGURE 1-14: WB6'S ENERGY MIX: GROSS AVAILABLE ENERGY BY PRODUCT, 2015 AND 2021



Source: Eurostat (2021). Gross Available Energy.

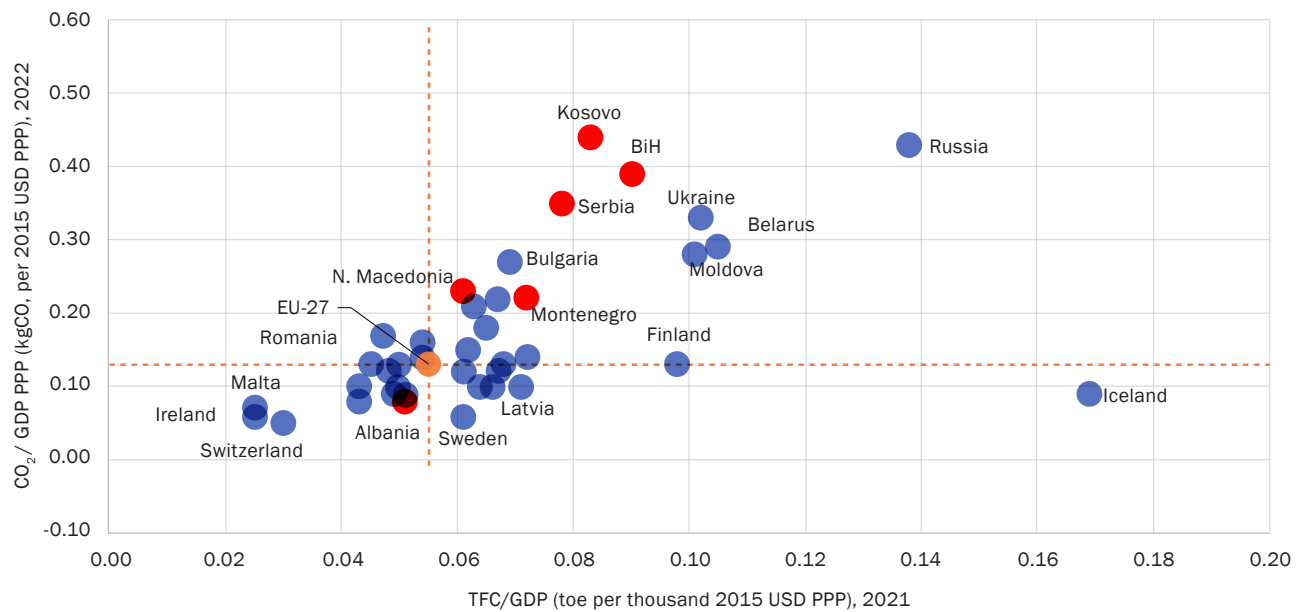
Note: Gross available energy is defined as the overall supply of energy for all activities on the territory of the country. For derived products (electricity), the chart shows only stock changes and international trade, as the original primary for of supply is accounted for in the form of the respective primary product. Resulting small negative balances for electricity, where applicable, are excluded from the chart for better overview.

⁹⁸ Land use, land-use change, and forestry.

⁹⁹ Eurostat. 2021. "Total Energy Supply." https://ec.europa.eu/eurostat/databrowser/view/NRG_BAL_C_custom_6428860/default/table?lang=en

WB6 countries are among the most carbon- and energy-intensive nations in Europe due to their heavy reliance on fossil fuels and aging infrastructure (refer to Figure 1-15). In 2022, Bosnia and Herzegovina, Kosovo, and Serbia ranked among the top four European countries in terms of CO₂ emissions per unit of GDP at PPP, being 2.5–3.5 times more carbon intense than EU-27.¹⁰⁰ This finding suggests that the WB6 countries have a challenging pathway to the net-zero objective; however, they all have ample opportunities to deploy established strategies such as energy efficiency improvements. In addition, many of the existing carbon-intensive assets need to be modernized or replaced independently from climate considerations: for example, most of coal plants in the region are more than 40 years old and require substantial investments to remain operational and comply with prescribed environmental standards. Due to the aging and inefficient infrastructure and the limited progress in energy efficiency improvements, the average total final consumption (TFC) of energy per unit of GDP at PPP in the WB6 countries was 30 percent higher than the EU-27 average in 2021.¹⁰¹

FIGURE 1-15: ENERGY INTENSITY VERSUS CARBON INTENSITY OF EUROPEAN COUNTRIES



Sources: World Indicators; IEA (2020) Indicators for CO₂ Emissions.

The relatively high energy intensity of WB6 countries makes the region more vulnerable to energy price shocks and exacerbates energy poverty concerns. Because of low income levels, approximately 41 percent of the WB6 populations spend 10 percent or more of their average monthly expenditure on energy bills,¹⁰² a typical threshold for energy poverty; and 21 percent are unable to keep their homes adequately warm despite the relatively low energy prices.¹⁰³ Therefore, any decarbonization efforts that may result in energy price increases need to be accompanied by targeted measures to protect the most vulnerable.

Persistently low energy prices in all WB6 countries have hindered investments in cleaner energy sources and energy efficiency improvements; to encourage GHG emissions reduction, price signals need to factor in externalities. Energy prices in the Western Balkans are significantly lower than in other European countries. In 2022, the weighted average electricity and natural gas prices at PPP were 48 and 41 percent cheaper in the WB6 than in EU-27, respectively.¹⁰⁴ This difference is mainly due to cheap domestic sources (hydro and

¹⁰⁰ OECD. 2022. "Indicators for CO₂ Emissions." https://www.oecd-ilibrary.org/energy/data/iea-co2-emissions-from-fuel-combustion-statistics/indicators-for-co2-emissions_data-00433-en

¹⁰¹ OECD. 2022. "World Indicators." https://www.oecd-ilibrary.org/energy/data/iea-world-energy-statistics-and-balances/world-indicators_data-00514-en

¹⁰² World Bank estimates based on ECAPOV (a World Bank data repository that harmonizes nationally representative household surveys).

¹⁰³ Eurostat. 2022. "Inability to Keep Home Adequately Warm." EU-SILC survey. Data not available for Bosnia and Herzegovina. https://ec.europa.eu/eurostat/databrowser/view/ILC_MDES01/default/table?lang=en.

¹⁰⁴ Eurostat. 2022. "Electricity Prices by Type of User." <https://ec.europa.eu/eurostat/databrowser/view/ten00117/default/table>. Data are not available for Kosovo.

coal), historical underinvestment in maintenance and capacity expansion, and low energy taxes and levies (especially environmental taxes), as well as, to a limited extent, explicit fossil fuels subsidies,¹⁰⁵ which are estimated at 1.0 percent of GDP in the WB6 versus 0.2 percent in EU-27 in 2020.¹⁰⁶ Electricity prices in the region are relatively low as a result of the relatively low production costs of domestic lignite (also due, to some extent, to the indirect support from the governments,) and the almost fully amortized generation fleet of both coal and hydropower plants. By not factoring in externalities, such as environmental and health impacts, the energy sector in the WB6 does not provide incentives to domestic and private sector players to invest in innovative and more efficient technologies, hindering the progress in GHG emissions abatement over the past decade. Implicit subsidies were estimated to average about 7 percent of GDP.

Energy market coupling could bring many benefits to the WB6, and the physical capacity exists to enable this market integration. Coupling energy markets among countries creates a larger market, which enables increased economic efficiency from trade, improved grid optimization, and security of supply due to reduced congestion; such coupling provides more opportunities for cost-effective integration of renewable energy due to cross border trade. The WB6 countries have good potential for market coupling due to the established grid infrastructure and high available transmission capacity among countries. Electricity interconnectivity (the ratio of net transfer capacity to total production capacity) in all WB6 countries is more than 20 percent, well above the EU target of 15 percent by 2030.¹⁰⁷ Further, the cross-border capacity allocation for all countries except Serbia is managed by a single joint company, the Central Allocation Office for Southeastern Europe (SECAO), which simplifies collaboration on capacity allocation. Significant investments in interconnections have been planned among WB6 countries and their neighbors, adding almost 3,000 MW of additional transmission capacity, valued at over €860 million in investments.¹⁰⁸

Although the physical capacity exists to enable market coupling, regulatory challenges and a lack of cooperation prevent full integration. All WB6 countries except for Bosnia and Herzegovina have an established day-ahead power trading market; Serbia is the only country in the region to also have intraday and futures markets, which were established in July 2023.¹⁰⁹ The lack of intraday and futures markets in the region means there is low liquidity, which leads to less efficient trading and higher energy prices. Steps have been made to increase energy market integration; the Energy Community (EnC) Ministerial Council meeting in December 2022 resulted in all Contracting Parties (CPs) adopting the new electricity package to establish the regulations required for full reciprocity between the EnC CPs and EU member states. Practically, the implementation of this package and its associated terms, conditions and methodologies (TCMs) has been slow, in part because Russia's invasion of Ukraine led countries to focus on energy crisis management rather than longer term systemic reforms.¹¹⁰ Further, disputes have hindered progress on energy trade; the inability of the transmission system operators (TSOs) of Kosovo and Serbia to agree on a net transfer capacity (NTC) has prevented trade and resulted in a dispute settlement case against Serbia's TSO, Elektromreža Srbije (EMS).¹¹¹ Overall, although the physical capacity exists, market coupling is hindered by regulatory hurdles and stalled cooperation.

¹⁰⁵ Black, Simon, Antung Liu, Ian Parry, and Nate Vernon, 2023. "IMF Fossil Fuel Subsidies Data: 2023 Update." Working paper, IMF, Washington DC. Explicit subsidies occur when the retail price is below a fuel's supply cost. For a non-tradable product such as coal, the supply cost is the domestic production cost, inclusive of any costs to deliver the energy to the consumer, such as distribution costs and margins. In contrast, for an internationally tradable product such as oil, the supply cost is the opportunity cost of consuming the product domestically rather than selling it abroad plus any costs to deliver the energy to the consumer. Explicit subsidies also include direct support to producers, such as accelerated depreciation, but these are relatively small. Data not available for Montenegro and Kosovo.

¹⁰⁶ Black, Simon, Antung Liu, Ian Parry, and Nate Vernon, 2023. "IMF Fossil Fuel Subsidies Data: 2023 Update." Working paper, IMF, Washington DC. Explicit subsidies increased in 2021–22 as countries in the WB6 (as well as in the rest of Europe) were facing the impacts of the energy crisis triggered by the consequences of the COVID-19 pandemic and Russia's invasion of Ukraine. However, these higher explicit subsidies (estimated at about 1.6 percent of GDP in 2021 and 2.7 percent in 2022 in the WB6) are expected to start decreasing again as the emergency measures adopted during the crisis are phased out.

¹⁰⁷ ENTSO-E; Energy Community. 2021.

¹⁰⁸ ENTSO-E TYNDP. 2022.

¹⁰⁹ Energy Community. 2023. <https://www.energy-community.org/news/Energy-Community-News/2023/07/26.html>.

¹¹⁰ Energy Community. 2022. <https://www.energy-community.org/implementation/report.html>.

¹¹¹ Energy Community. 2023. <https://www.energy-community.org/news/Energy-Community-News/2022/09/06a.html>.

The transition from fossil fuels for electricity/heat generation and transport would result not only in reduced GHG emissions but also in air quality improvements and lower energy import dependency, thereby yielding health and energy security benefits. In WB6 countries, air pollution is a serious threat that causes over 39,000 deaths¹¹² and an estimated welfare cost of US\$16 billion (15 percent of GDP) annually¹¹³ (refer to section 1.2). The main sources of air pollution are lignite power stations, manufacturing plants with inadequate pollution controls, aging vehicle fleet, mining, and the burning of firewood and coal in inefficient domestic heating systems.¹¹⁴ Dependence on energy imports is another concern particularly in the periods of high price volatility and supply disruptions. All WB6 countries are dependent on oil imports for transport; Albania and Kosovo are heavily reliant on electricity imports; and all countries import their gas from one single source, Russia. Switching to alternative local energy sources would reduce energy import bills and improve the security of the supply.

Despite the countries' high emissions intensity and trade exposure to the EU, the introduction of the EU's CBAM is expected to have only a limited long-term macroeconomic impact. However, CBAM (refer to Box 1-6) does pose challenges for key carbon-intensive sectors in the region. Prioritizing both private sector actions and government policies to encourage greener production and manage a Just Transition for those sectors can help mitigate these impacts. World Bank modeling exercises in Serbia¹¹⁵ and Kosovo¹¹⁶ estimate a minor negative impact of CBAM on GDP by 2035, approximately -0.23 percent and -0.3 percent, respectively, assuming no mitigating action is taken by the governments or affected entities. Despite potential decreases in exports and reduced domestic production of CBAM goods, countries are expected to adjust by lowering imports, reallocating labor and capital, and exploring new markets. However, the targeted sectors will be significantly affected, leading to losses in output, export, and employment due to increased costs associated with high carbon content, unless there are changes to domestic policy adjustments and/or production processes. WB6 countries, with their close economic ties to the EU and export composition, are estimated to be among the top 10 countries most affected by the CBAM.¹¹⁷ Figure 1-16 shows the exposure to CBAM by sector and country. Bosnia and Herzegovina and Montenegro are the most exposed, partly owing to large power exports. Carbon-intensive electricity generation (except in Albania) and industrial processes are particularly vulnerable; Serbia's iron and steel sector projects a 31 percent annual reduction in exports by 2035, and the power sector expects a 27 percent decline in exports and a 44 percent decline in output and employment.^{118,119} Both industries and governments need to act to ensure a smoother transition to lower-carbon processes and minimize the socioeconomic impacts of CBAM.

¹¹² European Environment Agency. 2022. "Air Pollution Fact Sheets." <https://www.eea.europa.eu/themes/air/country-fact-sheets/2022-country-fact-sheets/air-pollution-country-fact-sheets-2022>.

¹¹³ OECD. 2019. "Mortality and Welfare Cost from Exposure to Air Pollution." https://www.oecd-ilibrary.org/environment/data/air-quality-and-health/mortality-and-welfare-cost-from-exposure-to-air-pollution_c14fb169-en. Considered all WB6 countries apart from Kosovo. Data on Kosovo are not available.

¹¹⁴ UNEP. 2021. "Air Pollution in the Western Balkans: Key Messages for Policymakers and the Public." <https://zoinet.org/wp-content/uploads/2022/02/Pollution-Balkans-EN2.pdf>.

¹¹⁵ World Bank. 2022. <https://documents.worldbank.org/en/publication/documents/reports/documentdetail/099530111022255705/p17641306e85c00100a145093af447ee1fa>.

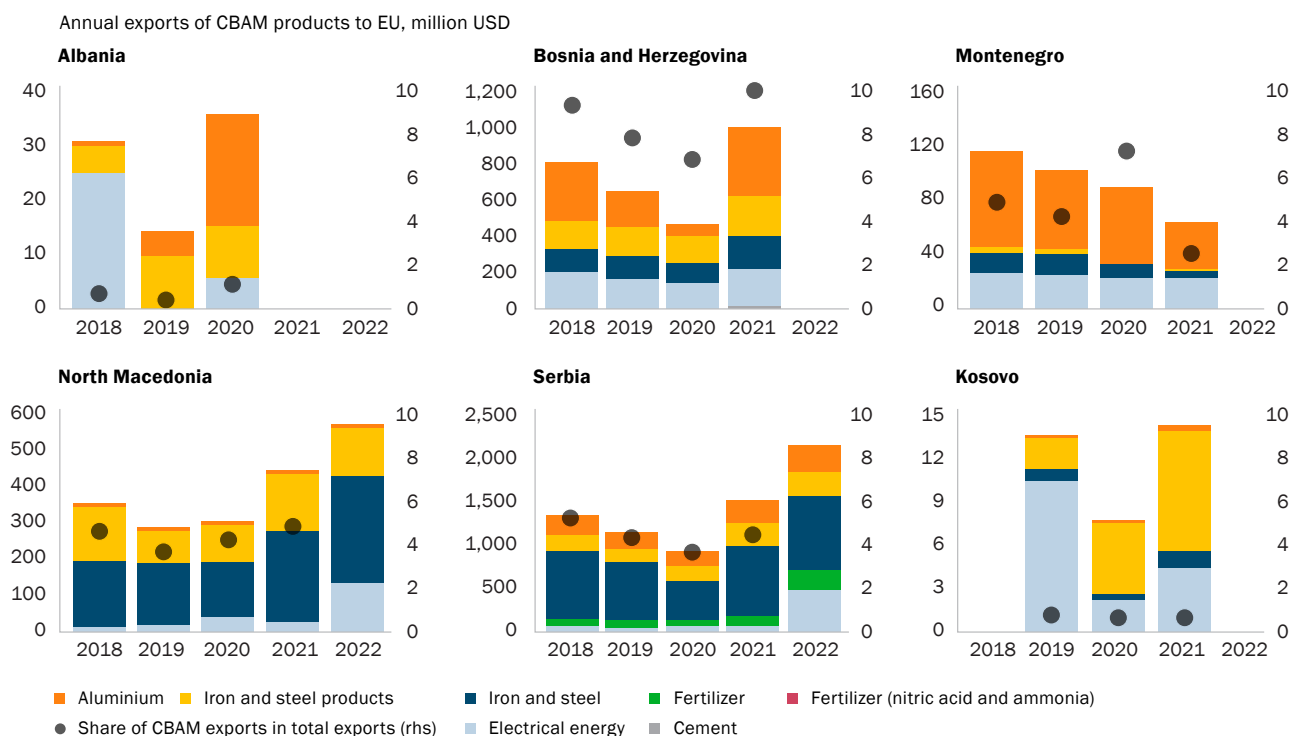
¹¹⁶ World Bank. 2021. "Environmental Tax Reform in Kosovo: Policy Note." World Bank, Washington, DC, Unpublished.

¹¹⁷ AFD, based on 2019 data. No data were available for Kosovo.

¹¹⁸ World Bank. 2022. "Supporting Serbia's Transition to Greener and More Resilient Growth: Policy and Institutional Reforms." <https://documents1.worldbank.org/curated/en/099530111022255705/pdf/P17641306e85c00100a145093af447ee1fa.pdf>.

¹¹⁹ It is important to point out that the specific medium-term sector-specific impact of CBAM on GDP, revenues, and GHG emissions reductions across all WB6 countries under different market configurations and trade arrangements remain unknown due to variations in analyses and uncertainties related to labor and capital reallocation. Sector-specific assessments are still necessary to determine the most suitable approach for implementing carbon pricing in the region.

FIGURE 1-16: SHARE OF EXPORTS EXPOSED TO CBAM BY SECTOR AND COUNTRY, 2018–2022



BOX 1-6: EU'S CARBON BORDER ADJUSTMENT MECHANISM (CBAM)

The EU adopted CBAM in May 2023 to prevent carbon leakage, create a level playing field for EU goods, and promote coordinated climate action among trading partner countries. CBAM will impose fees on imported goods, initially targeting the iron and steel, cement, fertilizers, aluminum, electricity, and hydrogen sectors. Importers of these goods will be obligated to purchase CBAM certificates, the price of which will be linked to the average price of EU ETS allowances and the required number of certificates will be based on the carbon content of the goods, including both direct and indirect emissions.¹²⁰ The CBAM regime took effect from October 2023 with a three-year transitional period for reporting emissions. From October 2026, the CBAM certificates will be gradually phased in and the allocation of free allowances to EU ETS entities will be phased out. Gradual implementation of CBAM allows both industries and governments in WB6 countries to take necessary preparatory actions.

The WB6 countries can qualify for derogations/exemptions from CBAM fees by introducing domestic carbon pricing and enhancing their climate actions. To qualify for derogations, the WB6 countries must adopt the EU ETS or a linked cap-and-trade system with a carbon price equivalent to the EU ETS. The derogation would eliminate the CBAM fee (with carbon pricing revenues staying within the country), while introduction of any other form of carbon pricing in WB6 would reduce the CBAM payments by the amount that has been effectively paid domestically during the production of the imported good. Exemptions for electricity are possible under specific energy and climate conditions for countries that couple with the EU electricity market until 2030.¹²¹

¹²⁰ Direct emissions from production processes and indirect emissions from the production of electricity used for these processes.

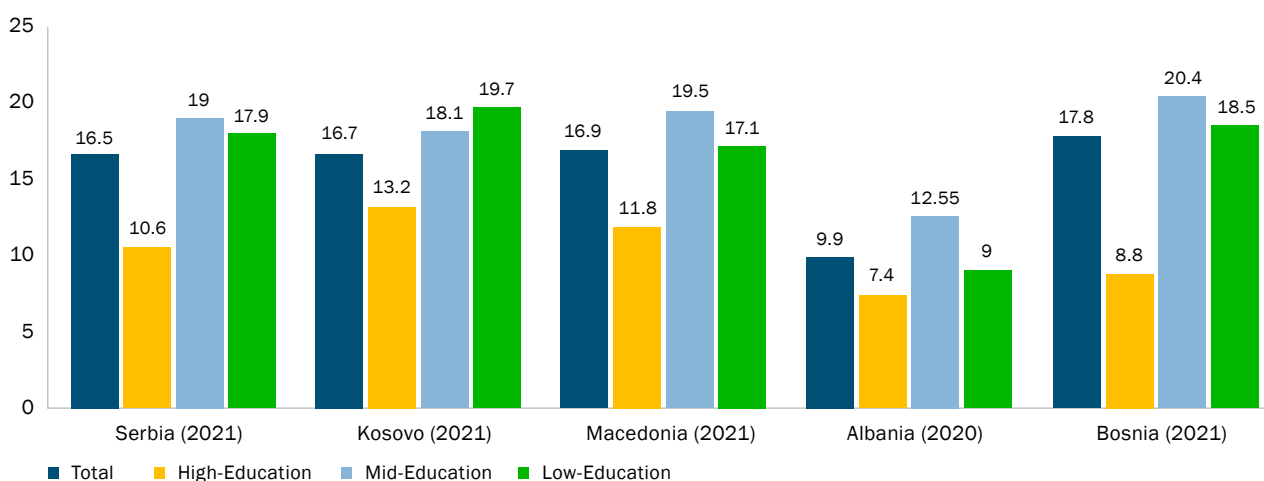
¹²¹ The WB6 countries that integrate with the EU electricity market through market coupling can obtain an exemption from CBAM for electricity exports, but only if they meet several requirements: apply EU law in the field of electricity and renewables; commit to carbon neutrality by 2050, submit a roadmap with deadlines to meet this target, demonstrate substantial progress in its implementation; and complete implementation of an ETS with EU-equivalent carbon price by January 2030.

Transitioning from coal will have significant socioeconomic implications in WB6 countries, and it also presents a unique opportunity to harness the transformation of the economies to a greener and more resilient future. The retirement of coal power plants and the closure of coal mines will directly impact coal communities, risking the loss of thousands of jobs and causing social and economic inequalities, including poverty and reduced access to essential services. The European Bank for Reconstruction and Development (EBRD) estimates that approximately 12,000 jobs are at risk in Serbia from the planned phase down of coal up to 2030, based on the country’s NECP targets.¹²² Preliminary results from the World Bank estimate that approximately 16,200 direct and 4,300 indirect jobs are at risk in Bosnia and Herzegovina.¹²³ The coal phaseout will also require simultaneous investments in new electricity generation capacity, and new approaches to ancillary services, which may contribute to an increase in electricity prices. However, retiring coal-based energy generation will help WB6 countries meet international commitments, promote a greener economy, attract investments in new power technologies and companies mindful of their carbon footprint. This will be a complex process that requires managing impacts on workers and communities caught within the energy transition.

The needs of retraining of the current workforce in the Western Balkans due to greening are sizable and go beyond high polluting sectors. The green transition or greening process is exerting both positive and negative impacts on labor markets across the world. Although occupations in most polluting industries are at the highest risk of disappearing (for example, coal mining), more occupations are seeing a deep transformation in their task content due to changes in technology or business models, so workers will need to undergo retraining or upskilling to remain productive in their occupations or move to other occupations with similar skill content. Not all occupations at risk will need substantive retraining, but the effort depends on the gap between the current skills required and the future skills.

Overall, about one in six workers in the Western Balkans is either at risk of dismissal due to restructuring of brown jobs or in need of upskilling to acquire the skills necessary to remain in the job or find other opportunities. The countries have a similar share of workers who require reskilling, ranging between 10 percent in Albania to 18 percent in Bosnia and Herzegovina (Figure 1-17). Occupations with a higher share of jobs facing structural transformations due to greening range from low-skilled (for example, plant operators, refuse workers, and truck drivers) to mid-skilled (for example, process control technicians) and high-skilled (for example, managing directors). Overall, about 400,000 jobs will be at high risk and will require retraining or reskilling toward safe or green occupations.

FIGURE 1-17: PERCENTAGE OF JOBS THAT NEED RETRAINING



Sources: Garrote, Gukovas and Makovec (forthcoming). “Jobs, Skills and the Green Transition in ECA.” Data from Labor Force Survey of respective countries (years indicated).

¹²² EBRD. 2021. <https://www.ebrd.com/work-with-us/projects/tcpsd/14896.html>.

¹²³ Indirect impacts would be larger than these estimates, which only consider the impacts on direct suppliers of the mines and not those on the local economy.

The green transition also needs to be supported by the health sector. Extreme weather conditions can affect occupational health through heat stress or exposure to poor air quality of outdoor workers.¹²⁴ The health system can support occupational health through training of health workers and public awareness campaigns on recognizing and managing climate-related occupational health issues. Moreover, in the medium to long terms, with the change of jobs from brown to green, the type of job-related hazards, as well as type of occupational health support necessary, will change, and health systems should respond adequately. For example, mental health and counseling services for workers who experience the direct effects of extreme weather events or who are involved in disaster response efforts become more relevant.¹²⁵

Reduce the risks and uncertainty of the green transition for people's income, consumption, and human capital investments, requires increased coverage and adequacy of social protection systems, as well as increased flexibility to protect households from climate shocks. Social protection systems are comprehensive, offering income protection to formal sector workers and social assistance to vulnerable groups backed by digital information systems.¹²⁶ Although reforms are ongoing to improve the performance of these systems, they do not always effectively support workers to transition between jobs; critical gaps in coverage exist for those employed in the informal sectors and in terms of meaningful income support. In Albania, for example, the benefit translates to a replacement ratio of 25 percent of average wage, while in Bosnia Herzegovina, it amounts to 40 percent. By design, social assistance in Kosovo, North Macedonia, and Serbia provides emergency support to households that lose income and assets due to localized climate shocks. North Macedonia is the only country that has established the legal basis to expand its national poverty-targeted social assistance program to additional poor households affected by natural disasters. Experience from the COVID-19 pandemic response in Albania and Montenegro points to how existing social assistance beneficiary registries could be leveraged to rapidly identify poor households for support, especially if linkages with early warning systems (EWS) were established to inform an early response. However, this aim would need to be embedded into program design and backed by sufficient funding to finance an increase in program size.

Social protection systems could be much better harnessed to protect households from climate-induced shocks, while promoting their resilience. An assessment of the capacity of the social protection systems to respond to climate shocks along the following pillars: (1) programs and delivery systems, (2) data and information, (3) financing, and (4) institutional arrangements concludes that the Western Balkan countries are rated as “emerging” or “established” in their readiness and ability to utilize their social protection systems in response to shock.¹²⁷

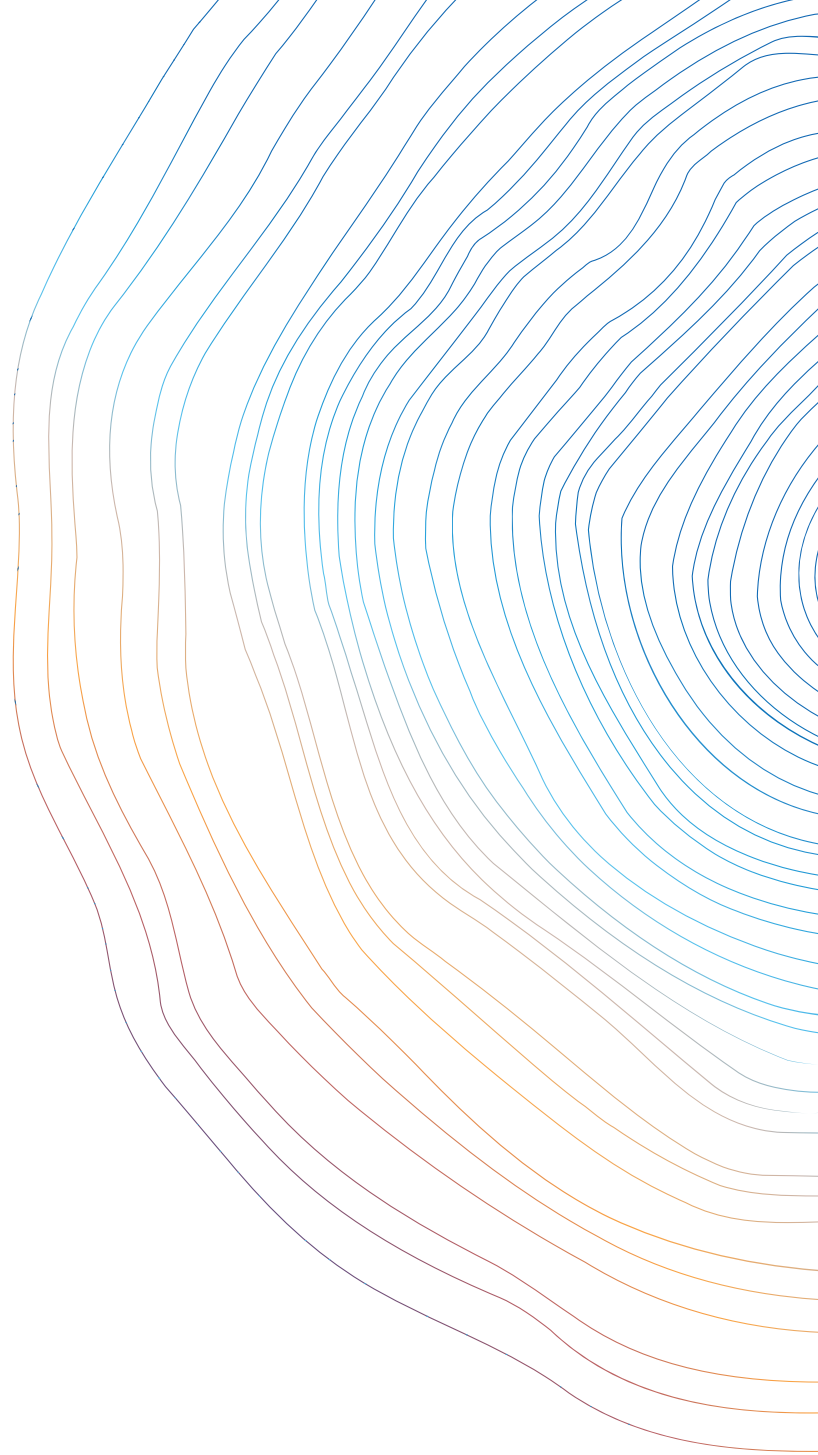
¹²⁴ CDC. 2023. “Occupation Safety and Health and Climate.” <https://www.cdc.gov/niosh/topics/climate/default.html>.

¹²⁵ Schulte, P. A., A. Bhattacharya, C. R. Butler, H. K. Chun, B. Jacklitsch, T. Jacobs, M. Kiefer, et al. 2016. “Advancing the Framework for Considering the Effects of Climate Change on Worker Safety and Health.” *Journal of Occupational and Environmental Hygiene* 13 (11): 847–65. doi: 10.1080/15459624.2016.1179388. PMID: 27115294; PMCID: PMC5017900.

¹²⁶ See social protection situational analysis for a discussion of the SP systems in the Western Balkans:

<https://www.worldbank.org/en/region/eca/brief/advancing-social-protection-and-opportunities-for-reform-in-the-western-balkans>.

¹²⁷ For each of the four pillars (programs and delivery systems, data and information, financing, and institutional arrangements), the set of questions was qualitatively assessed using existing studies, research, and consultation to devise a rating of between one and five, indicating progress from latent to advanced, based on the methodology detailed in: <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>.



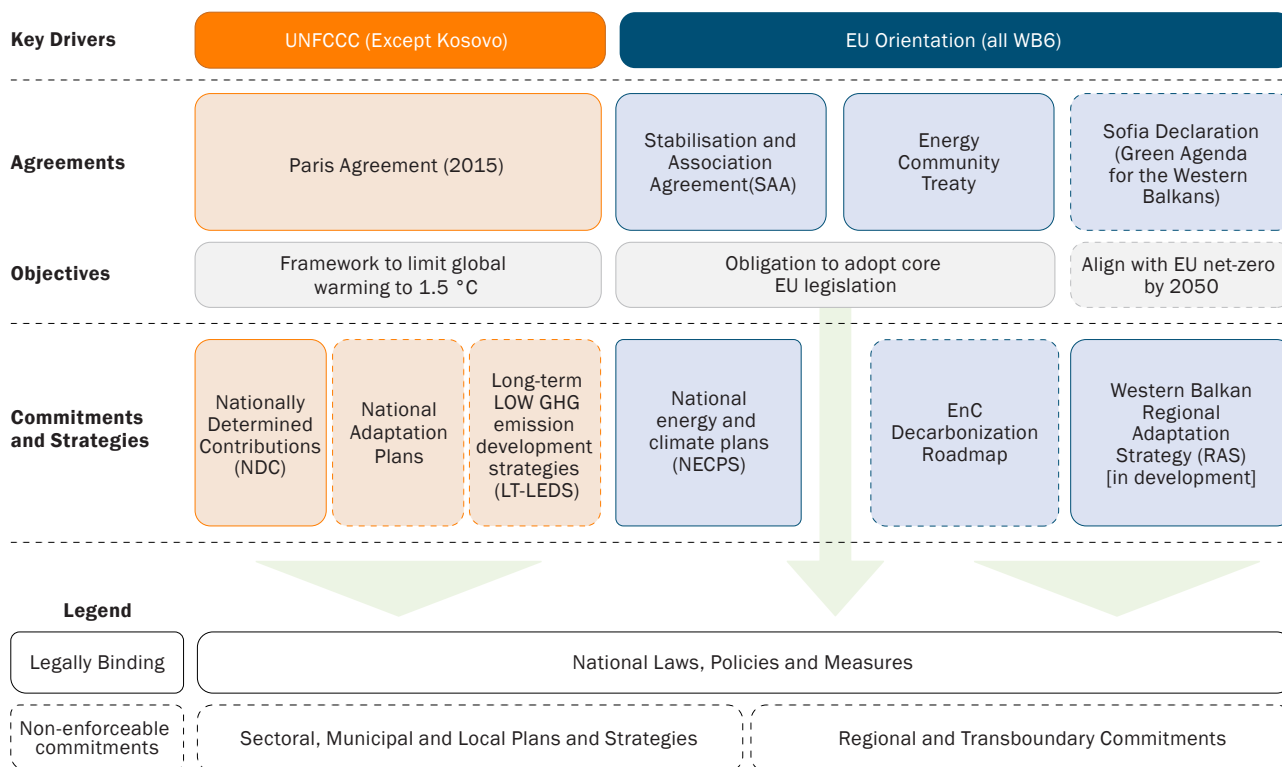
Chapter 2

Climate Commitments, Policies, and Capacities

2.1. Climate plans and commitments

Climate change actions in the WB6 countries are driven by several international obligations and national priorities. These include international climate commitments under the United Nations Framework Convention on Climate Change (UNFCCC) and the obligations to transpose European Union (EU) legislation as part of the EU accession process (refer to Figure 2-1 below and Box A1-1 in Annex 1). National challenges such as air pollution and energy security also lead to the adoption of policies that affect climate action.

FIGURE 2-1: FRAMEWORK FOR WB6 CLIMATE CHANGE ACTION

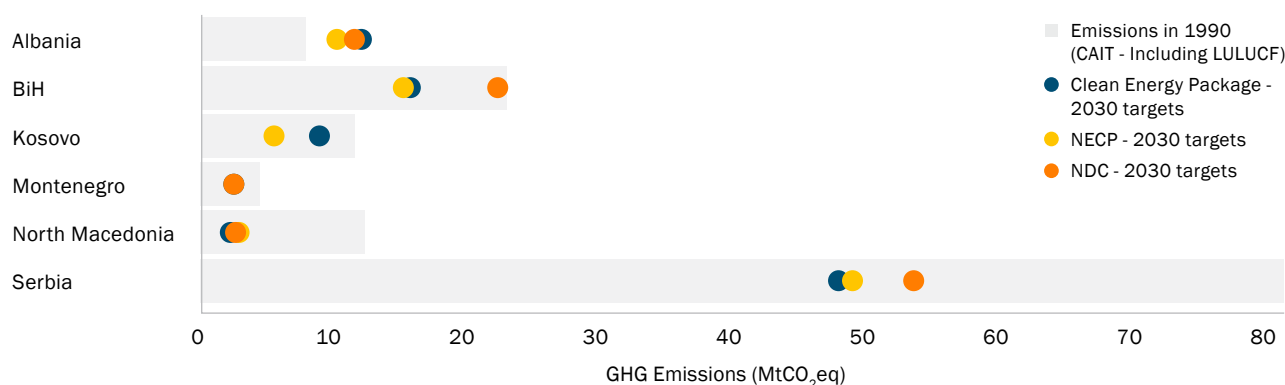


Source: Authors.

WB6 countries are increasing their climate change mitigation targets. Figure 2-2 shows the existing GHG emission reduction targets set by the WB6 countries for 2030. Five countries (except Kosovo), as signatories to the UNFCCC and the 2015 Paris Agreement, adopted GHG reduction targets within their updated National Determined Contributions (NDCs), submitted in 2021–22. In addition, Bosnia and Herzegovina, Montenegro, North Macedonia, and Serbia have submitted their long-term, low-emissions development strategies, putting their NDCs in the longer-term planning perspective. As contracting parties to the Energy Community (EnC) Treaty,¹²⁸ all six Western Balkan countries have adopted the EnC Clean Energy Package with objectives to reduce GHG emissions (refer to Figure 2-2) and energy consumption and to accelerate the uptake of renewables. These objectives were adopted by the Energy Community Ministerial Council on December 15, 2022, as part of a broader legislative package that also includes new acquis obliging the EnC parties to integrate into the pan-European electricity market, as well as new regulations for the monitoring, reporting, and verifying (MRV) of GHG emissions. The December 2022 package, if properly implemented, will be a significant step toward aligning the WB6 with the EU net zero target by 2050. However, all countries in the region lack a robust MRV system, which is key for ensuring compliance with the stated ambitious objectives. The most advanced countries are planning to issue the first permits to operators and publish their first MRV reports in 2026.

¹²⁸ The Energy Community Treaty was adopted by the WB6 countries at different times. Albania and North Macedonia adopted the treaty in 2006, followed by Bosnia and Herzegovina and Montenegro in 2007, Serbia in 2008, and Kosovo in 2009.

FIGURE 2-2: CLIMATE TARGETS IN THE WB6¹²⁹



Sources: Energy Community (2022). Clean Energy Package. Available at: <https://www.energy-community.org/implementation/package.html>; UNFCCC (2023). Nationally determined contributions. Available at: <https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs>

In addition to mitigation measures, the Western Balkan countries are taking steps to adapt to climate change. Under the technical guidelines developed by the UNFCCC, five countries (except Kosovo) have either submitted or drafted their national adaptation plans (NAPs).¹³⁰ The NAPs aim to identify the medium- and long-term adaptation gaps and develop and implement policies and measures to address those gaps. Depending on the specific climate risk and vulnerability of the countries, such adaptation measures are implemented in different priority areas and could take various forms, such as improving early warning systems, rehabilitating coastal areas, enhancing climate-resilience of crops and forests, and improving irrigation and water management. The Albanian NAP focuses on enhancing early warning systems through the flood risk management plan in the Shkodra region, rehabilitating coastal areas, and promoting the development of drought-resistant crops as part of their priority action numbers 11 and 7, respectively.¹³¹ Meanwhile, In Serbia, a number of adaptation measures were purposed for four priority sectors (agriculture, forestry, water, and biodiversity).¹³² There is often a lack of evaluation and monitoring mechanisms for the implementation of NAPs.

The EU Green Deal is an opportunity to shift public sector agriculture spending in that direction, and an improved implementation of the EU IPARD funding and support to increase the uptake of agri-environmental measures by farmers across WB6 national farm support programs is needed. To achieve higher productivity and better climate outcomes in the agrifood sector, governments need to repurpose public support for agriculture and increase the effectiveness of public sector spending on agriculture to raise productivity and climate resilience and reduce GHG emissions—all of this is possible through a greater orientation of agriculture policies and investment to climate smart agriculture (CSA). In the coming decades, the Western Balkan countries need to prioritize the modernization and digitalization of the sector, implementation of improved irrigation systems, rehabilitation of poorly functioning drainage systems, mainstreaming of CSA practices, upgrading of logistics and marketing infrastructures to deepen intraregional and interregional cooperation, as well as the development of insurance schemes to protect farmers from crop losses due to compounding climate shocks.

In addition to national efforts, these countries have collaborated to tackle climate change jointly and enhance cross-border capacity in adaptation. Given the cross-border nature of climate events, commitments have been made to enhance transboundary collaboration and communication between the countries for more effective adaptation and disaster risk management. The “Early Warning for All” initiative was launched in 2023 to provide early warning for disasters and climate events in the West Balkans through the DisasterAWARE

¹²⁹ Kosovo does not have an NDC target as it is a non-signatory to UNFCCC. Montenegro’s NECP is not available and emissions in 1990 exclude LULUCF.

¹³⁰ Kosovo has developed a National Adaptation Strategy, but because it is not a member of the UNFCCC, no NAP was submitted; GoK. 2013. “National Adaptation Strategy 2014-2024.” <https://www.preventionweb.net/publication/kosovo-strategy-climate-change-2014-2024>.

¹³¹ Government of Albania. 2021. “National Adaptation Plan of Albania.” <https://unfccc.int/documents/307740>.

¹³² Republic of Serbia. 2017. “National Adaptation Plan.” <https://www.klimatskepromene.rs/wp-content/uploads/2017/04/NAP-UNDP-2015.pdf>.

platform, which provides critical information and data for effective disaster management and forecasting.¹³³ The initiative also supports data sharing and knowledge exchange between the countries to strengthen EWS capacities and technical expertise. A few adaptation measures have been implemented in cross-border areas that are vulnerable to disaster and climate risks. Furthermore, the extent to which the health systems are prepared for and have the capacity to manage changes in hazards, exposure, and susceptibility will play a crucial role in protecting and promoting the population's health and well-being amid climate change challenges. Countries have shown their commitment to support mitigation and adaptation in health. The Ministries of Health of the Western Balkan countries developed a joint action Roadmap for Health and Wellbeing in the Western Balkans (2021–25), in which they made the commitment to strengthen the health workforce capacity to deal with emergencies, support a green economy, improve data systems on the climate impacts of health, and build the resilience of health facilities to climate change and natural disasters.¹³⁴

The EU accession process and the WB6 countries' obligations under the Energy Community Treaty drive the development of climate change related policies and legislation in the region. All the WB6 countries have committed to preparing draft National Energy and Climate Plans (NECPs) by June 2023 and adopting them by June 2024. The NECPs will outline the countries' targets, policies, and measures for energy and climate sectors, and these will guide their efforts to reduce GHG emissions, increase the share of renewable energy, improve energy efficiency, and enhance energy security. The NECP targets are expected to align with the objectives set under the December 2022 package. As of March 2024, Bosnia and Herzegovina, Kosovo, and Serbia had submitted their draft NECPs to the EnC Secretariat, and Montenegro's NECP was being prepared. Albania and North Macedonia adopted their earlier NECPs in December 2021 and May 2022 respectively, but these need to be updated to align with the EnC December 2022 package. Table 2-1 captures the primary laws and strategies that have been passed in the WB6 countries related to energy decarbonization, climate change mitigation and adaptation, energy efficiency, and air quality; and this legislative process continues constantly.

TABLE 2-1: KEY NATIONAL LAWS AND STRATEGIES, AS OF DECEMBER 2023

Country	Paris Agreement			Strategies				Laws			
	Entry into force	NDC last update	LT-LEDS	NECPs	Climate Change Strategy	National Adaptation Plans	Energy Strategy	Law on Climate Change	Law on Air Quality	Law on Energy Efficiency	Law on Renewable Energy
Albania	Nov 2016	Oct 2021	✗	✓ until 2040	✓ until 2030	✓	✓ until 2030	✓	✓	✓	✓
Bosnia and Herzegovina	Apr 2017	Apr 2021	July 2023	» until 2050	✓ until 2025	✓	✓ until 2035	✗	»	✓	✓
Montenegro	Nov 2016	Jun 2021	»	»	✓ until 2030	»	✓ until 2030	✓	✓ needs updating	✓	✓
North Macedonia	Nov 2017	Apr 2021	Nov 2021	✓ until 2040	✓ until 2050	»	✓ until 2040	»	✓	✓	»
Kosovo	Kosovo is not a UN member. Not a signatory to the UN Framework Convention on Climate Change			» until 2040	✓ until 2028	✗	✓ until 2031	✓	✗	✓ under revision	»
Serbia	Aug 2017	Aug 2022	Jun 2023	» until 2050	✓ until 2050	✓	✓ until 2025 Drafting one until 2040	✓	✓	✓	✓

Legend: Green: document approved and valid. Blue: draft document exists but has not yet been approved. Red: document does not exist or expired.

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

As signatories to the 2020 Sofia Declaration, the WB6 countries have expressed their intention to work toward the EU 2050 target of a carbon-neutral continent and to adopt mitigation and adaptation measures. At the Sofia Summit, the Green Agenda for the Western Balkans (GAWB) was endorsed; the Action Plan, which

¹³³ Goering, C. 2023. "Early Warning for All" initiative gains momentum in Balkan region." Pacific Disaster Center. <https://www.pdc.org/early-warning-for-all-balkan-region/?MdcOrigin=https%3A%2F%2Fmcas-proxyweb.mcas.ms>.

¹³⁴ Roadmap for Health and Wellbeing in the Western Balkans (2021-2025).

includes 58 actions and 7 roadmaps for implementation related to climate policy and sustainable development, was endorsed at the Brdo Summit in October 2021. The agenda, aligned with EU's Green Deal, demonstrates the non-binding commitment of WB6 countries to work toward the EU's 2050 net zero emissions target, phase out coal subsidies, and participate in the Coal Region in Transition initiative for the Western Balkans. In national strategic documents, Montenegro aims to phase out coal by 2035, North Macedonia by 2030, and Kosovo by 2050. Albania, Montenegro, and North Macedonia have joined the Powering Past Coal Alliance (PPCA),¹³⁵ affirming their commitment to phase out coal. Bosnia and Herzegovina and Serbia have not made a clear commitment to a coal phaseout date yet. The 2021–22 European energy crisis has underscored the politically sensitive nature of mine closure and the phaseout of coal-fired electricity and heat. By signing the Sofia Declaration, the WB6 countries have demonstrated their intention to continue their alignment with the EU Emissions Trading Scheme, work toward introducing other carbon pricing instruments and adopting various measures to decarbonize the transport sector. In addition, to align with the EU Climate Law and the EU Strategy on Adaptation to Climate Change, the WB6 countries have undertaken a few adaptation action for the broader deployment of nature-based solutions. The Regional Cooperation Council (RCC) recommended the preparation of a Western Balkans Regional Adaptation Strategy by 2026 to jointly address common adaptation needs and identify financial resources.¹³⁶

2.2. Implementation Outlook

2.2.1. Policies and measures

Adaptation policies and measures

In recent decades, the West Balkan countries have made progress in developing a legislative framework related to climate change adaptation. However, there is still no or very limited existence of a unified, comprehensive legal framework in place for mainstreaming adaptation in decision-making at national level. Key adaptation documents, such as NAPs and National Adaptation Strategies (NASs), have been developed to identify the adaptation gaps in the countries and propose potential adaptation measures, especially in key sectors such as agriculture, forestry, water, human health, and biodiversity. In addition, adaptation has been integrated in urban planning in some countries (refer to Box 2-1).

BOX 2-1: ADAPTATION IN URBAN PLANNING

In recent years, adaptation measures have been implemented at municipal or city level and integrated in urban planning in some West Balkan countries, usually in alignment with UNFCCC or EU initiatives. For instance, in Serbia, the Green, Livable, Resilient Cities program was launched by the World Bank to support sustainable, low-carbon, and climate-resilient urban development of select cities in the country.¹³⁷ The program provides Serbia an opportunity to enhance green urban transition, envisaged under the EU's Green Deal. In Kosovo, a project was completed in 2022 to inform climate-smart decisions in urban planning and transport.¹³⁸ The project receives financial and technical support from The City Climate Finance Gap Fund, which aims at assisting low- and middle-income countries to move toward low-carbon and climate-resilient pathways, in line with the climate target of the United Nations Framework Convention on Climate Change (UNFCCC). The project helps to inform investment and policy decisions outlined in a revised Municipal Development Plan (MDP) that supports green and climate-smart living, such as investing in energy efficient heating systems, implementing the Local Green Building Code, and enhancing the city's storm water and sewage management infrastructure for flood risk reduction.

¹³⁵ A coalition working on the transition from unabated coal power generation <https://poweringpastcoal.org/>.

¹³⁶ RCC. 2021. "Action Plan for the implementation of the Sofia Declaration on the Green Agenda for the Western Balkans." <https://www.rcc.int/files/user/docs/d6b170df3ed1b06973f02675e474d661.pdf>.

¹³⁷ World Bank. 2022. "Green, Livable, Resilient Cities in Serbia Program." <https://www.worldbank.org/en/country/serbia/brief/green-livable-resilient-cities-in-serbia-program>.

¹³⁸ World Bank. 2023. "Building cleaner, greener, more Liveable Cities: Pristina: A blueprint for Transforming Urban Development." <https://www.worldbank.org/en/news/feature/2023/05/22/building-cleaner-greener-more-liveable-cities-prishtina-a-blueprint-for-transforming-urban-development>.

Mitigation policies and measures

Although WB6 countries are developing national legal and regulatory frameworks for meeting ambitious climate change commitments, there is room for improvement. The countries' NDCs and draft NECPs include comprehensive packages of mitigation strategies, mainly consisting of measures to reduce energy consumption in the key end-use sectors (for example, buildings and transport) and to develop renewable energy sources, along with measures in agriculture, forestry, waste and other priority sectors. Serbia has been considering whether to include modular nuclear power plants in its forthcoming energy strategy, and its NECP contains one scenario with nuclear power. Most countries are considering national policies for carbon pricing—an instrument that captures external costs of GHG emissions and ties them to their sources through a price (refer to Box 2-2). According to the assessments of the Energy Community Secretariat, the overall policy packages need to be strengthened significantly in most countries: most draft NECPs do not demonstrate clearly how the policies and measures will contribute to meeting the decarbonization targets and objectives because of lacking analytical basis, or impact assessments, or investment estimates, or explanation of the synergies between different dimensions or a combination of these and other factors.¹³⁹

BOX 2-2: CARBON PRICING

Despite potential short-term impacts, the introduction of national carbon pricing represents a key policy instrument for climate change mitigation and economic development. It enables countries to align with EU policy trends and acquis requirements, attract clean technology investments, and shift to low-carbon production. Modeling exercises in Kosovo, North Macedonia, and Serbia show that carbon pricing can drive emissions reductions without significant negative effects on long-term economic growth, depending on revenue utilization. The generated revenue can be reinvested to fund clean energy projects and research, enhance product competitiveness, support vulnerable households, and facilitate a Just Transition. In the long run, carbon pricing can have positive macroeconomic effects; Serbia's GDP is projected to increase by 0.1 percent, compared to business as usual.¹⁴⁰

Domestic efforts toward carbon pricing are limited but are gaining momentum. The WB6 countries have committed to implementing carbon pricing as part of the Sofia Declaration, Green Agenda Action Plan, and the Energy Community's Decarbonization Roadmap. The region is moving to carbon pricing but at different speeds and capacity levels across countries. Montenegro has an operational Emissions Trading System (ETS) for industry and power sectors that are being reviewed because the system has faced significant challenges. Bosnia and Herzegovina is exploring options for its national ETS, with a national roadmap for ETS implementation by 2026. As part of broader work on green growth strategies, Serbia has assessed the impact of a national ETS based on the EU ETS design.¹⁴¹ North Macedonia has listed a carbon tax as a key policy measure in its NECP. Albania has suggested implementing an ETS in its NECP and is considering adjustments to its coal tax. Kosovo's energy strategy outlines the gradual implementation of a carbon price to facilitate integration into the EU ETS. Additionally, most WB6 countries have downstream excise taxes on energy products; however, rates vary, do not fully reflect their environmental impact, and are considerably below the rates proposed in the EU's revised energy taxation directive.¹⁴² The region is moving toward carbon pricing, but progress and consistency are needed.

Given intra-WB6 trade, an uncoordinated approach to carbon pricing in the region presents challenges. The WB6 countries trade significantly among themselves, creating a potential first-mover disadvantage if carbon pricing is introduced at different times. Bosnia and Herzegovina, a major electricity exporter, may be hesitant to implement carbon pricing and risk losing electricity export opportunities to the region. Albania has the highest exposure to intra-WB6 trade for CBAM-covered products and is likely to be reluctant to introduce carbon pricing without similar measures in neighboring countries.

¹³⁹ <https://www.energy-community.org/news/Energy-Community-News/2023/12/29.html>.

¹⁴⁰ The World Bank Group. 2022. "Supporting Serbia's Transition to Greener and More Resilient Growth". <https://openknowledge.worldbank.org/server/api/core/bitstreams/a1cf83e2-bfcf-5454-90a5-aa3b09e8f816/content>.

¹⁴¹ World Bank. 2022. Supporting Serbia's Transition to Greener and More Resilient Growth: Policy and Institutional Reforms. Washington, DC: World Bank. <http://hdl.handle.net/10986/38271>.

¹⁴² Energy Community. 2021. https://www.energy-community.org/dam/jcr:82a4fc8b-c0b7-44e8-b699-0fd06ca9c74d/Kantor_carbon_012021.pdf.

A regionally harmonized approach that pairs the introduction of a coordinated, regional carbon pricing system with integrated power and gas markets is being discussed. Fragmented electricity markets and uncoordinated carbon pricing in the power sector pose risks of carbon leakage and hinder the transition to a low-carbon economy. Coordinated carbon pricing, combined with integration into the pan-European electricity market, could enhance cross-border energy flow options, promote power mix diversification, attract investments in cleaner technologies, and facilitate a smoother transition.¹⁴³ However, further analytical work assessing leakage, liquidity and other challenges is needed to fully understand the benefits and risks of this approach. Collaboration among countries can also be a cost-effective method of developing common institutional infrastructure, monitoring systems, and other design elements.

CBAM provides an impetus to develop carbon pricing in the WB6, but exactly how governments should respond to this requires a more detailed impact assessment of the options. The implementation of CBAM presents WB6 governments with a choice in the short term—to bear the additional cost of the CBAM on exports to the EU or to implement an EU-equivalent carbon pricing scheme to receive a derogation from CBAM. The introduction of ETS with the price equivalent to the EU ETS is a necessary prerequisite for coupling WB6 electricity markets with the EU market, to which the WB6 governments committed by signing the ambitious Energy Community electricity package in December 2022. The Energy Community Secretariat has highlighted that a regional ETS could be the best option to ensure the success of energy market coupling reforms and to limit the impact of the CBAM, and the EC is conducting an impact assessment of this approach. The core building blocks of this approach are yet to be fully developed, including a timeline, and they should be interpreted very loosely. Some estimates suggest that the impact of a regional ETS on energy prices in WB6 would be more costly than the impact of CBAM;¹⁴⁴ careful analysis is required to understand the distributional impacts of both schemes, especially on vulnerable groups, such as low-income or fossil fuel-dependent communities. Overall, detailed impact assessments are necessary to determine the best carbon pricing options for each country – e.g., a carbon tax, a carbon fee, a national or regional ETS and eventually joining the EU ETS – and the optimal timeframes for their introduction, as well as the necessary transitional arrangements.

The success of a domestic carbon pricing mechanism depends on its implementation and revenue utilization. Although a well-designed ETS can foster structural emission reductions, developing such a system is not without its challenges. Lessons from Montenegro¹⁴⁵ highlight the importance of having sufficient trading entities with good financial health for price discovery. Setting a tight emissions cap aligned with climate goals and defining clear legislation on trading, free allowances, and revenue utilization are also crucial. Establishing a realistic baseline year and effective fines for noncompliance will be essential to ensure adherence to the legislation. In addition, international experience demonstrates that to be effective, any carbon pricing instrument should align with other policies such as phasing out conflicting pricing signals, adjusting electricity tariffs to align with emission reduction targets, increasing excise taxes in line with the EU Tax Directive, and implementing Just Transition policies to support coal-dependent communities and prevent energy poverty. Modeling work in Serbia highlights that differing revenue use packages can have significant impacts on macroeconomic outcomes and should be carefully considered as part of any ETS design work. That said, given the additional infrastructure and capacity needs of developing an ETS, implementing a carbon tax that leverages existing fuel excise systems could offer a faster interim or alternative carbon pricing option for some WB6 countries.

The development of national legislation is a dynamic process that is evolving with the broader EU framework. The Energy Community Secretariat monitors the progress in transposing the relevant EU legislation in the areas that include climate change governance, renewable energy, energy efficiency, and electricity market development. The Secretariat's progress report¹⁴⁶ demonstrates that the WB6 countries were at different stages of transposing the EU acquis at the end of 2023. Serbia was the most advanced in terms of adopting policies and legislation related to climate governance, followed by Albania and North

¹⁴³ Energy Community. 2021. https://www.energy-community.org/dam/jcr:82a4fc8b-c0b7-44e8-b699-0fd06ca9c74d/Kantor_carbon_012021.pdf.

¹⁴⁴ Mačić, Ljubo. 2023. "Introducing Carbon Pricing and EU CBAM Mechanism Application in the Energy Community." <https://balkangreenenergynews.com/introducing-carbon-pricing-and-eu-cbam-mechanism-application-in-the-energy-community>.

¹⁴⁵ Bankwatch. 2022. <https://bankwatch.org/blog/the-cautionary-tale-of-montenegro-s-emission-trading-scheme>.

¹⁴⁶ Energy Community. 2023. "Implementation Progress." <https://www.energy-community.org/implementation/report.html>.

Macedonia. Practical implementation of these policies, including the monitoring and enforcement of regulatory requirements, differs significantly among countries and depends to a large extent on the national institutional capacities (refer to Section 2.2.2). Other barriers to implementation include political dynamics, economic and social considerations, technological hurdles, lack of public awareness, and challenges related to international coordination.

Just Transition policies

The phasing out of coal is necessary to meet the climate commitments of the WB6, and socioeconomic dependence on coal within the region necessitates a coordinated Just Transition approach. The impacts of coal phase out are dynamic and complex, and the effects tend to be highly localized within coal-dependent communities, in both the coal and adjacent sectors. A Just Transition is one that is fair and inclusive of everyone, creating alternative productive opportunities and leaving no one behind, especially in highly impacted communities. Enabling a Just Transition requires that governments have a comprehensive national vision for phasing out coal, considering three key pillars: (1) institutional governance, (2) people and communities, and (3) environmental reclamation and repurposing of assets (refer to Box A1-3 in Annex 1).

Work in each of these three pillars is ongoing across the region. Bosnia and Herzegovina and Serbia are actively collaborating with international organizations, including World Bank, EBRD, and UNDP, to develop sequenced Just Transition policies to ensure socioeconomic recovery in regions dependent on coal. Kosovo has engaged with the World Bank to conduct a land use and repurposing assessment (LURA) for current and former coal mines, and discussions are underway regarding the required institutional arrangements to enable a Just Transition. The Western Balkans/Ukraine Coal Regions in Transition initiative¹⁴⁷ promotes international dialogue among seven countries to build a long-term vision for coal phase down and to share lessons learned by national authorities, international organizations, nongovernmental organizations, academics, and private sector representatives.

2.2.2. Institutional readiness

The institutional maturity for addressing climate change—the ability to take effective climate action and implement climate policies—varies among the six countries, according to the World Bank’s Climate Change Institutional Assessment (CCIA). The CCIA examines the countries’ capacity to plan, implement, and sustain climate change policies over multiple political cycles by analyzing 74 indicators across five pillars: (1) planning (articulated in strategies, laws and regulations); (2) organization (institutions and institutional mechanisms); (3) public finance (investments, climate finance mechanisms); (4) accountability (audits, oversight, public engagement); and (5) SNG/SOE (the extent to which climate action extends to the subnational governments and SOEs that dominate the region’s energy sector). The 74 indicators measure different aspects of institutional maturity for climate action and categorize them as nascent, emerging, or established, with further breakdowns within each category. Given the fact that the CCIA is a point-in-time analysis, the findings may not capture recent developments due to 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 and helps to inform peer learning and innovation in climate action.

The WB6 countries have relatively well-developed planning frameworks related to climate change, but their ability to deliver on these ambitions is hindered by institutional weaknesses and poor technical capacities. Most governments in the region, supported by donors, have articulated short-, medium-, and long-term ambitions for climate change adaptation and mitigation (refer to Section 2.1). However, their ability to deliver on these commitments varies widely, and the legal frameworks are still not fully in place to ensure the proper implementation of measures at national and local levels. Lead ministries and regulatory authorities in most countries do not have organizational structures in place that are suitable for action against climate

¹⁴⁷ Initiative for Coal Regions in Transition in the Western Balkans and Ukraine. https://energy.ec.europa.eu/topics/oil-gas-and-coal/coal-regions-western-balkans-and-ukraine/initiative-coal-regions-transition-western-balkans-and-ukraine_en#:~:text=The%20Initiative%20for%20coal%20regions.while%20ensuring%20a%20just%20transition.

change; they have insufficient capacities compounded by uncompetitive salaries, brain drain to other countries, and a general lack of opportunities for professional development in the public sector. Where there is some capacity available, specialist knowledge about climate change is limited. A positive example, however, is the establishment of a Group for Climate Change in the Agricultural Sector in the Ministry of Agriculture, Forestry and Water Management of Serbia. Another positive development in many countries is the establishment of relatively strong entities that promote energy efficiency, renewable energy, or the electrification of heating and transport, such as the Kosovo Energy Efficiency Fund (KEEF) or the renewable energy one-stop-shop RESKosovo.

Efficient coordination and independent advice mechanisms are insufficient. There is often a disconnection between the existing national legal framework and the operational reality at municipal levels, as well as a lack of collaboration between central and local authorities. Coordination related to climate change policies and measures is generally organized through national climate change councils. These bodies typically consist of a large number of members, meet irregularly, and do not have a high-level profile in the government. Across the WB6, Montenegro is the only country with a council located in the prime minister's office that deals with climate change. Although the councils usually have the mandate to provide advice, there is no legal or practical obligation for lead ministries or the government to consider it. Ministries of finance in the region do not have an active role in coordination mechanisms for climate action and policy, despite their central role in controlling public resources and spending.

The institutional set-up is a mirror image of the countries' political economy. The region faces a complex process of decarbonization because of its high dependence on fossil fuels (except in Albania), as discussed in Section 1.3. Many issues make decarbonization politically challenging in the short-term: energy security considerations, high reliance on domestic coal, strong political influence of national energy utilities, inertia in decision-making, high costs associated with the energy transition in the context of relatively low average incomes and significant social impacts of energy price increases, and social problems related to coal mine closures. The EU accession process is a major driver for climate action (refer to Section 2.1); however, this so-called "Brussels Effect" has not been sufficient so far to transform the political economy of individual countries and their institutions. Climate-responsive institutions with strong mandates and sufficient capacities, as well as high-level political support for climate action, are the cornerstones of effective implementation of ambitious commitments.

The integration of climate change considerations into public finance management is at a nascent stage, and sustainable climate financing mechanisms are limited. Several WB6 countries have ongoing initiatives, supported by donors, to move to climate-responsible public finance management; these actions are at an early stage. Some countries have an enabling framework for green public procurement (GPP) and have provided guidance for its voluntary use, but there are no standardized environmental criteria and no legal obligation to apply the GPP. Designated funds for the environment and climate change in Bosnia and Herzegovina and Montenegro are partially replenished from fuel and environmental taxes, and from ETS revenues in Montenegro. In addition, there are budgetary allocations for financing energy efficiency in Kosovo and Serbia. Apart from limited funds for subsidizing crop insurance and irrigation systems, there are no designated funds for climate change adaptation. The only country in the region with a green bond framework is Serbia. The need to implement green budgeting and ways to improve the process of making informed climate-sensitive fiscal choices is addressed in more detail in Section 4.4.

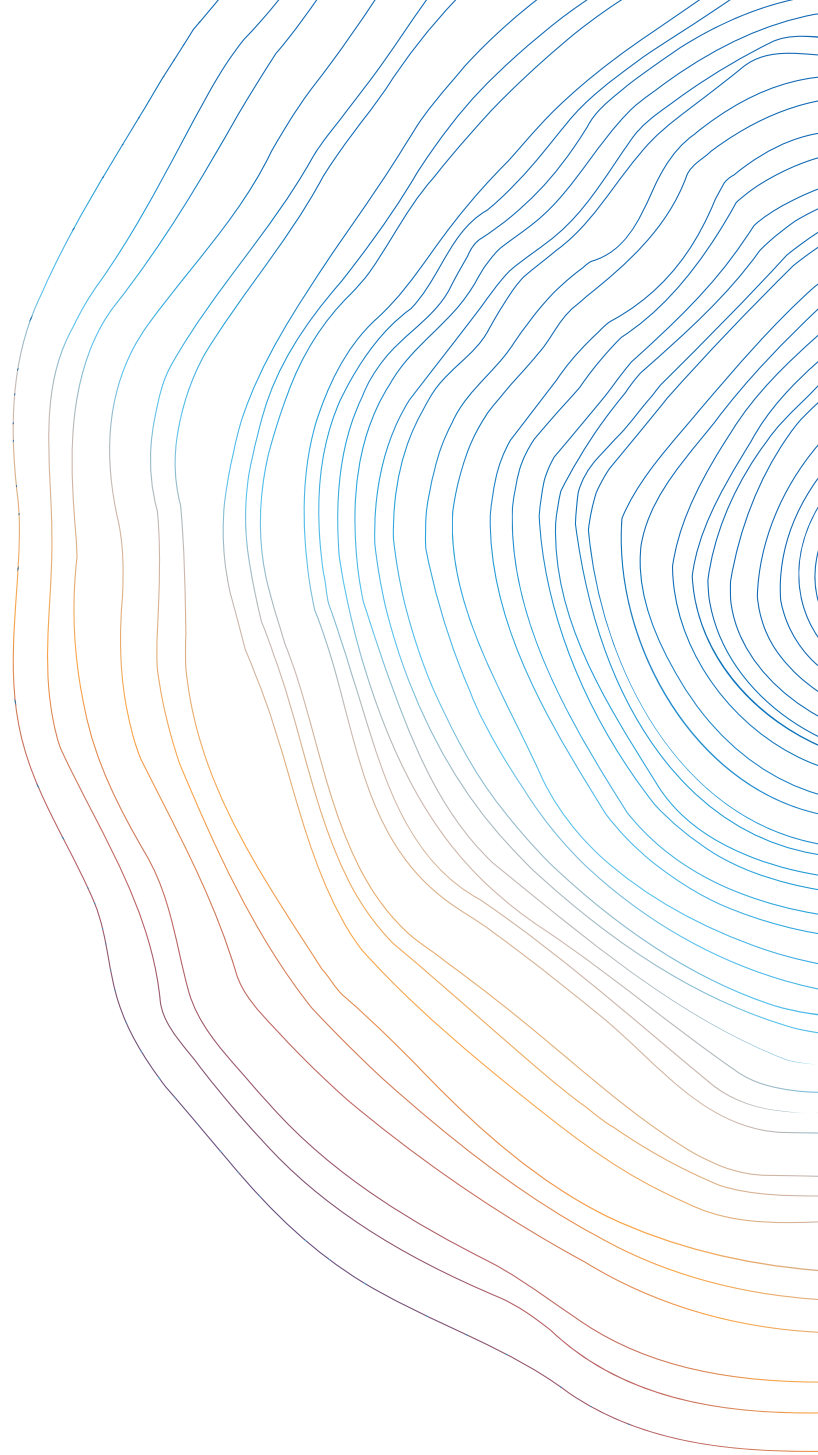
Several gaps have been identified in the financial component of adaptation in the Western Balkan countries. For the financial preparedness to address climate risks, a huge gap exists in adaptation budgetary planning; all six countries lack mandatory catastrophe insurance policies for disaster and climate events and have limited post-disaster compensation to uninsured homeowners or businesses as risk-transfer products to maintain financial sustainability¹⁴⁸ Budgetary constraints hamper preparedness and resilience, as well as the responsiveness of health, social protection, and education systems.

¹⁴⁸ World Bank. 2021. SEE Catastrophe Risk Insurance Facility TA SECO (P156455). <https://documents1.worldbank.org/curated/en/164351616972613977/pdf/Western-Balkans-SEE-Catastrophe-Risk-Insurance-Facility-TA-SECO-Project.pdf>.

The effectiveness of the intergovernmental system to facilitate climate action by subnational governments and SOEs has the lowest average CCIA score across the region, compared to the other four pillars. North Macedonia and Serbia perform slightly better than the other countries in this regard. Subnational governments are assigned only very limited roles in climate change adaptation and mitigation; they do not have the capacities, financing, and adequate coordination mechanisms to engage in climate action. The capacities are usually limited to energy managers or civil servants from the environmental protection departments, without specific expertise in climate change. Although subnational governments have a clear role in energy efficiency and waste management, subnational climate planning is carried out on a voluntary basis. One exception is Albania, which recently mandated that energy efficiency programs as part of municipal energy management be aligned with NECP targets. Another example is the Water Alliance for the Modernization of the Water Services Sector in Bosnia and Herzegovina, which united efforts across several development partners, including the EBRD, EIB, UNDP, World Bank, and bilateral partners from Switzerland and Sweden. In all WB6 countries, SOEs are active in the energy sector, which is the largest GHG emitter (except in Albania). Nevertheless, SOEs do not have any designated role in climate action. The broad role of the state and SOEs is addressed in Section 4.4.

There is room for significant improvements in transparency and engagement mechanisms that hold the government and others accountable for the implementation of climate action across the region. On average, Montenegro is the best performer in this category; the scores of Albania and Kosovo are below the WB6 average. Across the region, state audit institutions and courts are generally not enforcing climate action. State auditors have started looking into compliance issues with environmental policy, but to date they have not considered the specific aspects of climate policy. One exception is North Macedonia, where the state audit institution reviewed measures and policies of competent authorities for mitigating climate change. The number of environmental court cases has been limited, although these cases are starting to trend upward. There is, however, no evidence of any climate-related court cases.

Effective climate action requires that all members of society are aware of, understand, and accept the transition to a green economy. In the WB6 countries, however, citizen engagement platforms are weak and avenues for sharing information are limited. Public awareness of the impact of climate change and the importance of adaptation is limited, especially in vulnerable communities. The countries lack good data and information management systems on historical and projected climate impacts, which limits their capacity to undertake climate risk assessments and make effective, evidence-based policy and investment decisions. There is mistrust in what “participation” in policy means. The voices of affected community groups are not reflected in decision-making around climate policies and programs. Yet, ensuring that the voices of marginalized groups, civil society, and the private sector are meaningfully reflected is critical to ensure that such policies are equitable, as well as to build social support for them and ensure that the green transition is a Just Transition. Governments are strongly advised to lay the foundation for timely dialogue with civil society organizations; the private sector; sector representatives from agriculture, water, energy, mining, urban development; and environment protection organizations, women, youth, and academics involved in climate action and policy makers.



Chapter 3

What can be done? Adaptation and mitigation

3.1. People and Places Deep Dive

Climate hazards affect different people and different places differently—also because they differ *ex-ante* in their ability to adapt and mitigate to stressors. The effects of climate-related hazards vary across and within countries, with differential effects on various segments of the population of a city or region. Recent global research¹⁴⁹ demonstrates how different types of cities have different exposure to hazards, with vastly differential impacts within the same city according to, say, income or gender. The Western Balkans are no different. Given that local characteristics will inevitably affect resilience and adaptation capabilities, understanding the interplay between localized impacts and local conditions is necessary to design targeted policies that can help countries reach their adaptation and development goals.

Climate hazards also overlap with other stresses, notably demographic decline, resulting in hotspots of acute and compounding vulnerabilities that can exacerbate regional inequality and hinder development trajectories. Countries in the region are also struggling to manage other socioeconomic vulnerabilities, including demographic decline, pockets of isolation, low levels of urbanization, and economic stagnation. Climate shocks and stressors can interact and further exacerbate these underlying vulnerabilities. They can induce further emigration; they can resurface underlying tensions and drive conflicts; and they can have a disproportionate effect on already vulnerable populations, such as the Roma minority.

Urban areas will be vital to any efforts at adaptation and represent an opportunity for greener and more resilient growth in the region. Western Balkan countries have been urbanizing continuously despite widespread population decline, and the population is increasingly concentrated in cities. Moreover, urban municipalities are often those that have successfully eluded the negative regional demographic trend in the past two decades. Accordingly, as population centers and economic hubs, cities in the region have an important role to play as efforts toward adaptation gear up. Yet, cities have, so far, squandered this opportunity by expanding inefficiently and becoming less resilient and less carbon efficient. This increased vulnerability represents a hidden opportunity: remodeling cities can achieve growth that is greener and more resilient and provide the propellant for meeting the countries' EU-accession goals.

3.1.1. Where are the vulnerability hotspots?

Vulnerability hotspots are those that account for exposure to hazards alongside the underlying socioeconomic characteristics—at a highly disaggregated level. Novel, high-resolution, hazard datasets described in Chapter 1 are employed to build disaggregated measures of exposure. These are combined with data on socioeconomic attributes that exemplify local stresses. The latter are obtained from global datasets such as the Global Human Settlement Layer¹⁵⁰ that allow comparability across different countries in the Western Balkans (refer to Box 3-1). The analysis primarily focuses on the following vulnerabilities: (1) demographic decline, one of the most pressing issues in a region where less than one-fifth of all municipalities witnessed population growth in the past two decades; (2) isolation from economic activity; (3) lack of urbanization; and (4) economic productivity. Due to regional differences in the classification of statistical territorial unit levels (NUTS),¹⁵¹ the common administrative definition of municipality (komuna/općina /opština)¹⁵² and that of cities as identified by the European Commission's definition of urban clusters discussed in Box 3-1 is used.

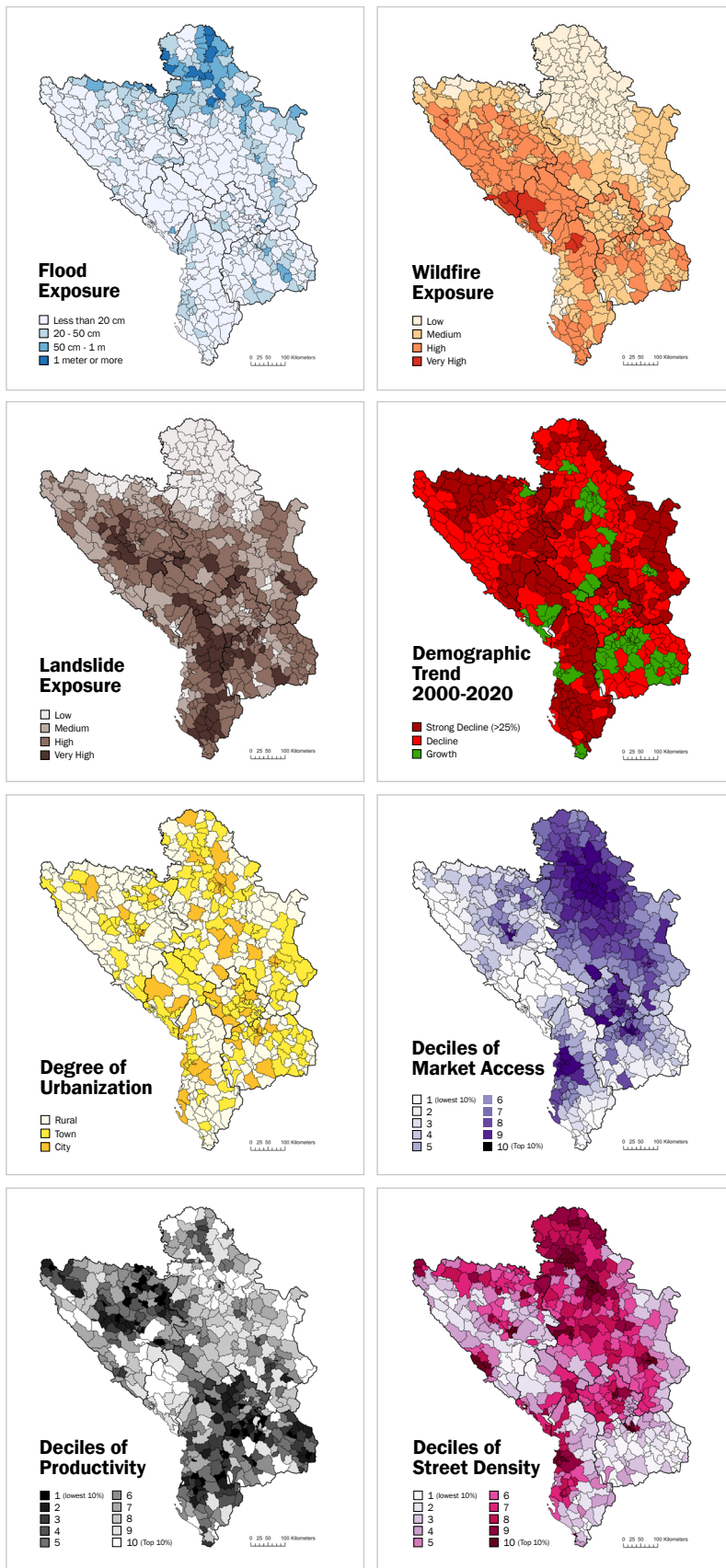
¹⁴⁹ Mukim, Megha, and Mark Roberts, eds. 2023. *Thriving: Making Cities Green, Resilient, and Inclusive in a Changing Climate*. Washington, DC: World Bank. <http://hdl.handle.net/10986/38295> License: CC BY 3.0 IGO.

¹⁵⁰ European Commission, GHSL Data Package 2023, Publications Office of the European Union, Luxembourg, 2023, doi:10.2760/098587, JRC133256.

¹⁵¹ Such differences also exist across different entities in Bosnia and Herzegovina.

¹⁵² Geographical boundaries of municipalities were obtained from multiple sources cross-checked with official national statistical services registers of administrative units. Municipalities in Albania, North Macedonia, and Serbia were obtained from Eurostat 2021 Local Administrative Units dataset. Municipalities in Bosnia and Herzegovina, Montenegro, and Kosovo were obtained from Open Street Maps. All internal administrative boundaries at the borders whenever inconsistent were adjusted to match the World Bank official country level boundaries.

FIGURE 3-1: WB MUNICIPALITIES' EXPOSURE TO HAZARD AND SOCIOECONOMIC VULNERABILITIES



Places that are already vulnerable are also more exposed to climate hazards. Declining, rural, and isolated areas display high exposure to climate hazards. A quick graphical analysis (refer to Figure 3-1) helps visually highlight the hotspots, that is, those areas with higher exposure to climate hazards and with other types of stresses. For instance, flood risk is highest in Northern Bosnia and Serbia along the course of the Danube and Sava rivers that flow across Belgrade and multiple secondary cities in Serbia, and the incidence often falls on declining and mostly rural municipalities in both countries. Bosnian municipalities on the Sava bordering Croatia are also more isolated and have lower market access. Higher exposure to landslides and wildfires is often correlated (refer to Section 1.2) and is often found in hilly and mountainous areas that coincide with remote, often rural, declining areas. This is the case in Southern Bosnia and Herzegovina as well in Southern Albania. Mountainous municipalities at the border between Albania and North Macedonia suffer from the highest landslide risk in the region and are also rural and isolated.¹⁵³ These examples illustrate the need for regional investment actions to pool physical and financial resources for emergency response in the form of Cross-Border Mutual Aid agreements.

Sources: Authors' elaboration based on GHS-POP R2023A, JBA flood data, CIMA wildfire data, European Landslide susceptibility (ELSUSV2), OpenStreetMap, and VIIRS DNB NTL

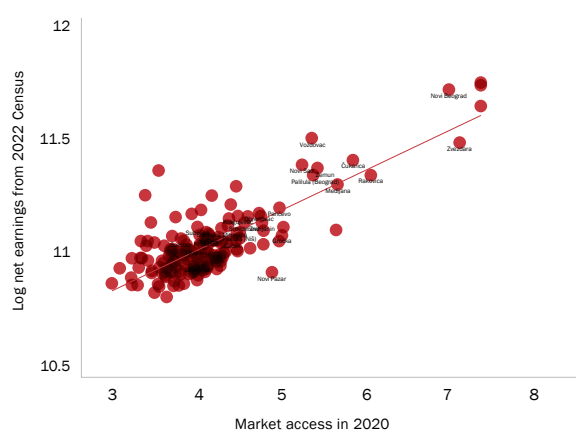
¹⁵³ Nevertheless, those on the Macedonian side of the border are among the few to have seen positive population growth in the past 20 years.

BOX 3-1: GLOBAL DATASETS PROVIDE CONSISTENT MEASURES OF VULNERABILITIES THAT ALLOW DISAGGREGATED ANALYSIS

Global gridded datasets are often employed to measure socioeconomic characteristics in data poor environments. In the context of the Western Balkans CCDR, these datasets offer two key advantages. First, they allow for cross-country comparability whenever the measurement of a given indicator is inconsistent across countries, and they fill data gaps due to the different capacities of individual National Statistical Offices. Second, the gridded nature of the data allows the construction of indicators at disaggregated levels, such as local administrative units or urban areas that are otherwise not available.

The People and Places Deep Dive relies on the Global Human Settlement Layer¹⁵⁴ to build a dataset measuring several municipal and urban area-level characteristics, including measures of vulnerabilities, across multiple years, to investigate local demographic trends. This data is instrumental in measuring demographic decline, one of the key measures of vulnerability. Population information in GHS-POP R2023A for 2020 is employed to determine the extent to which urban areas follow the European Commission's definition of urban clusters.¹⁵⁵ Urban clusters account for both low- and high-density urban cells and are preferred to the more restrictive urban center¹⁵⁶ definition due to the low-density nature of urbanization in the region.

FIGURE B3-1: NET EARNINGS AND MARKET ACCESS IN SERBIAN MUNICIPALITIES



Sources: GHS-POP R2023A, OpenStreetMap, SORS 2022.

Population data are also the basis for measuring isolation through market access.

At the municipal level, market access is measured as the population potential using the routing distance in km from the centroid of the municipality to all urban clusters in 2020, restricting only to markets in the same country.¹⁵⁷ Market access at urban cluster level is computed similarly. Economic performance is proxied by a nighttime light-based measure of productivity: the residual from regressing the natural logarithm of the sum of nighttime lights emissions within the area of interest over the natural logarithm of its population.¹⁵⁸ The rationale for this measure is to proxy productivity with the variation in a proxy for local output (nighttime lights emissions) that cannot be explained by a proxy for local inputs (population).

The vulnerability measures used in the People and Places Deep Dive are highly correlated with measures of deprivation. While the four measured of vulnerability used in the analysis capture unique relevant characteristics of municipalities in the Western Balkan countries, some of them also represent good proxies for local measures of deprivation. Indeed, the newly released Census data from North Macedonia (2021) and Serbia (2022), and recent wage data from Montenegro (2023) allow comparisons of how they correlate to municipal averages

¹⁵⁴ European Commission, GHSL Data Package 2023, Publications Office of the European Union, Luxembourg, 2023, doi:10.2760/098587, JRC133256.

¹⁵⁵ A cluster of contiguous grid cells of 1 km² with a density of at least 300 inhabitants per km² and a minimum population of 5000.

¹⁵⁶ A cluster of contiguous grid cells of 1 km² (excluding diagonals) with a population density of at least 1,500 inhabitants per km² and collectively a minimum population of 50000 inhabitants after gap-filling.

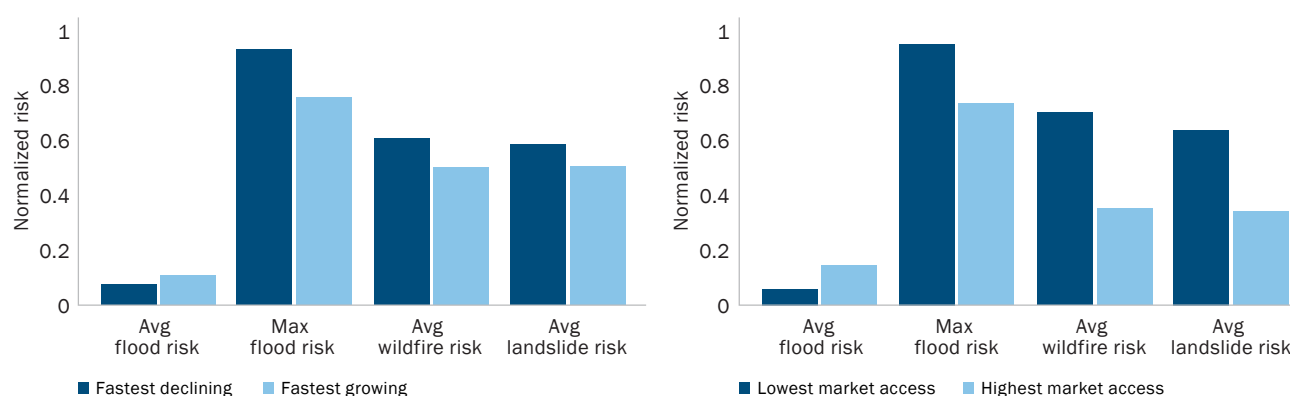
¹⁵⁷ Based on the assumption of the lack of full integration of national markets, despite the free movement agreement between countries, due to different currencies and hard borders.

¹⁵⁸ Nighttime lights effectiveness in proxying economic performance is reduced in smaller and less densely populated areas in low- and middle-income countries. For example, they fail to correctly estimate output of rural, agriculture-based local economies. This is a significant drawback in utilizing nighttime lights-based proxies in municipal-level analysis the WB region. Nevertheless, case studies from other countries show NTLs are still a valuable tool to estimate economic performance at small scale (Pérez-Sindín, X.S., T. H. K. Chen, and A. V. Prishchepov. 2021. "Are Nighttime Lights a Good Proxy of Economic Activity In Rural Areas in Middle and Low-Income Countries? Examining The Empirical Evidence from Colombia." *Remote Sensing Applications: Society and Environment* 24: 100647.

of wages, educational attainment (measured using the share of population with secondary education), and unemployment rates. For example, market access is highly correlated to net earnings ($r = 0.76$, refer to Figure 3-2) and educational attainment ($r = 0.5$) in Serbia, while displaying the expected correlation with all other available indicators.¹⁵⁹ Population growth/decline is also highly correlated to both net earnings and educational attainment in Serbia (relatively $r = 0.5$ and $r = 0.67$), while it displays inverted correlations in North Macedonia and little correlation to net wages in Montenegro.

On average, the fastest declining municipalities have 22 percent higher localized exposure to floods, 16 percent higher average exposure to landslides, and 21 percent to wildfires than the fastest growing ones. A simple analysis looking at the average exposure of municipalities vis-à-vis different socioeconomic vulnerabilities finds a positive correlation. Figure 3-2 shows how the fastest declining areas have higher exposure to landslides and wildfires than the fastest growing ones.¹⁶⁰ When focusing on floods,¹⁶¹ a similar relationship exists for localized exposure (highest hazard level in the area of interest) but not for the average value.¹⁶² The same results hold true for other measure of vulnerabilities such as isolation and lack of urbanization but not when focusing on a nighttime lights-based measure of productivity. Moreover, the results are not driven by differences across countries in aggregate levels of vulnerability and development. When using country-level rather than regional distributions of socioeconomic stresses to rank municipalities, the results are unchanged.

FIGURE 3-2: HIGHER SOCIOECONOMIC VULNERABILITY IS ASSOCIATED WITH HIGHER AVERAGE EXPOSURE



Sources: Authors' elaboration based on GHS-POP R2023A, JBA flood data, CIMA wildfire data, and European Landslide susceptibility (ELSUSV2).

Similarly, areas of highest deprivation also face higher exposure to localized flood events, wildfires, and landslides. Available national statistics from selected countries (refer to Box 3-2) allow better capturing of the “people” element by focusing on local measures of deprivation such as net earnings or wages, educational attainment, and unemployment rates. The resulting analysis¹⁶³ shows very similar patterns to those outlined; the most deprived areas face higher exposure to localized flood events (compared to the top quartile, 11 percent higher for the municipalities with lowest education, 12 percent higher in lowest wage areas, 21 percent

¹⁵⁹ The available variables in addition to net earnings and educational attainment for Serbia are unemployment rate for Serbia ($r = -0.21$ all country, $r = -0.37$ only urban); educational attainment ($r = 0.375$) and unemployment rate for North Macedonia ($r = -0.16$ all country, $r = -0.25$ only urban), net wage in Montenegro ($r = 0.25$).

¹⁶⁰ The analysis compares the first and last quartile of the regional distribution of a given measure of vulnerability (i.e., demographic decline). The differences are statistically significant at a 10 percent level.

¹⁶¹ Exposure to floods is measured as a combination of exposure to fluvial and pluvial flooding where each is expressed as the maximum flood depth in a grid cell with a 100-year return period (or the maximum flood depth that can occur each year with a probability of 1 percent). Combined flood exposure is the maximum flood depth of any type in the same return period, following Rentschler and Salhab (2020) and Rossitti (2022). Grid-cell level exposure is then averaged to calculate municipality level values.

¹⁶² Average exposure to floods is mostly driven by fluvial floods and, hence, proximity to river bodies. Therefore, the results are affected by the low variation in this measure as most grid-cells have no baseline exposure to floods. In this context, maximum localized exposure within the municipality may represent a more accurate indicator.

¹⁶³ The analysis compares the first and last quartile of the national distributions of each measure of deprivation. The educational attainment and unemployment rate figures include North Macedonia and Serbia, the wage's one includes Montenegro and Serbia.

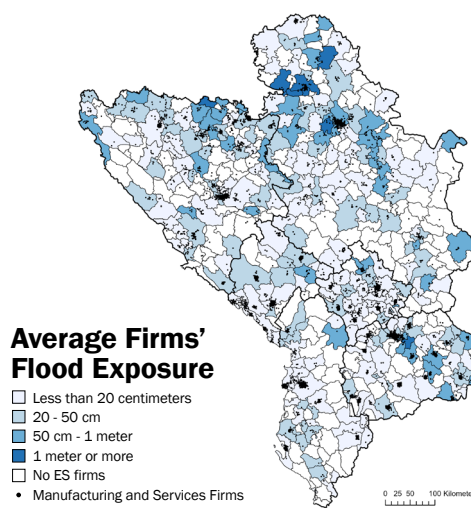
in areas with higher unemployment) but not to average flood exposure.¹⁶⁴ Wildfire exposure is 29 percent higher in lowest education areas, 54 percent higher in lowest wage areas, and 51 percent higher in highest unemployment areas. For landslides, the relative higher exposure is respectively 9 percent (education), 38 percent (wages), and 37 percent (unemployment).

BOX 3-2: THE IMPACT OF CLIMATE RISKS ON WESTERN BALKAN FIRMS

Firms in several municipalities in the Western Balkans with a high concentration of economic activity are highly exposed to floods, in particular riverine ones.

Figure B3-2 (in which only riverine flood is relatively well captured, with, most likely, an underestimate of flash flood exposure given data limitations) shows the average firms' flood exposure by municipality in the six countries, indicating substantial variation across the region.¹⁶⁴ Just below 19 percent of all firms face high local exposure (flood depth of an event with 1 percent yearly probability above half a meter); a considerable share of enterprises is in even riskier locations (approximately 8 percent and 1.5 percent in areas with flood depth respectively higher than 1m or 2m). Firms are on average located in risky areas because the average exposure of firms is higher than the whole municipality's average exposure in 69 percent of instances (this is especially in Bosnia and Herzegovina and North Macedonia, where it holds true for respectively 81 percent and 76 percent of municipalities). Moreover, several municipalities that face high exposure to riverine floods also display a high concentration of formal manufacturing and services firms (black dot clusters in the map): Fier in Albania; Bijeljina, and Novi Grad in Bosnia and Herzegovina; Rahovec/Orahovac in Kosovo; Bitola, Iliden, Negotino, and Skopje's municipalities of Aerodrom, Centar, and Gazi Baba in North Macedonia; Niš – Palilula, Novi Sad, Zrenjanin, Belgrade's municipalities of Čukarica, Novi Beograd, Palilula, and Zemun in Serbia. Notably, the detailed exposure to flood risk also depends on the resilience of local infrastructure such as water, wastewater, and drainage systems for roads not illustrated in Figure B3-2.

FIGURE B3-2: SEVERAL MANUFACTURING AND SERVICE FIRMS FACE HIGH EXPOSURE TO FLOODS



Source: ETIIC Firms and Climate Adaptation Toolkit for the geocoded locations of manufacturing and services firms (black dots) from the World Bank Enterprise Surveys (WBES) with a 3 km deviation, JBA for flood exposure. The last WBES wave is used for each country (2019 for Albania, Kosovo, and Serbia; 2023 for the remaining countries).

Note: Due to the masked firms' geolocation (random deviation of 3 km from actual location), flood risk is measured as the average raw depth of an event with a 1 percent yearly probability within a 6 km radius around the available geolocations.

Combining data on exposure and underlying vulnerabilities allows the development of a typology to categorize municipalities in the region. The ability to classify different areas according to their characteristics and needs has an immediate twofold benefit. First, it allows for better comparisons within and across countries in the region, as well as globally, with respect to recent research.¹⁶⁵ Second, it allows policy makers to quickly translate policy recommendations into targeted place-based interventions. The most cost-efficient (accounting for losses averted) measures to protect population and economic assets in primary and secondary cities will differ greatly from those targeting isolated, mountainous, and rural areas. The former may focus on infrastructure investments, maintenance, and city-level government capacity; the latter may focus on early warning systems and regionally coordinated mechanisms for the rapid deployment of emergency services. Table 3-1 provides an example of a typology.

¹⁶⁴ See footnote 160.

¹⁶⁵ See the World Bank's *Thriving: Making Cities Green, Resilient, and Inclusive in a Changing Climate* by Mukim and Roberts (2023) on cities and the forthcoming data platform.

TABLE 3-1: EXAMPLE OF A TYPOLOGY OF MUNICIPALITIES IN THE WB6

Measure	Categories	Description
Internal market size	Large	Population above 50,000
	Very small	Population below 5,000
Demographic decline	Declining	Negative population growth 2000–20
	Strongly declining	Population fell by more than 25 percent from 2000–20
Access to markets	Connected	Top 10 percent of market access within the country
	Isolated	Bottom 5 percent of market access within the country
Urbanization level	City	More than 50 percent of population in high-density urban cells
	Town	More than 50 percent of population in low-density urban cells
	Rural	More than 50 percent of population in rural cells
Elevation	Plain	Average elevation below 300 meters
	Mountainous	Average elevation above 600 meters

Sources: Authors' elaboration based on GHS-POP R2023A, OpenStreetMap, and EU-DEM.

3.1.2. How overlapping vulnerabilities interact with one another

Different vulnerabilities compound stresses by interacting with one another, while people's and places' responses to hazards depend on local characteristics. Overlapping vulnerabilities do not only subject local populations to different stressors; they can also interact with one another to exacerbate their effects. The SD Flagship Report *Thriving* (2023) recounted several scenarios in which poverty intensifies vulnerability to climate change. This report finds this to be true for the already marginalized Roma community in the WB6 countries. Similarly, decline and economic stagnation in some areas can suppress the necessary investment for resilience and adaptation. Poorly connected areas will face further isolation and will be difficult to access by emergency services, because the effects of compounding climate hazards disrupt local infrastructure links; upgrading regional transportation links is a must for bolstering resilience.

Climate hazards could exacerbate decline—for instance, by accelerating outmigration from areas that are struggling with demographic decline. A changing climate negatively affects livability and economic productivity. People can migrate because of poverty, lack of economic opportunity, conflict, or political instability—climate change could compound the effects, for instance, by amplifying preexisting migration patterns of circular, seasonal, and rural-to-urban migration. Globally, climate-related cross-border movements have occurred on a smaller scale than internal ones. Given the existence of well-established migration corridors, climate shocks and stressors could worsen outmigration trends, further affecting the negative demographic trend in the region. Climate shocks may also negatively affect the skills and human capital of migrants, worsening their prospects at their destinations.

Climate shocks can resurface underlying social tensions, leading to further conflict. The increased frequency of climate change-related shocks could translate into increased instability in the region. The linkage between conflict and climate change has been widely discussed. While the literature has not managed to unequivocally establish a clear causal relationship between climate and conflict, a volume of evidence suggests that climate acts as a threat multiplier, particularly in conjunction with agricultural dependency, low economic development, and political marginalization.¹⁶⁶ This is particularly relevant for the Western Balkans in light of the historical ethnic tensions and political fragmentation. The inconclusiveness of some empirical studies can be ascribed to the reliance on country-level data that fail to capture the spatially restricted effects of climate shocks and conflict.¹⁶⁷ Harari and La Ferrara's work shows that the relationship between climate and conflict is localized and persistent in space and time: climate shocks only matter if they occur during growing season, they generate conflict locally, and future conflict is more likely in the same area regardless of future shocks.¹⁶⁸

¹⁶⁶ Koubi, V., 2019. "Climate Change and Conflict." *Annual Review of Political Science*, 22: 343–60.

¹⁶⁷ Ide. 2023. "Catastrophes, Confrontations, and Constraints: How Disasters Shape the Dynamics of Armed Conflicts." <https://direct.mit.edu/books/oa-monograph/5593/Catastrophes-Confrontations-and-ConstraintsHow>.

¹⁶⁸ Harari, M. and E. L. Ferrara. 2018. "Conflict, Climate, and Cells: A Disaggregated Analysis." *Review of Economics and Statistics* 100 (4): 594–608.

BOX 3-3: CASE STUDY ON ROMA COMMUNITIES' EXPOSURE TO HAZARDS

Discriminatory practices lead Roma populations to live in highly exposed areas at the margins of urban agglomerations. Multiple case studies from all of Europe, including the Western Balkans, show how discrimination towards the Roma minority results in higher levels of exposure to climate and environmental hazards. They are often forced to relocate to marginal and highly exposed neighborhoods,¹⁶⁹ on flood plains, lacking access to essential services,¹⁷⁰ or in proximity of waste disposal sites.¹⁷¹ Quantitative evidence is at odds with qualitative observations. This work does not find evidence of a relative higher exposure of municipalities with larger Roma communities in the newly released census data from North Macedonia and Serbia. Nevertheless, the analysis is unable to capture differences in exposure within individual municipalities, as well as the exact location of Roma majority neighborhoods. Therefore, it is important to rely on the wealth of qualitative evidence and case studies painting a clear picture of over-exposure and marginalization.

The Roma minority in the Western Balkans has lower adaptation capacity than the average population to natural hazards and extreme weather events. The vulnerability of the Roma in the region is compounded by unfavorable housing conditions; the majority lives in severely crowded slums or informal settlements.¹⁷² Access to services is limited; Roma neighborhoods often lack basic infrastructure (i.e., access to piped water in Albania is less than half that of non-Romas¹⁷³) and are deprioritized in the provision of other essential services.¹⁷⁴ The COVID-19 pandemic clearly showcased how these factors affect resilience to shocks as the lack of running water and overcrowded housing made it difficult to adhere to safety measures, and while ambulances and emergency services could not reach the most vulnerable communities facing shortages of food and medical supplies.¹⁷⁵ Moreover, due a combination of informality, discrimination, and low literacy rates, the Roma are often excluded from traditional home and health insurance markets,¹⁷⁶ and they lack access to social protection schemes, further hindering their ability to cope with climate shocks. Due to their below-average educational attainment, and the corresponding gaps in foundational skills, the Roma are less likely to be adequately prepared to manage changes in labor market needs.

The Roma's role in waste management represents a story of economic opportunity for a community whose entrepreneurship's ability is severely limited by societal discrimination, but it is also a marker of further marginalization. The Roma's relegation to settlements nearby waste disposal sites has generated an opportunity for entrepreneurship. The Roma have a long-established history of contributing to waste recovery and recycling in the Western Balkans:¹⁷⁷ they increase the amount of recycling and waste collection, improving the efficiency and productivity of waste management systems.¹⁷⁸ In Serbia, it is estimated that 10 percent to 30 percent of all waste is recycled; informal waste collectors, primarily Roma, are responsible for 80 percent of this tally. Nevertheless, the association between Roma and waste collection is also a marker of further marginalization in the society. Many individuals' earning potential is tied to performing a hazardous task without any protective equipment or training, unable to observe proper hygiene and occupation health principles; the result is an average life expectancy for waste collectors of around 46 years—lower than the rest of the Roma population.¹⁷⁹ Furthermore, informality means

¹⁶⁹ Bernard Rorke. 2023. "Unnatural Disaster: Environmental Racism and Europe's Roma." Civil Rights Defenders, Stockholm.

¹⁷⁰ UNDP. 2016. "Risk-Proofing the Western Balkans: Empowering People to Prevent Disasters." Human Development Report 2016.

¹⁷¹ Heidegger, P., and K. Wiese. 2020. "Pushed to the Wastelands: Environmental Racism against Roma Communities in Central and Eastern Europe." European Environmental Bureau, Brussels.

¹⁷² For example, in Kosovo, 72 percent of Roma neighborhoods are marked by overcrowding, compared to 49 percent in non-Roma ones (World Bank, UNDP, EU (2018): Roma at a Glance: Kosovo, based on 2017 Regional Roma Survey.).

¹⁷³ World Bank, UNDP, EU. 2018. Roma at a Glance: Albania, based on 2017 Regional Roma Survey

¹⁷⁴ World Bank. 2019. "Breaking the Cycle of Roma Exclusion in the Western Balkans.

¹⁷⁵ ERGO. 2020. "The Impact of COVID-19 on Roma Communities in the European Union and the Western Balkans."

¹⁷⁶ In Albania, only 27 percent of Roma have health insurance, which exacerbates Roma, and in particular Roma women's, vulnerabilities to external shocks (World Bank, UNDP, EU (2018): "Roma at a Glance: Albania," based on 2017 Regional Roma Survey).

¹⁷⁷ In North Macedonia, 70–90 percent of the recycled plastic, cardboard paper, and iron is collected by informal waste collectors, among which the Roma are overrepresented (Mojanchevska, K. 2017. "Mapping the Potential of Informal Waste Pickers to Become Social Entrepreneurs and to Drive Up the Local Social Economy. In Bosnia and Herzegovina, informal Roma waste collectors recover 14 percent of the produced waste in urban and peri-urban areas, contributing to reducing the waste amount collected and disposed of by the municipality or the related costs (Vaccari and Perteghalla. 2016. "Resource Recovery from Waste by Roma in the Balkans: A Case Study from Zavidovici (BiH)"

¹⁷⁸ GIZ. 2018. "Inclusion of Informal Collectors into the Evolving Waste Management System in Serbia."

¹⁷⁹ Ibid.

lack of job security. As most countries in the region bid to improve waste management services in line with EU standards, Roma communities of informal pickers may be left behind. However, integrating informal collectors into municipal waste systems can generate economic opportunity, associated with new environmental services such as separate collection of recyclables, safe management of construction and demolition waste, and initiatives for down- and up-cycling. A successful example is the REDI Recycling initiative in North Macedonia that employs 4,500 Roma waste collectors while establishing a system for primary waste separation in households and companies.¹⁸⁰

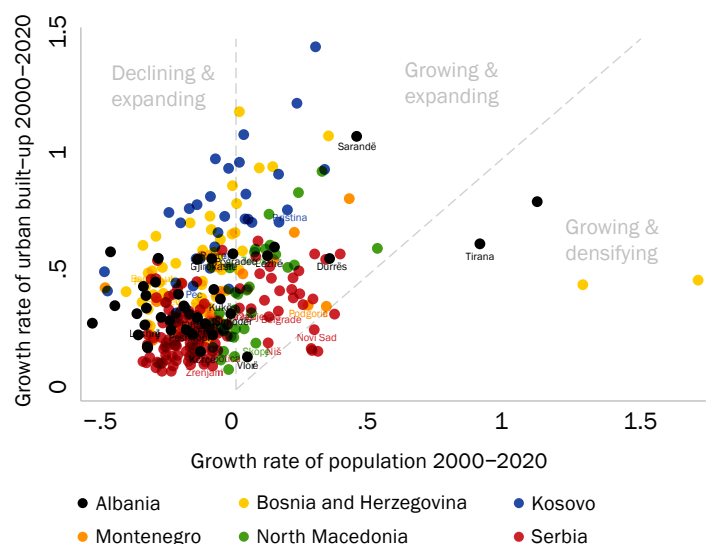
In a world of compounding stresses, education programs and social protection systems are key components of adaptation responses. As climate change exacerbates existing stresses, it is crucial to align the existing mechanisms to alleviate underlying vulnerabilities with overarching adaptation goals. For example, legislation should be adjusted to embed adaptation into social protections systems by allowing expanded coverage following disasters, targeting the most severely affected communities, and investing in systems capacity during disasters. Education or up-skilling programs and training systems to aid the transition to a green economy can provide economic opportunities to otherwise marginalized populations (as seen for the Roma community in North Macedonia in Box 3-3), as well as allowing human capital accumulation in areas of the countries that have witnessed sustained outmigration and increasing isolation.

3.1.3. The opportunity of remodeling WB cities

Urban areas have been growing inefficiently despite a declining population. Although more than three-quarters of all urban areas in the region experienced some level of population decline in the past 20 years, nearly all have witnessed an increase in their built-up area (refer to Figure 3-3). Similarly, most of the few non-declining cities have accommodated population through expansion rather than densification, leading to further sprawl. This has multiple negative implications for urban economies, their carbon efficiency, and local levels of pollution. Sprawl often requires development on previously green areas, contributing to the exacerbation of urban heat island effects and reducing carbon capture. Sprawling cities require longer journeys and generate increased usage of private vehicles. Moreover, unlike denser urban areas, they fail to create the close connections among people, businesses, and services that generate agglomeration economies and the accumulation of human capital.

Sprawl also makes cities less resilient—the expansion of urban footprints has led to increased exposure. The research finds that inefficient urban forms¹⁸¹ are associated with higher exposure to landslides and wildfires hazards.¹⁸² There are two potential (non-mutually exclusive) mechanisms for relationships. First, path dependence: urban areas with higher ex-ante exposure have grown faster as they have established themselves as population attractors. Second, continued urban expansion pushes new developments to areas with higher

FIGURE 3-3: INEFFICIENT EXPANSION THROUGH SPRAWL OF WB CITIES



Source: Authors' elaboration based on GHS-POP R2023A and GHS-BUILT-S R2023A.

¹⁸⁰ <https://redi-ngo.eu/recycling/redi-recycling/>.

¹⁸¹ The measures of urban forms' efficiency considered are: sprawl, the increase in built-up area from 2000 to 2020, and roundness.

¹⁸² While exposure to floods is not associated to more inefficient urban forms like other hazards, cities that have seen a higher increase in built-up from 2000 to 2020 have also seen a larger increase in their average flood exposure, and the relationship is stronger for more sprawling cities.

exposure, i.e., closer to water bodies (riverine floods), surrounding vegetation (wildfires), or slopes (landslides). This work introduces a novel piece of analysis using World Settlement Footprint high-resolution data to track the evolution of urban built-up within cities over time to investigate the validity of both hypotheses. The results show that urban areas with higher exposure in 2000 have not grown faster or declined less in the next two decades than those with lower exposure. However, average exposure to floods in stretches of new urban expansion (post-2000) is more than double that of pre-existing urban built-up area; for landslides, the difference is much smaller in relative terms (just below 1 percent) but nevertheless statistically significant.

Urban decline in the Western Balkans can be reappraised, from being the most considerable regional challenge threatening the region's prosperity, to an opportunity to redesign better cities to propel economic development. Urban areas are the centers of economic activity in the region and globally, and their relative influence will keep increasing given that demographic decline is more pronounced in rural areas. Usually, a diminishing population means a decreasing labor supply, lower human capital, and reduced investment. However, decline can also represent an opportunity in conjunction with climate shocks, because there is no pressing need to accommodate growing populations in highly exposed marginal areas. Urban planners could fully shift their focus to the requalification of existing structures, which would contribute to meeting country level decarbonization goals by cutting construction sector's emissions.¹⁸³ Cities in the region can draw from international successful experiences of managed decline (Detroit, Halle, Leipzig, and St. Louis),¹⁸⁴ learning how to manage the unique challenges this experience presents.

Remodeling urban areas represents a unique chance to achieve triple dividends because resilience goes hand in hand with development and sustainability. Cities in the Western Balkan countries will provide the ideal setting to reap the triple dividends of adaptation, as policies aimed at making cities more resilient will translate into higher productivity and less pollution. The resulting higher-density cities will be able to capture multiple benefits from agglomeration by fostering connections and the spread of ideas. More compact urban forms imply better access to economic activity and services for a larger share of the population, thereby improving inclusion. More people can rely on alternative transport options reducing the overall urban carbon footprint and contributing to abating other disamenities such as noise pollution. More resilient, accessible, and less-polluted neighborhoods will be more able to attract private investment and human capital, further snowballing the benefits of agglomeration. As a result, declining cities can be reshaped to be resilient, productive, green economic centers that will propel the WB6 countries to sustainable growth. However, densification will have to be done carefully, protecting and enhancing existing green spaces, incorporating green and blue infrastructure, and encouraging development of sustainable transportation (public transport and active travel). Indeed, densification has in the past led to direct loss of green spaces in urban areas; yet, nature-based solutions need to be prioritized in the context of climate change, as they enable to tackle several risks, including extreme heat, and fit the need for flexibility and increased livability.

3.2. Reimagining the Energy Systems to Mitigate Climate Change

As described in Chapter 1, GHG emissions in the region, excluding LULUCF, have remained relatively flat in the past decade at about 120 MtCO₂eq. The WB6 countries today are among the most carbon- and energy-intensive countries in Europe; their limited progress in terms of carbon- and energy-intensity reduction has been offset by their economic growth. The countries are struggling to significantly decouple their GDP and GHG emission trajectories, especially due to their continued reliance on lignite and other fossil fuels.

This Section investigates what it would take for the countries to embark on a pathway to economy-wide, net zero GHG emissions by mid-century. An energy system modeling analysis was carried out to develop sectoral decarbonization scenarios for each of the countries and compare them to a Reference Scenario (RS).

¹⁸³ CO₂ emissions from the construction sector include those embedded in building materials. The 2022 Global Status Report for Buildings and Construction estimates that buildings constructions materials alone command 9 percent of all energy-related CO₂ emissions globally.

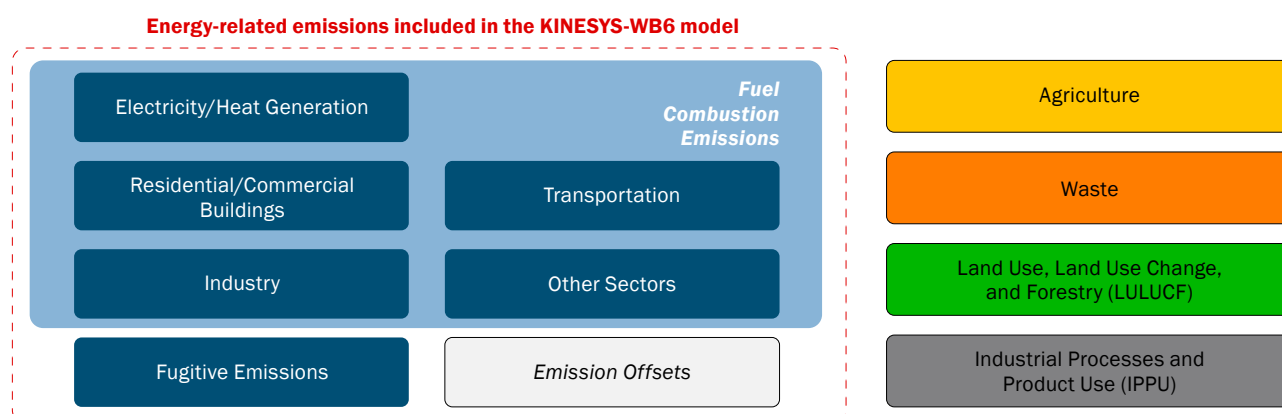
¹⁸⁴ Campos-Sánchez, F. S., R. Reinoso-Bellido, and F.J. Abarca-Álvarez. 2019. "Sustainable Environmental Strategies for Shrinking Cities Based on Processing Successful Case Studies Facing Decline Using a Decision-Support System." *International Journal of Environmental Research and Public Health* 16 (19): 3727.

The purpose was to highlight the extent to which the WB6 energy systems would have to transform to reach net zero GHG emissions, as well as to provide policy makers with recommendations on how this can be achieved, with a focus on short-term actions. In this context, 2050 was selected as the net zero GHG emissions target in light of the fact that in 2020, with the Sofia Declaration on the Green Agenda for the Western Balkans, the WB6 countries committed to “working towards the 2050 target of a carbon-neutral continent together with the EU.”

3.2.1. Modeling approach

The analysis relied on the Knowledge-based Investigation of Energy System Scenarios for the Western Balkans 6 (KINESYS-WB6) model, a global energy system model based on the TIMES paradigm. In the model, each of the countries and their neighboring countries are represented individually; other countries are grouped in regions. The model covers energy flows for each energy supply and demand sector (electricity generation, transportation, residential, commercial, agriculture, and industry), as well as a wide range of subsectors/services. KINESYS-WB6 explicitly covers GHG emissions from fuel combustion and fugitive emissions from fossil fuel extraction and transportation (refer to Figure 3-4). In 2019, these emissions collectively amounted to 94 MtCO₂eq in the WB6 countries, corresponding to about three-quarters of the region’s total gross GHG emissions (excluding LULUCF emissions). To set economy-wide GHG emissions targets to model quantity-constrained scenarios,¹⁸⁵ 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 are described in Box 3-4. All additional methodological details and assumptions, as well as an in-depth discussion of results, are presented in the Mitigation Background Note accompanying this CCDR.

FIGURE 3-4: GHG EMISSIONS SECTORAL COVERAGE OF THE KINESYS-WB6 MODEL



Source: World Bank analysis.

The energy system model was soft linked¹⁸⁶ with other models developed in the context of the WB6 CCDR to produce a broader and more accurate set of results. Four models were developed in addition to KINESYS-WB6: (1) a standalone transport model was used to develop transport demand projections for both the passenger and freight segments; (2) the Electricity Planning Model (EPM), a least-cost power system planning tool developed by the World Bank, was used to develop the NZE-RI scenario and simulate the effects of higher levels of regional integration of the power sectors within the WB6 countries on decarbonization; (3) the Climate Change Macro-Fiscal Model (CC-MFMod) was used to assess the impacts of climate change mitigation actions on macro-fiscal stability and policies; and (4) the Climate Policy Assessment Tool (CPAT) was used to provide additional insights on the economic co-benefits of climate change mitigation, the distributional impacts of energy price changes related to mitigation policies, and the options for recycling carbon pricing revenues when a carbon price is imposed.

¹⁸⁵ “Quantity-constrained” refers to scenarios in which a cap on annual GHG emissions is imposed on the model.

¹⁸⁶ “Soft linking” refers to an approach in which multiple models operate independently of each other but pass data back and forth and run sequentially to conduct a defined number of iterations.

BOX 3-4: SCENARIOS FOR ENERGY SYSTEM MODELING

The Reference Scenario (RS), which serves as a reference to assess the incremental effects of the decarbonization scenarios described, reflects a least-cost evolution of the energy system that is not subject to any GHG emission or carbon pricing constraints. In this scenario, 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 decarbonization scenarios described.

The Net Zero Emissions Scenario (NZE) aims to achieve net zero GHG emissions across all sectors of the economy for each WB6 country. This is a quantity-constrained, least-cost scenario; GHG emissions targets until 2030 are aligned with the scenarios "with additional measures" (WAM) as defined in the NECPs (whenever available) or other government strategies, and a linear reduction of GHG emissions afterward to reach economy-wide net zero by 2050.

The Net Zero Emissions Scenario with Higher Growth (NZE-HG) is a quantity-constrained scenario that imposes the same GHG emissions trajectories as the NZE until 2050 but assumes higher GDP growth rates, which could be achieved through more ambitious structural reforms. This scenario aims to investigate the trade-offs of decarbonizing larger economies that also have a higher capacity to invest.

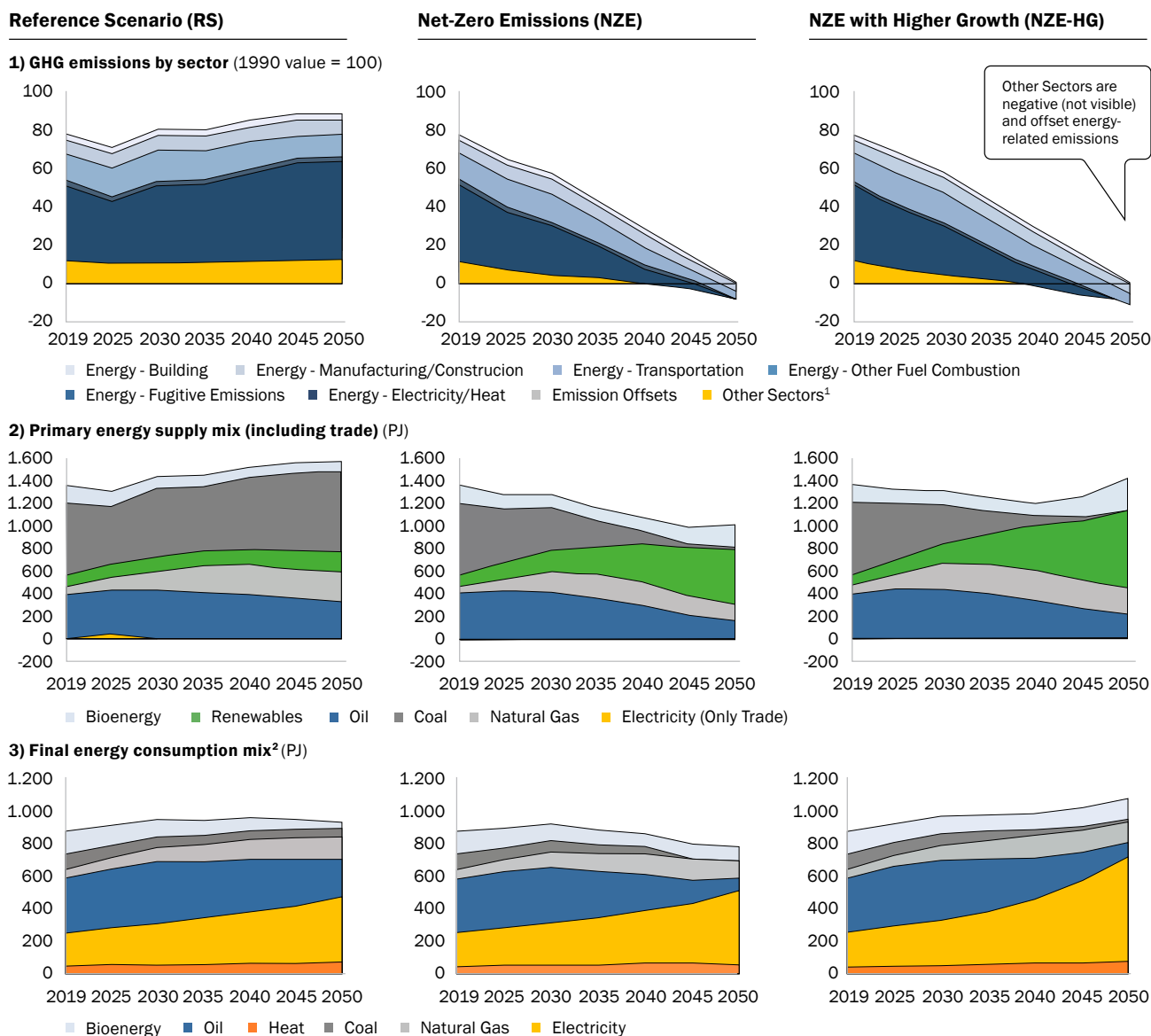
The Net Zero Emissions Scenario with Deeper Regional Integration (NZE-RI) is a quantity-constrained scenario based on the NZE that investigates the effect of higher levels of integration of the power sectors across the WB6 on the decarbonization pathways and their costs. This scenario (developed using the Electricity Planning Model or EPM) imposes the same decarbonization trajectories until 2050 as the NZE, but it assumes that the WB6 countries will share capacity and operational reserves and allow higher levels of import dependency. However, net zero targets are maintained at the country level, in line with the international commitments of the WB6 countries.

3.2.2. Under the unconstrained Reference Scenario, the WB6 would achieve only limited progress on climate change mitigation

In the RS, economy-wide GHG emissions (including sectors outside the model scope) for the WB6 countries would plateau at about 126 MtCO₂eq by 2050, about 10–15 percent higher than today's value but 10–15 percent lower than 1990 emissions (refer to row 1 in Figure 3-5). However, this value hides diverging trends at the country level. In Bosnia and Herzegovina and Kosovo, economy-wide emissions in 2050 would be even higher than 1990 emissions (5 and 15 percent higher, respectively), as a result of the continued reliance on domestically produced coal. In Montenegro and North Macedonia, by 2050, economy-wide emissions would almost halve compared to today's values; they would be 50–70 percent lower than 1990 emissions, especially due to the projected increase in carbon sinks or decrease in non-energy-related emissions.

In the RS, the energy mix of the WB6 countries would remain stubbornly high over the next decades, with a limited level of penetration of RE sources. The primary energy supply mix would continue to be dominated by fossil fuels (refer to row 2 in Figure 3-5). In 2050, at the WB6 level, coal would still account for 45 percent of the total primary energy supply, compared to 48 percent in 2019. In the power sector, until 2030, the deployment of gas-fired plants and renewables would allow the WB6 countries to meet the growing electricity demand and support the decommissioning of older coal plants. Bioenergy (biomass and biofuels) and renewables (mostly solar and wind) would show relatively modest growth, increasing from 17 percent of the total primary energy supply in 2019 to 18 percent in 2050.

FIGURE 3-5: SYSTEM-WIDE INDICATORS ACROSS THE RS, NZE, AND NZE-HG SCENARIOS FOR THE WB6 AS A WHOLE



Source: World Bank analysis.

1. Includes sectors not covered by KYNESIS-WB6, such as agriculture and waste, LULUCF, and IPPU. 2. "Electricity" refers to the consumption of electricity in end-use sectors, and "renewables" refers to the direct use of RE in end-use sectors.

Although it represents the least-cost development pathway under no external constraints, the RS is not a viable scenario for a sustainable development of the energy sectors, because it would not eliminate the existing negative externalities and it would be incompatible with their aspirations of EU integration and their existing climate change commitments. The results of the RS are driven by the fact that lignite-fired generation remains relatively competitive in the WB6, given the availability of domestic resources and the mostly fully depreciated generation fleet. However, significant negative financial and nonfinancial 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 WB6 economies in terms of job creation and attractiveness for foreign direct investment and financing from international financial institutions. Lastly, the lack of progress on coal phaseout would be incompatible with EU integration and the commitments the WB6 have made with the Sofia Declaration. In addition to a delayed coal phaseout, in the RS consumption of imported fuels (especially oil and natural gas) would grow compared to today. As a result,

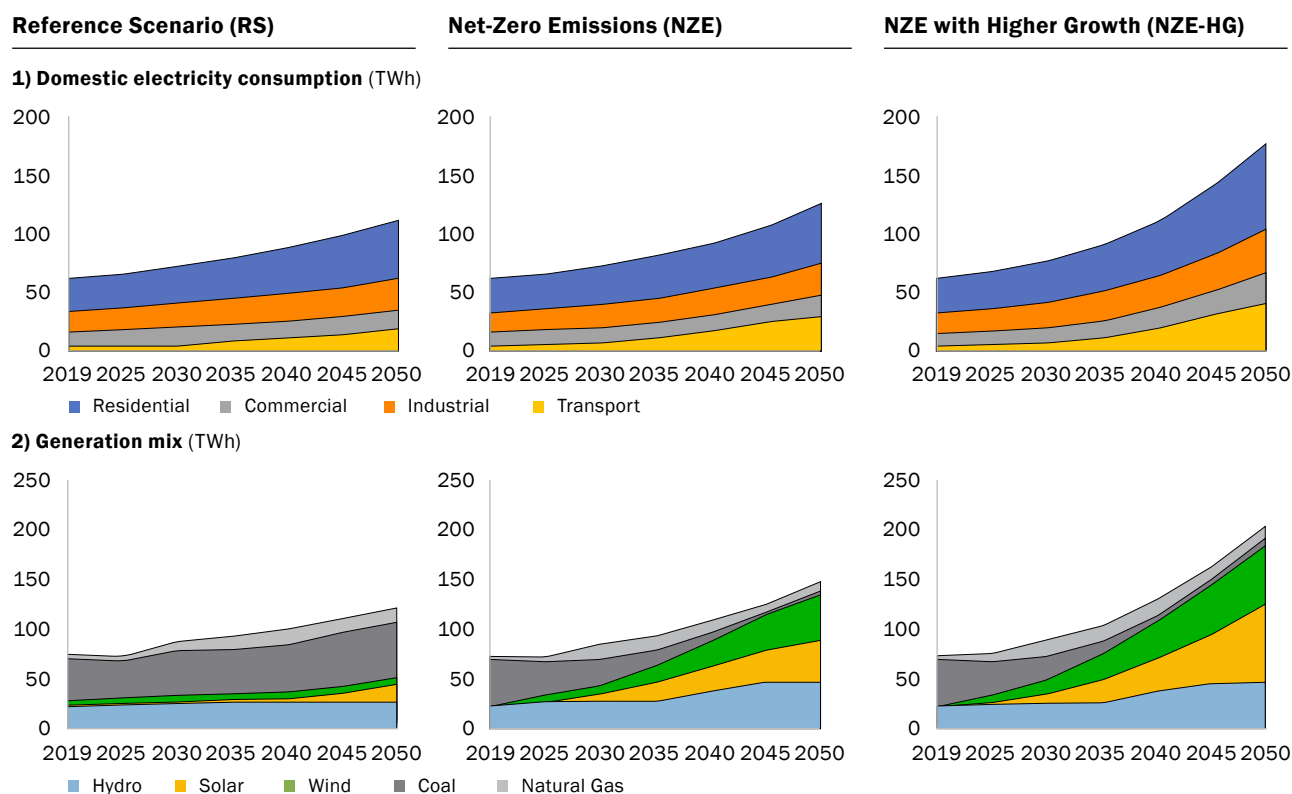
net import dependency of the countries (defined as net energy imports as a share of primary energy supply) would increase from about 35 percent in 2019 to a peak of about 50 percent in 2035, and then decrease to 37 percent in 2050, mainly due to the growth of renewables.

3.2.3. The energy systems would have to radically transform to achieve net zero by 2050

Early power sector decarbonization could support the achievement of economy-wide net zero

In a least-cost net-zero scenario, the power sector could help fully decarbonize the rest of the economy, due to the large and economically cost-attractive renewable energy resources. Power sector emissions for the region as a whole would decrease from about 57 MtCO₂eq in 2019 to - 0.3 MtCO₂eq in 2050, achieving negative emissions through the use of carbon capture and storage (CCS) technologies applied to biomass-fired power plants. In the NZE, the share of renewable energy in total electricity generation would increase from about 35 percent in 2019 (mostly hydro) to almost 95 percent in 2050 (refer to Figure 3-6, panel 2).

FIGURE 3-6: POWER SECTOR INDICATORS ACROSS THE RS, NZE, AND NZE-HG SCENARIOS FOR THE WB6 AS A WHOLE

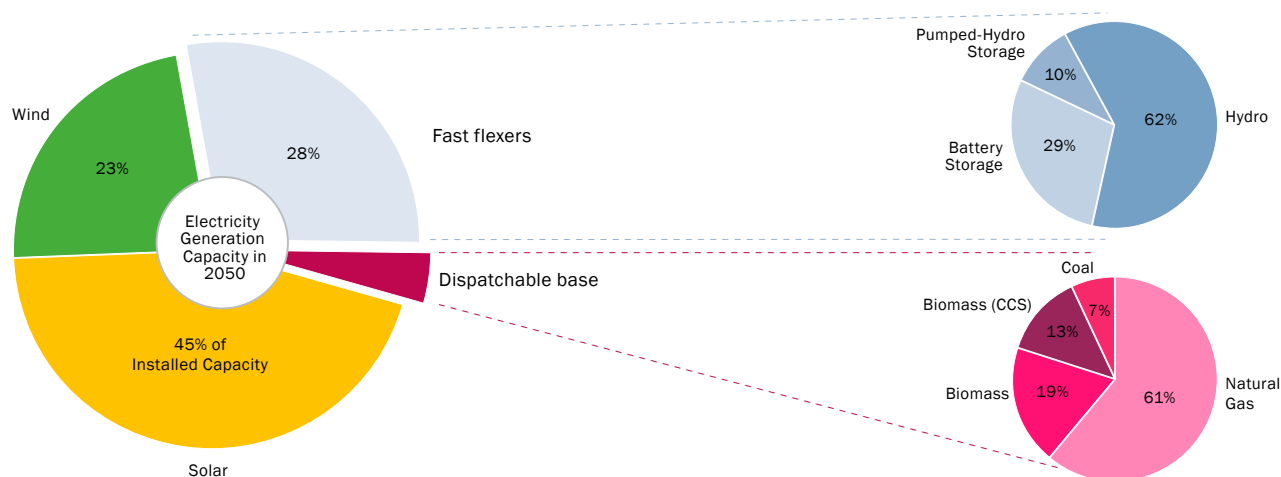


Source: World Bank analysis.

Coal generation would be almost fully phased out already by 2040. Coal phaseout would be achieved at different times across the countries, depending primarily on the economics of their coal supply, the availability of alternative sources that can ensure the reliability of the power sector, and the GHG emissions level that their energy sector needs to reach. The Bitola and Oslomej lignite power plants in North Macedonia will be decommissioned already by 2030; Bosnia and Herzegovina, and Kosovo, and Serbia could phase out coal by 2040–45, replacing it with natural gas and renewable energy sources. In Montenegro, coal generation would represent only a small percentage of total generation after 2040; however, the full decommissioning of the Pljevlja lignite power plant could be hard to achieve by 2050, due to the lack of economically viable alternative energy sources that can provide a dispatchable base of electricity. Similarly, other countries might choose to maintain some of their coal generation capacity for longer as reserves. In any case, coal phaseout should happen gradually, starting from the assets (mines and thermal power plants) that are financially unviable or fully depreciated, within the constraints imposed by the presence of a few systemically important power plants in some countries. Phasing out coal will also require a careful management of a broader set of environmental, social, and economic issues. The broader approach of a Just Transition from coal is discussed in Box 3-4.

The NZE scenario demonstrates that full decarbonization of the power sectors of the WB6 countries would require an orchestrated interplay of three different sets of power generation technologies (refer to Figure 3-7). In the NZE, the countries would exploit their ample renewable energy resources and use wind and solar PV generation as a “fuel saver,” resorting to storage and producing green hydrogen when generation exceeds demand. Battery storage and hydro would act as “fast flexers” that ramp up and down in seconds to counterbalance short-term fluctuations of wind and solar. Combined-cycle gas turbines (CCGTs) and biomass-fired power plants with and without CCS would act as a “dispatchable base” to counterbalance the seasonal/longer-term variability of wind and solar. Full decarbonization would require major incremental investments in all three types of technologies in parallel, combined with investments in the strengthening and digitalization of the power grid to exploit their synergies and ensure the reliability of the power sector.¹⁸⁷ As a result, the model suggests that in the NZE, electricity generation and supply costs in 2050 would be about 50 percent higher than in the RS. Assuming that these costs are fully passed on to customers, the increase in retail tariffs would be of a similar magnitude. These tariff increases could be mitigated by the shift to liberalized wholesale markets and increased regional integration, but the countries would need to manage them carefully, by assessing their impacts on the population and businesses and implementing social security measures targeting lower-income and vulnerable consumers.

FIGURE 3-7: ELECTRICITY GENERATION CAPACITY MIX IN THE NZE IN THE WB6 AS A WHOLE, 2050



Source: World Bank analysis.

BOX 3-5: A JUST TRANSITION AWAY FROM COAL

Phasing out coal is the single most important step to achieve the WB6 region’s climate goals, but its impacts need to be carefully considered for the transition to be just. Impacts of coal closures are complex because of four key factors: (1) impacts are highly localized and non-uniform (2) impacts are dynamic and change over time; (3) most impacted companies lack the social performance capabilities and means to assess and mitigate the risks of transition themselves; and (4) the primary responsibility of the transition lies with the government, managed through regulatory frameworks. These complexities support each other, highlighting the need for a holistic and coordinated approach to transitioning from coal.

The World Bank has developed a comprehensive approach to Just Transition that is being used to support governments’ activities across the WB6 countries and the world. A Just Transition from coal is one that is fair and inclusive of everyone concerned, creating decent work opportunities and leaving no one behind, especially in highly impacted communities. The approach includes activities required before, during, and

¹⁸⁷ All projects pertinent to the WB6 region from the Ten-Year Network Development Plan (TYNDP)-2024 were incorporated in the RS and NZE.

after coal closures across three key pillars: (1) institutional governance, (2) people and communities, and (3) environmental reclamation and repurposing of assets. Coal phaseout is not simply a matter of physical closures. The key to an effective Just Transition is to plan early, consider the interconnections among the three pillars, and ensure early and ongoing stakeholder engagement.

A well-planned Just Transition from coal can be a springboard for developing future-ready industries. In periods of high energy price volatility and a global transition from coal, coal-dependent communities are subject to many long-term risks and potential short-term fluctuations. This situation is reflected in higher risk premia and subsequent increases in energy prices. A well-coordinated approach to Just Transition identifies the skills in affected communities, the natural and physical assets, and the ways in which these communities can diversify their economies to be more resilient. Investments can be made to fill in any gaps that exist between the current and potential future states with ample lead time. Future economic opportunities may be in the energy sector, such as in the development of renewable energy capacity or storage, or in the development of adjacent industries, such as mineral mining. The region, particularly Serbia, has a unique opportunity to transform its mining sector thanks to a significant endowment of metals that includes a competitive advantage for copper and lithium. These metals are essential for the construction of renewable energy infrastructure and battery storage; accordingly, Serbia can play a vital role in the supply of the minerals that are driving the global energy transition. However, such a shift to a more sustainable mining sector would require improvements in the regulatory, institutional, and governance frameworks; labor reskilling and relocation might also be needed because mineral deposits are not necessarily located in the same geographical areas as the coal mines. Coal-mining communities may be able to diversify beyond the energy sector into agriculture, light industry, and the commercial or recreational sectors. Further, such a transition can be an opportunity to develop further private sector participation, such as through PPPs, to develop renewable energy.

Decarbonizing the rest of the economy will require significant energy efficiency improvements and the large-scale use of electricity

In the NZE, GHG emissions from the transport sector could be abated by more than 80 percent by adopting a three-pronged strategy consisting of demand reductions (*Avoid*), the shift of demand to more sustainable modes (*Shift*), and the adoption of more energy-efficient vehicles running on cleaner fuels (*Improve*). The *Avoid* strategies could help reduce total passenger transport demand in 2050 by about 5 percent in the NZE, compared to the RS. The *Shift* strategies could include additional policies and incentives to support the shift of the residual demand for transport services from more-polluting means of transportation to less carbon-intensive ones. In 2050, private road transport would account for 70 percent of motorized passenger transport activity in the NZE, compared to 83 percent in the RS; public road transport and rail would account for the remaining 30 percent, compared to 17 percent in the RS. For freight transport, increasing the combined modal share of rail and inland water transport (IWT) from 15 percent in the RS to 24 percent in NZE would yield significant emission reductions.

A large share of the GHG emission reductions in the transport sector would have to come from the *Improve* strategies, that is, the adoption of more efficient vehicles and the transition to cleaner fuels. The specific energy consumption (the amount of energy required per vehicle-km) would improve substantially for both passenger and freight transport and be 40–70 percent lower in 2050 than in 2019, depending on the transport segment. This reduction would be achieved through fuel-efficiency improvements in internal combustion engine (ICE) vehicles and, by 2050, a significant increase in the penetration of electricity, biofuels, and hydrogen in the transport fuel mix. Passenger cars would be mostly electrified by 2050 (80 percent of the total stock). In the freight transport segment, in 2050, conventional fuels would still account for about 50 percent of total fuel energy consumption, followed by electricity (about 40 percent) and biofuels (10 percent).

The decarbonization of the buildings sector would require energy efficiency improvements on top of the RS, combined with higher levels of electrification of heating demand and the switch to cleaner heating sources. In the RS, the implementation of building insulation measures could reduce final energy demand for space heating by about 20 percent by 2050, compared to projected consumption trends, because these

measures would be largely cost-effective even in this scenario. However, achieving economy-wide net zero would require further efforts in this area: in the NZE, building insulation measures would help reduce the final energy demand for space heating by almost 30 percent by 2050, compared to projected consumption trends (corresponding to a 12–13 percent reduction, compared to the RS in the same year. In addition to insulation measures, investments would be needed in the adoption of cleaner and more efficient heating systems. In the NZE, district heating and electricity could account for about 40 and 20 percent, respectively, of the final energy demand for space heating in 2050; biomass and natural gas would account for the rest. Considering that heat pumps have efficiency rates several times higher than traditional gas and biomass boilers and stoves, this level of penetration of electricity in the heating energy mix would correspond to more than 40 percent of households and businesses relying on heat pumps for heating in 2050.

Decarbonization options for the industrial and energy transformation sectors would include energy efficiency, the replacement of coal and oil with natural gas for heat production, the electrification of industrial processes, and the adoption of CCS. The implementation of energy-efficiency measures could reduce energy demand in these sectors by almost 10 percent in 2050 in the NZE, compared to the RS. At the same time, oil and coal would have to be completely phased out and replaced by natural gas, electricity, and biomass. After 2035, in the NZE, CCS would become economically viable (unlike in the RS) and would be implemented to capture IPPU and energy-related emissions from the industrial sector. The development of heat pumps technology is also improving the viability of electrification in the industrial sector, even in high-heat processes.

Significant decarbonization efforts in the non-energy sectors (for example, waste, agriculture, and LULUCF – not included in the modeling exercise described) would be crucial to achieve economy-wide net-zero GHG emissions in a cost-effective manner. Stepping up GHG emissions reduction efforts in these sectors could reduce the need to resort to decarbonization solutions with a higher abatement cost in energy-related sectors (for example, biomass with CCS in the power sector). The Western Balkan countries should focus on reducing direct methane emissions from the waste and agriculture sectors and improving the carbon sink potential of forests. Methane is a potent GHG, with a global warming potential (the capacity to absorb infrared thermal radiation and warm up the atmosphere) is about 30 times that of CO₂. It also contributes to the formation of ground-level ozone.

The establishment of a well-performing waste management system would be essential to curb methane emissions and make the waste sector more resilient to climate-related shocks. 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 approach should be accompanied by measures to integrate sector development, minimize and separate waste, increase and improve treatment, and improve sector governance, especially with respect to the availability and predictability of operational financing. Waste management also brings other positive environmental and health outcomes, such as reduced soil and marine pollution and better local health and environmental outcomes. Better waste management accelerates economic development by improving access to public services, helping to create jobs and improving livability.

In an optimistic growth scenario, the WB6 countries would have to make additional efforts to achieve economy-wide net zero targets. In 2050, the GDP of the WB6 countries combined is assumed to be about 75 percent higher in the NZE-HG than in the NZE and RS, which would correspond to a similar increase in the demand for services. However, efforts to further improve energy efficiency across all sectors could lead to an increase in the final energy demand of just about 40 percent, compared to the NZE in 2050. In addition, in the NZE-HG, meeting the net zero target would require resorting to higher levels of penetration of cleaner technologies across all sectors. In the NZE-HG, the WB6 countries would have to install about 89 GW of solar and wind capacity, compared to 53 GW in the NZE, which would produce about 69 percent of total electricity, compared to 61 percent in the NZE. In the NZE-HG, electricity prices would be higher than in the NZE in the medium term; however, they would converge to the NZE values in the long term, because in most cases, the technology setting the marginal price would be the same in the two scenarios (typically, wind).

3.2.4. Achieving net zero GHG emissions by 2050 would require large investments but would bring benefits in terms of reduction of operational expenditures, import dependency, and air pollution levels

Overall, compared to the RS, in the NZE, the WB6 would collectively need to invest in the energy system an additional additional \$89.4 billion (in 2020 US\$) undiscounted or \$31.9 billion discounted at 6 percent to achieve economy-wide net zero goals, equivalent to about 1.9 percent of GDP, on average, until 2050.

These investments are incremental to the investments required in the RS, which amount to US\$431.5 billion until 2050 (discounted values). The lion's share of the incremental discounted investment until 2050 would go to the power sector (US\$24.7 billion), followed by industry and energy transformation (US\$3.8 billion), transport (US\$2.6 billion), and the residential and commercial sectors (US\$0.9 billion).¹⁸⁸

Until 2030, the investments required in the NZE and RS would be similar, which highlights the fact that in the short term, efforts should be directed to laying the groundwork for an enabling environment for the subsequent scale-up of investments in the following decades. The total discounted incremental investments for the WB6 until 2030 would be about US\$2.1 billion, equivalent to about 0.3 percent of GDP on average. The relatively small magnitude of the incremental investments until 2030 suggests that while the WB6 countries would not require significantly more investments than already planned until 2030, significant policy changes are necessary to lay the foundation for rapidly scaling up renewables from 2030 onward. Within the required investments, specific focus should be placed on stepping up investments in renewables and gas-fired power plants to accelerate the decommissioning of coal plants. In the transport sector, there would be a shift in investments from private road vehicles to public transit and rail. In addition to redirecting some investments, the WB6 countries until 2030 should focus on creating the enabling policy and regulatory environment to accelerate the energy transition across all sectors of the economy and support the scale-up of investments after 2030. Recommendations on how the WB6 countries can achieve this are included in Chapter 5.

The incremental investment needs would ramp up after 2030, especially in the power and industry sectors. In the power sector, most of the incremental investment would be directed to the scale-up of solar PV and wind generation, and to a lesser extent, hydropower and battery storage. Around 2045–2050, investments would be needed to build a limited amount of biomass-fired generation capacity equipped with CCS, which would support the achievement of negative emissions in the power sector in Albania and Serbia. In the industrial sector, significant incremental investments would be needed after 2040 to build biorefineries for the production of biofuels and the installation of CCS.

Although the energy transition would be even costlier in absolute terms in the NZE-HG as larger economies correspond to higher levels of energy demand, the required incremental investments would be similar to the NZE in terms of share of GDP. In the NZE-HG, to achieve economy-wide net-zero, the WB6 would collectively need to invest in the energy system US\$545.7 billion until 2050, compared to US\$463.5 billion in the NZE), all in discounted terms. However, in the NZE-HG the incremental investments (calculated compared to a different RS in which GDP growth is the same as in the NZE-HG) would correspond to about 2.1 percent of GDP, on average, until 2050, in line with the NZE.

In the NZE, the accelerated decarbonization pathway to reach net zero GHG emissions by 2050 would bring sizeable benefits in terms of lower operational expenditures. The incremental CAPEX would ramp up over time; in the short and medium terms, the incremental OPEX would be negative, which would translate in cost savings for the economy. In the NZE, the OPEX would be significantly lower than in the RS, especially in the transport and buildings sector, where the shift to more efficient vehicles and appliances would contribute to reducing overall fuel costs, and in the power sector, which would transition from fuel-intensive technologies to renewable energy sources with no associated fuel costs. The incremental OPEX is projected to reach -1.5

¹⁸⁸ Discounted incremental investments in the transport sector would be relatively small because of the impact of the Avoid strategies to reduce transport demand and the Shift strategies to shift demand from road vehicles to rail. As a result, for both the passenger and freight segments, the incremental investments in electric and hydrogen vehicles would be lower than the absolute reduction in investment in internal combustion engine (ICE) vehicles. Similarly, discounted incremental investments in the residential and commercial sector would be relatively small because large investments in energy efficiency would be economically viable already in the RS.

percent of GDP in 2045 and then increase to -0.4 percent of GDP by 2050, mainly due to the need to run CCS equipment and resort to more expensive feedstock in the industrial sector.

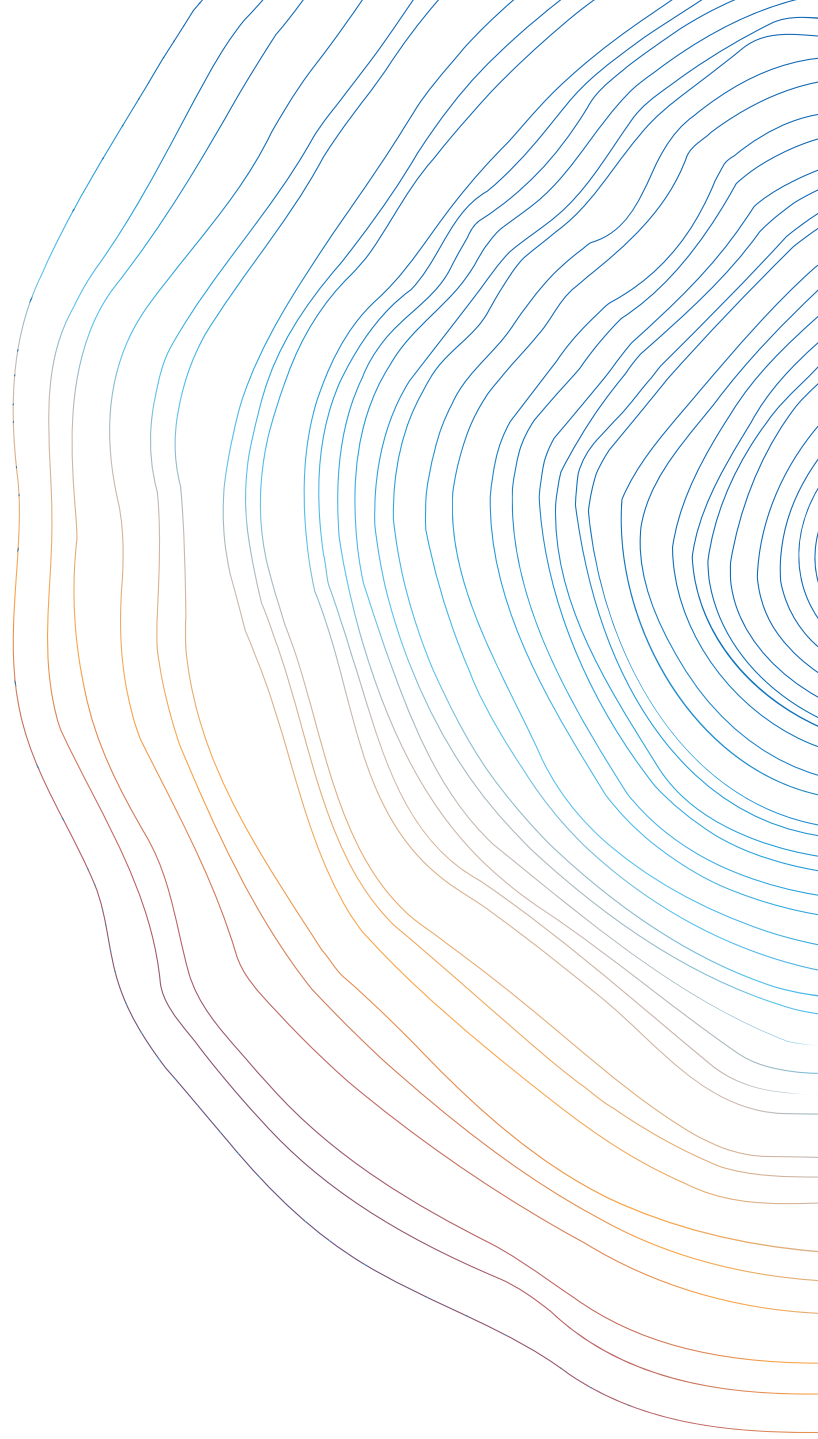
Decarbonization would also yield benefits in terms of reduced energy import dependency and lower air pollution levels. In the medium term, the accelerated replacement of domestic coal with imported natural gas would make net energy imports increase, from about 35 percent of primary energy supply in 2019 to a peak of about 50 percent in 2035, in line with the RS. In the longer term, the more widespread reliance on domestic renewable energy resources would allow the WB6 countries to significantly reduce their import dependency, compared to the RS. By 2050, net energy imports as a share of primary energy supply would decrease to about 32 percent, compared to 37 percent in the RS. Air pollution reduction benefits were calculated using the CPAT model, whose results are presented in detail in Chapter 4.

3.2.5. The regional integration of the power sectors could increase RE penetration and reduce energy transition costs

By achieving higher levels of regional integration in the power sector, the WB6 countries would be able to integrate higher amounts of RE capacity into their grids while reducing the need for gas-fired capacity and battery storage. Compared to the NZE, in the NZE-RI, the WB6 would collectively install an additional 2.2 GW of wind, 1.6 GW of solar PV, and 0.5 GW of hydro. At the same time, in 2050, in the NZE-RI, the WB6 countries would need to install 0.9 GW less natural gas capacity and 0.8 GW less battery storage capacity than in the NZE. This result stems primarily from the fact that with higher levels of regional integration, the possibility of being able to rely on trade with neighboring countries improves the reliability of the power system and allows it to handle fluctuations in variable RE generation more easily. In turn, this scenario allows for the integration of higher RE capacities and reduces the need for flexible gas-fired capacity and battery storage. Under this scenario, Albania, Bosnia and Herzegovina, and Montenegro would export more electricity, and the other three countries would import more. Although this scenario focused on modeling the integration of the power sectors within the WB6, it can be expected that an even higher amount of RE capacity could be integrated by enhancing integration between the WB6 and neighboring EU countries.

Another key benefit of regional integration is the reduction in total power systems costs, which are estimated to decrease by more than 3 percent as a result of more interconnected power systems within the WB6 countries. In the NZE-RI, the total discounted power system costs until 2050 could be about US\$2.7 billion lower than in the NZE (a 3.4 percent reduction), as a result of a reduction in the following: (1) overall CAPEX for generation due to postponed investments in capacity expansion and a more cost-effective use of available renewable resources across countries; (2) fuel costs, due to the lower reliance on gas- and biomass-fired capacity; and (3) operations and maintenance (O&M) costs, due to the shift from OPEX-intensive to more CAPEX-intensive technologies. Regardless of whether they would be net importers or exporters, all WB6 countries could benefit from regional integration and achieve lower total power system costs with adequate trade agreements on the allocation of integration benefits. Depending on the tariff-setting methodologies adopted, retail electricity tariffs could also be reduced in a similar manner with a financial benefit for final consumers. The benefits of integration with neighboring EU countries were not assessed in this analysis, but it is expected that the system cost savings would be even higher if integration efforts encompassed countries beyond the WB6.

Unlocking these benefits would require significant additional investments to strengthen cross-border interconnection capacities, as well as efforts to harmonize the power sector legal and regulatory frameworks and overcome existing political barriers. The incremental investments in cross-border transmission capacity within the WB6 in the NZE-RI, compared to the NZE, are estimated to be US\$0.3 billion in discounted terms until 2050. In the NZE-RI, until 2050, the WB6 countries would have to build about 6 GW of net transfer capacity (NTC) of interconnections within the region to enable the projected higher levels of trade, in addition to about 1 GW of NTC that would have to be built in the NZE. Under the framework of the Berlin Process established in 2014 and the Energy Community, the WB6 countries have repeatedly asserted their commitment to establish a regional electricity market. All WB6 countries have made progress in these areas, but more needs to be done to improve the liquidity of the power markets and harmonize the legal and regulatory frameworks, including through the full transposition of EU regulations, per Energy Community requirements.



Chapter 4

What will the future bring? Macroeconomic impacts

4.1. Development trajectories

Over the past two decades, the Western Balkan countries have experienced notable developmental strides as per capita incomes nearly doubled and poverty rates plummeted. This period has witnessed increased integration with the global economy, particularly with the EU, evident through continuously rising trade shares, remittances, and FDI. EU accession remains an important anchor for the structural reform agenda in the region, providing a much-needed impetus to close remaining gaps in human capital, governance, infrastructure, digitalization, and finance.

The region is facing challenges from climate change, as well as an energy transition. The energy transition can be viewed as a counterbalance to the climate shocks and stressors, given the growth opportunities it presents and the region's proximity to the EU market which is open to low carbon imports. On the adaptation side, investments can build resilience by avoiding losses, creating jobs, and extending social and environmental co-benefits. On the mitigation side, the energy transition allows the WB6 to green their economies and their export offerings, and to potentially set a higher growth trajectory (refer to Figure 4-4). Adaptation and mitigation are expected to yield long-term benefits, including reduced pollution, improved public health, decreased morbidity rates, and increased labor productivity. These benefits are welcome in light of the anticipated climate damages and the region's declining populations. Adaptation and mitigation will not come without costs; however, the proximity to the EU—including access to markets, funding, and expertise—will provide avenues for the WB6 to mitigate the impact of climate change. The EU absorbs 73 percent of the Western Balkan's exports and is a source for 68 percent of its imports. The Western Balkans are already trading in environmental goods and are integrated in global value chains for electric vehicles, wind and solar—which are likely to see substantial global growth in the future, including in the EU market.

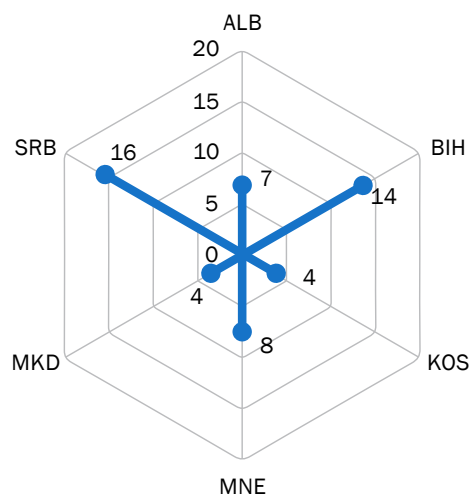
4.2. Climate hazards and the impact of adaptation investments

Climate damages

The Western Balkan countries will be subject to varying degrees of economy-wide damages from climate hazards. Bosnia and Herzegovina and Serbia are expected to experience the most significant damages from climate hazards, while Kosovo and North Macedonia are expected to experience the least damages. Figure 4-1 shows the percent reduction in 2050 GDP under trend growth from selected impact channels, namely riverine floods, droughts (through the impact on maize and wheat), and labor heat stress obtained with the climate-enhanced macro-structural model of the World Bank, MFMOD.¹⁸⁹ Under optimistic growth, the damages are, on average for the region, less than 1 percentage point of GDP smaller than the damages under trend growth, except for Serbia. The results should be taken as indicative because maize and wheat are not major income earners for the Western Balkans.¹⁹⁰

From selected impact channels, floods are expected to cause the largest damages to the economies of the region. As noted, modeling here only accounts for selected

FIGURE 4-1: PERCENT REDUCTION IN 2050 GDP FROM DROUGHTS, FLOODS, AND HEAT STRESS UNDER RCP 4.5 WITH TREND GROWTH



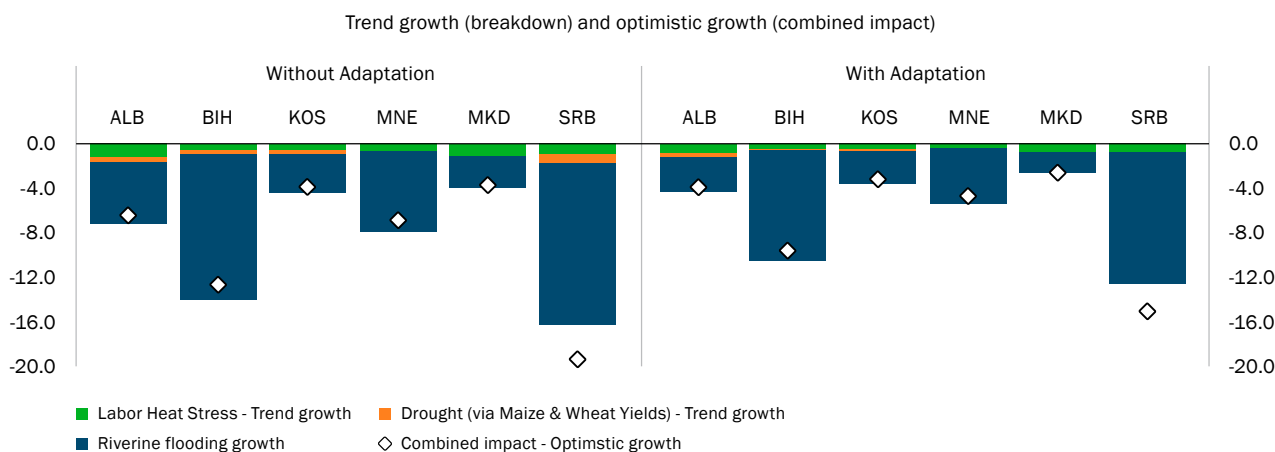
Source: World Bank staff.

¹⁸⁹ See more details on the scenarios and model used to produce the results in Annex 2.

¹⁹⁰ While the analysis is based on the expected annual losses during 2025–50, these losses are small in the early years and increase with time. Low expected annual loss in the early years of the projection horizon, i.e., 2026 or 2030, may convey the message that an event that occurs once in 100 years or once in 1,000 years is not likely take place soon, which is not entirely true. Therefore, we choose to focus the presentation of adaptation results on 2050, as these results include the cumulative base year impact of previous years' damages and give a different sense of proportionality of the potential damages.

impact channels of riverine floods, droughts (through its impact on maize and wheat), and labor heat stress, and it likely underestimates overall country climate damages. Further, the estimated damages do not explicitly capture within-year hydrological extremes or periodic extremes across multiple years and their poverty impacts due to a focus on average risk metrics and due to climate-data uncertainties. Figure 4-2 shows the reduction in 2050 GDP, by country, under RCP 4.5 by hazard, growth scenario, and adaptation action. For trend growth, floods are expected to cause the most significant reduction in GDP in all countries. At the same time, with a warmer climate (progressing from RCP 2.6 to RCP 8.5) and prolonged climate action, the GDP impact of labor heat stress increases while the impact of flooding decreases. The latter is due to the region getting hotter and drier, and the impacts of riverine flooding decreasing while the impact of flash floods is expected to continue to worsen. The impact of a worsening climate on droughts, estimated through their impact on maize and wheat only, appears to be small and to vary by country. One example where the methodology falls short is the case of Serbia. The yield per hectare for maize is about 20 percent less in drought years than in non-drought years, and during 2007-23 there were 4 drought years, occurring approximately once every five years. The variation in yields particularly affects family farms, which account for the largest share of maize production, and which suffer large variations in revenues. Further, it is important keep in mind that drought poses a serious threat in the Western Balkans (as discussed in earlier chapters) and that its full impact cannot necessarily be captured in this exercise.

FIGURE 4-2: PERCENT REDUCTION IN 2050 GDP FROM SELECTED CLIMATE HAZARDS (RIVERINE FLOODS, DROUGHTS, AND LABOR HEAT STRESS) UNDER RCP 4.5



Source: World Bank staff.

Higher growth can offset some of the expected damages. Figure 4-2 shows that for all damages combined, the optimistic growth scenario yields lower losses in 2050 GDP than the trend growth scenario, except in Serbia. For Montenegro, there is a loss of 8.1 percent of the 2050 GDP under trend growth and a loss of 7.2 percent of 2050 GDP under optimistic growth. For Serbia, the result reflects the formulation of the optimistic growth scenario. Greater capital intensity of that scenario relative to the trend scenario yields greater losses.¹⁹¹

Although earthquakes are not a climate change risk, their economic impact is assessed, given the historical seismic hazards in the region and their significant adverse economic impacts that could happen concurrently with climate shocks. For Albania, earthquakes could bring a loss in 2050 GDP of 15.7 percent with trend growth and 14 percent with optimistic growth, but the loss in GDP can drop to about 4 percent of 2050 GDP (for both growth scenarios) with adaptation investments.¹⁹² For the other WB6 countries, the losses in 2050 GDP are expected to be smaller: 5 percent for Montenegro, 4 percent for Serbia, 3 percent for Bosnia and Herzegovina, and 2 percent for Kosovo and North Macedonia. Across all countries, adaptation investments have the potential to reduce the 2050 GDP losses by about one-third.¹⁹³

¹⁹¹ The Serbia optimistic growth scenario relies on productivity gains and also increases in the investment rate; the higher investment rate contributes to an increase in the capital stock. As floods work through the damages to the capital stock, the optimistic growth scenario delivers proportionally more damages than the trend growth scenario.

¹⁹² These losses are incremental over expected losses that would occur based on the historical occurrence of earthquakes.

¹⁹³ Optimistic growth yields somewhat smaller GDP losses and adaptation benefits compared to trend growth.

Adaptation investments need to be initiated early and shared by all stakeholders

Damages from climate risks can be alleviated through adaptation investments and early interventions.

Figure 4-2 also presents the impact of adaptation investments on GDP in 2050 based on the three hazards (riverine floods, drought impact on maize and wheat, and labor heat stress). The adaptation investments are derived from high-level country parameters.¹⁹⁴ Based on these parameters, the figure shows a significant reduction in losses in 2050 for most countries due to the adaptation investments, but not the elimination of the losses. Table 4-1 presents investment costs and benefits, providing further detail to the modeling in Figure 4-2. The table shows that the average annual investment needed across all countries is 1.3 percent of GDP from 2025–50 (column B). The average annual benefit is 1.7 percent of GDP (column C), and the BCR is 1.6 (column D). Some countries have larger BCRs (Albania and Montenegro), while others have ratios less than one (suggesting a need for fine-tuning of the adaptation investment modelling but also highlighting the importance of project selection in adaptation). The table also shows that adaptation investments take time to yield results; it shows that in 2025, investments are much larger than benefits, but by 2050, benefits are much larger than investments in most cases. The adaptation investment package for the region amounts to US\$76.4 billion (in 2020 US\$), or \$34.9 billion discounted at 6 percent, for 2025–50 under RCP 4.5 and trend growth, with the largest share going to Serbia due to the economy's size. Leveraging additional resources, including private savings and external funding, and implementing structural reforms to improve productivity and expand labor force participation could strengthen the triple dividend of adaptation investments and help countries to maximize the returns to investments in adaptation. The estimates in Table 4-1 should be taken with caution as they are based on country level parameters, and the estimates should be updated when disaggregated data become available.

TABLE 4-1: ADAPTATION INVESTMENTS FOR THREE HAZARDS OF FLOODS, DROUGHTS, AND LABOR HEAT STRESS, AND BENEFITS AS SHARE OF GDP UNDER RCP 4.5 AND TREND GROWTH—AN ILLUSTRATION

	Investments 2025–2050 Total	Investments 2025–2050 Avg annual	Benefits 2025–2050 Avg annual	Benefits / Investment 2025–2050	Investment 2025	Benefits 2025	Investments 2050	Benefits 2050
	\$2020 Mill. (A)	% of GDP (B)	% of GDP (C)	Ratio (D)	% of GDP (E)	% of GDP (F)	% of GDP (G)	% of GDP (H)
ALB	4,402	0.8	2.1	2.6	1.1	0.8	0.6	3.3
BIH	13,191	1.6	2.6	1.6	1.8	0.8	1.5	3.7
KOS	5,366	1.4	0.7	0.5	1.8	0.2	1.2	1.0
MNE	1,208	0.6	1.7	2.9	1.0	0.3	0.4	2.6
MKD	4,804	1.05	1.05	1.0	1.3	0.6	0.9	1.4
SRB	47,431	2.3	2.2	0.9	2.4	0.6	2.3	3.6
SUM / AVG	76,402	1.3	1.7	1.6	1.6	0.6	1.1	2.6

Source: World Bank staff.

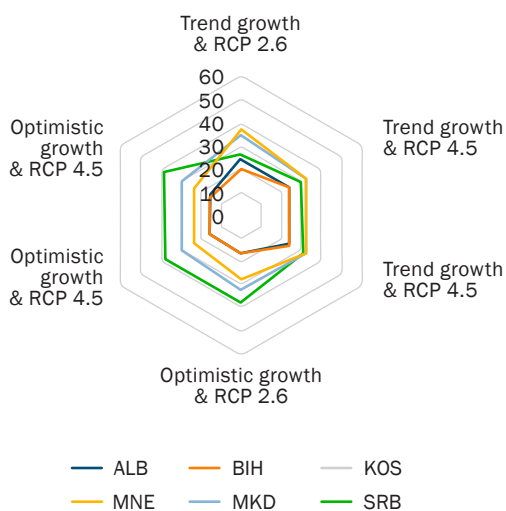
The Western Balkans will need to adopt policies to incentivize households and firms to take early action to reduce the fiscal impact of adaptation investments.

If governments alone were to take on the adaptation investments presented in Table 4-1, they would leave their countries with significantly higher debt levels (Figure 4-3).¹⁹⁵ Higher societal returns for public goods relative to individual returns call for public policy interventions. Nonetheless, governments can incentivize households and firms to take preemptive action against damages via targeted regulation, directed financial support, and co-financing mechanisms, or insurance. Governments can then undertake some of the investment burden (including via PPPs) and the cost of supporting programs.

¹⁹⁴ This exercise differs from the adaptation investments presented in chapter 1 which were developed by a sector based bottom-up approach for each country. That exercise does not have annual costs and benefits that could be used in the macro modeling exercise.

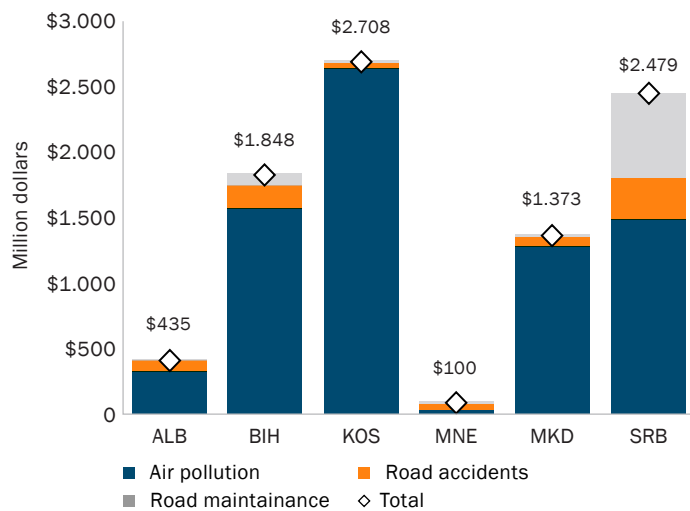
¹⁹⁵ In the case of Serbia, the optimistic growth scenario shows higher public debt than the trend growth scenario because the optimistic growth is assumed to be more capital intensive, so flooding is assumed to proportionally have a higher impact. In the case of Kosovo, the optimistic growth is based on substantial productivity improvements and lower capital intensity.

FIGURE 4-3: SIMULATION: ADDITIONAL PUBLIC DEBT IN 2050 FROM ADAPTATION INVESTMENTS (IN PERCENTAGE POINTS OF GDP)



Source: Bank staff.

FIGURE 4-4: CO-BENEFITS FROM THE ENERGY TRANSITION 2023–50 (IN 2020 US\$, DISCOUNTED AT 6 PERCENT)



Source: CPAT, World Bank staff analysis.

4.3. The transition to net zero by 2050

Macroeconomic impact and investment needs

The Western Balkans can transition to net zero without compromising their economic growth potential.

About one-half the countries can be expected to have higher GDP per capita growth rates under net zero than under the RS in 2030 and 2040, although most have lower GDP per capita growth rates under net zero than under the RS in 2050. The average difference for the WB6 in 2050 is -0.17 percentage points under trend growth and -0.18 percentage points under optimistic growth. The level of GDP per capita (in 2020 US\$) can be expected to be slightly smaller under net zero than under the RS for 2030, 2040, and 2050. The average difference in GDP per capita is expected to be -0.5 percent under net zero than under the RS with trend growth and -0.6 percent smaller with optimistic growth (refer to Annex 2 for country specific results). These results include the positive impact that externalities have on GDP (through the impact of lower air pollution, lower road accidents, and lower road maintenance). Figures 4-5 and 4-6 show GDP per capita in US\$ 2020 under net zero and the RS for trend and optimistic growth.

The Western Balkans may increase their economic potential as part of their net zero transition with appropriate structural reforms. The net zero transition can have a longer-term positive impact on GDP growth through the opportunities it creates for increased trade, investment, and finance, given the WB6’s proximity to the EU its commitment to net zero by 2050. However, making higher growth a permanent feature of the economy requires structural reforms to increase productivity, investment, quality of human capital, and labor force participation. The Western Balkans, already engaged in extensive trade with the EU, can leverage global value chains for clean energy technologies in their journey to net zero emissions (refer to Box 4-1).

The transition to net zero by 2050 will bring significant benefits to most of the Western Balkans as the result of lower air pollution. The net zero scenario anticipates a 2 percent reduction in air pollution mortality attributed to fossil fuels and biomass by 2030, with a 15 percent drop expected by 2050, compared to the RS across the six countries. The net zero scenario requires a shift to public transport, which is expected to bring fewer road accidents and lower maintenance costs. The economic value associated with the reduction in air pollution mortality is estimated at US\$2.7 billion from sectors such as transportation, industry, and power levels (refer to Figure 4-3). The transport sector offers additional co-benefits, including reduced mortality from road accidents (US\$0.8 billion) and decreased costs associated with road maintenance (US\$1.4 billion).

BOX 4-1: CAN THE NET ZERO TRANSITION BE A PATH TO HIGH-INCOME STATUS?

The energy and macro modeling approaches 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 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 (see Annex 2 for results).

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 here 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 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 the 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.

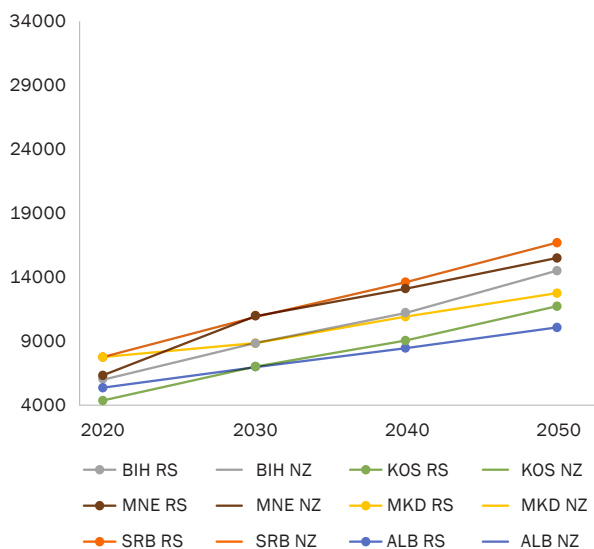
To capitalize on the energy transition, the WB6 will need to increase their productivity. Middle-income countries are able to transition to becoming high-income countries by improving their productivity. The World Development Report (WDR 2024, forthcoming) looks at the transition from upper middle income 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, 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. 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 this 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.

* The analysis was undertaken for two sizes of an economy, one that grew at trend growth and one that grew at optimistic growth.

The private sector is expected to undertake about 85 percent of investment needs; they will be back-loaded. The Western Balkans will need, on average, 1.9 percent of GDP a year of additional investment under net zero compared to the RS for the whole energy system. Figure 4-7 and Figure 4-8 show the incremental public and private investment under net zero relative to the RS for 2020-50; public investment is front loaded in the period while private investment will be more important from 2036 onward. Under trend growth, the WB6 average incremental public investment peaks at 0.5 percentage points of GDP in 2036, and the WB6 average incremental private investment peaks at 2.6 percentage points of GDP in 2041. North Macedonia will require large amounts of public investment early, while Albania, Kosovo, and Serbia will need large

amounts of private investments from 2036 onward. Figure 4-7 and Figure 4-8 also show investment needs under optimistic growth; the average public investment rates are more evenly spread over the projection horizon, while the public investment rates are slightly lower relative to the trend growth scenario, reflecting the greater share of services under the optimistic growth scenario.

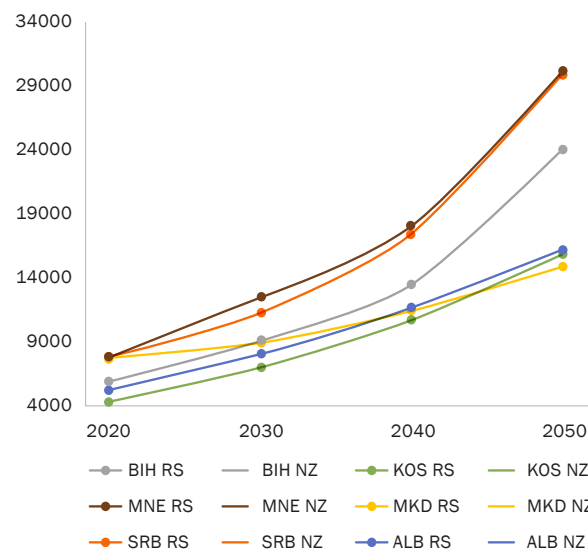
FIGURE 4-5: GDP PER CAPITA FOR RS AND NET ZERO UNDER TREND GROWTH INCLUDING CLIMATE CO-BENEFITS, IN 2020 DOLLARS



Note: 1. RS = Reference Scenario; NZ = net zero scenario as developed in Chapter 3. 2. All the per capita income plots under the RS and NZ scenarios overlap. See Annex 2 for details.

Source: World Bank.

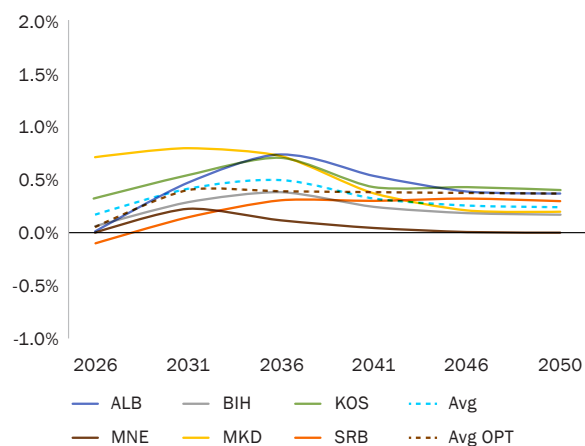
FIGURE 4-6: GDP PER CAPITA FOR RS AND NET ZERO UNDER OPTIMISTIC GROWTH INCLUDING CLIMATE CO-BENEFITS, IN 2020 DOLLARS



Note: 1. RS = Reference Scenario; NZ = net zero scenario as developed in Chapter 3. 2. All the per capita income plots under the RS and NZ scenarios overlap. See Annex 2 for details.

Source: World Bank.

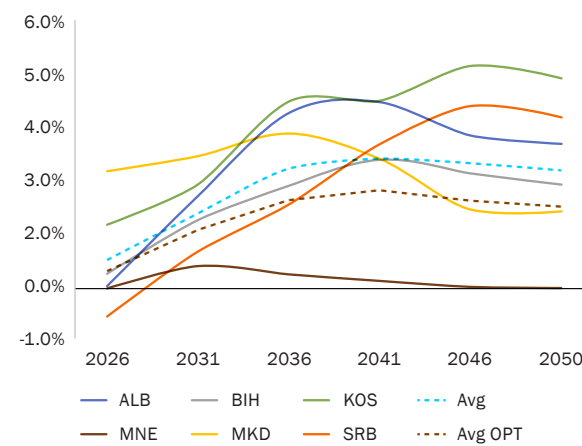
FIGURE 4-7: PUBLIC INVESTMENT UNDER TREND GROWTH, PERCENT OF GDP



Note: For Serbia, for both public and private investment, the level of investment under net zero is less than the level of investment in the RS. However, the composition of investment differs under the two scenarios. For Montenegro, the level of investment under the net zero and the RS are approximately equal after 2041.

Source: World Bank.

FIGURE 4-8: PRIVATE INVESTMENT UNDER TREND GROWTH, PERCENT OF GDP



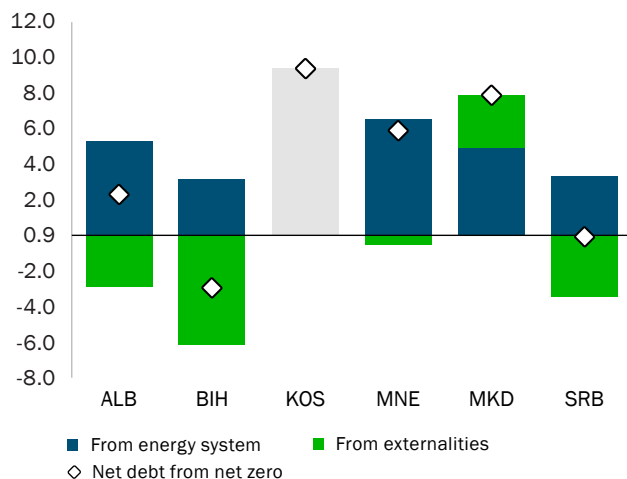
Note: For Serbia, for both public and private investment, the level of investment under net zero is less than the level of investment in the RS. However, the composition of investment differs under the two scenarios. For Montenegro, the level of investment under the net zero and the RS are approximately equal after 2041.

Source: World Bank.

The net effect of the higher incremental public investment on public debt is expected to be partially offset by the impact of lower public spending on health that results from co-benefits. Figure 4-9 and Figure 4-10 show the net effect of the net zero transition on public debt. The increase in public debt is expected to be largely driven by additional public investment needs for the energy system. The increase in public debt is partially or fully offset by the lower health expenditures and lower road upgrading and maintenance costs on the budget

that come under the net zero scenario (the impact of externalities on Kosovo is not available because of data constraints). Nevertheless, the additional public investments average about 0.5 percent of GDP under trend growth, and they can add up to a sizable impact on the stock of public debt (refer to Figure 4-9 and Figure 4-10).

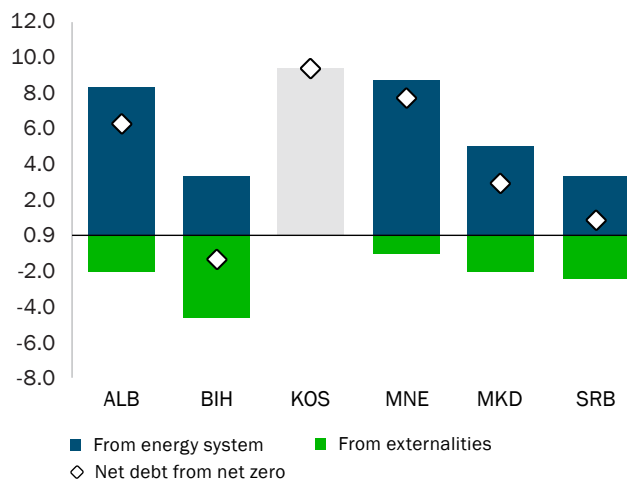
FIGURE 4-9: INCREMENTAL PUBLIC DEBT IN THE NET ZERO SCENARIO WITH TREND GROWTH, 2050



Source; World Bank.

Note: For Kosovo, no information in health expenditures is available.

FIGURE 4-10: INCREMENTAL PUBLIC DEBT IN THE NET ZERO SCENARIO WITH OPTIMISTIC GROWTH, 2050



Source: World Bank.

Note: For Kosovo, no information in health expenditures is available.

The burden of price changes on lower income groups is likely to be manageable

Some modeling challenges. The energy modeling approach involves cost minimization subject to GHG emissions. The model yields internal energy cost adjustments that depend on global price forecasts and country-specific market dynamics; as such, it does not use an explicit carbon price to incentivize an energy demand response. The approach leaves it to subsequent analysis to decide the combination of decarbonization instruments, i.e., carbon pricing versus other non-pricing instruments (e.g. regulation) that will deliver the desired level of energy demand.¹⁹⁶

Energy modeling suggests that the net zero scenario will affect the cost of both final energy and non-energy products consumed by households. This analysis is presented with some apprehension, as globally renewables prices and the levelized cost of energy prices have been on a downward trend in the past 10 years.¹⁹⁷ Nevertheless, the modeling suggests that the net zero transition will include price rises and drops (relative to the RS, assuming full passthrough of forecasted energy cost changes onto household retail prices) throughout the projection horizon that will vary by product, country, and year. Electricity and natural gas are expected to exhibit the most material price changes across countries and over time, particularly in later years; coal, other oil products, and transport fuels are not expected to show substantial price variability. Natural gas price changes are relatively concentrated across countries, with North Macedonia exhibiting both the largest natural gas price increase (+31.48 percent in 2025) and fall (-79.12 percent in 2050). The positive (i.e., price increases) and negative (i.e., price decreases) variations in prices will translate into both losses and gains in terms of household consumption across the consumption distribution, respectively.

As a result of the modeling exercise, households are expected to lose around 3 percent of total consumption from 2025–50 due to the net zero transition. The net zero transition scenario could lead to average annual losses of 1.77, 3.26, and 2.74 percent of total household consumption in 2025, 2030, and 2035, respectively. These losses are expected to amount to 2.11 percent of total household consumption by 2050. Kosovo is expected to see the largest average annual household consumption losses at around 5.26 percent of consumption, followed by North Macedonia at around 2.91 percent of consumption. Almost all of the consumption losses

¹⁹⁶ See Mitigation Background Note accompanying this CCDR for further discussion.

¹⁹⁷ IRENA (International Renewable Energy Agency). 2022. "Renewable Power Generation Costs in 2021." IRENA, Abu Dhabi.

can be explained by higher electricity bills faced by households (i.e., the “direct” incidence effect), as opposed to lower consumption of fossil fuel-intensive, non-energy products by households (i.e., the “indirect” incidence effect). Household consumption losses are roughly equally distributed among urban and rural households; the overall consumption-based Gini coefficient is expected to increase by 0.4 percent across countries and years.

Revenue recycling through targeted cash transfers could potentially reduce the impact of the net zero transition on poorer households. A simulation was undertaken to assess the cost of mitigating the impact of rising prices on the bottom 40 percent of the household consumption distribution in 2030. Fully compensating the bottom 40 percent of the household consumption distribution in 2030 would entail total revenue amounts equivalent to 0.9 percent of GDP for Albania, 0.5 percent of GDP for Bosnia and Herzegovina, 1.1 percent of GDP for Kosovo, 0.2 percent of GDP for Montenegro, 0.7 percent of GDP for North Macedonia, and 0.25 percent of GDP for Serbia. Should policymakers choose to recycle a larger amount, they could consider additional revenue recycling modes, such as increasing public investment, cutting more distortionary taxes on capital/income, or scaling up existing social programs).

4.4. Macroeconomic impacts of adaptation and mitigation—some implications

Adaptation and mitigation will result in structural shifts in the Western Balkans. The average annual adaptation and incremental mitigation investment needs for 2025-50 of 1.3 percentage points of GDP and 1.9 percent of GDP a year, respectively, that emerge from parallel modeling exercises are sizable, when considering that the 20-year average total investment rate for the WB6 is about 27 percent of GDP, and the public investment rate is about 7 percent of GDP. We anticipate that part of the incremental investment will come from new sources of funding, and part will be in lieu of investment that was previously going to other sectors. Accordingly, more emphasis is placed on the intersectoral shift in investment rather than on the incremental increase at the macro level. With shifts in investment demand, new employment opportunities will be created.

Countries’ ability to capitalize on the investment opportunities and get on a higher growth trajectory will depend on the progress with structural reforms and the availability of concessional financing. Adaptation and mitigation investments will compete for domestic resources against other investment needs and potentially bid up interest rates in a constrained setting of labor force participation, human capital quality, productivity levels. Reducing these constraints requires economy-wide structural reforms to increase the economy’s potential growth and alleviate pressure on domestic resources. Foreign investment and concessional financing will be critical to alleviate some of this stress.¹⁹⁸ The lower import bill that comes from smaller production of fuel imports will alleviate some pressure on the current account.

The Western Balkans have typically had a low savings rate; in the medium and longer terms, they will need to increase it. The gross savings rate for the WB6 averaged 19 percent of GDP in 2022.¹⁹⁹ The rate, which has been rising in the past 20 years, remains lower than the ECA average of 30 percent in 2022 and the Euro area average of 25 percent in the same year. These figures suggest that incremental investment needs may have to be supported by foreign savings, especially in the post-2031 or post-2036 period (refer to Table 4-1, Table 4-2, and Table 4-3 and Figure 4-8).

Fiscal policy will need to respond to new priorities and still serve traditional needs. Several sources of stress will emerge for fiscal policy, both on the investment and recurrent spending sides.

- **Compounded public investment needs.** Across the WB6, the public sectors’ need to invest in adaptation and mitigation will compete against investment needs in health, education, social protection and even public infrastructure. Greater scrutiny of public investments (for adaptation, mitigation, and other priorities) will be in order. PPPs also provide an opportunity to increase investment but should not be pursued only on

¹⁹⁸ For two countries with different energy profiles, Albania and Serbia, a modeling assumption of 100 percent grant funding for the government portion of the incremental investment obtained a positive growth differential and lower debt by 2050. However, the incoming grant assumption was very generous, being at least 50 percent larger than the than the grants available historically for each country.

¹⁹⁹ Gross savings are calculated as gross national income less total consumption, plus net transfers.

the basis of fiscal constraints because they require enhanced technical capacities coupled with stronger institutions, as evidenced by the rapid CCAs.

- **Reprioritized current spending.** On adaptation, programs to support vulnerable households and firms suffering from climate damage, as well as programs to incentivize adaptation initiatives by households and firms (such as insurance and new financial products), will be needed. On mitigation, programs related to the social costs of a Just Transition and to human capital strengthened by science, technology, engineering, and mathematics (STEM) skills will also be needed, so that the human capital needed to make the green transition a reality becomes available (see Box 3-5). In addition, programs to incentivize households and firms to improve energy efficiency, to modernize or adopt new technologies in generation and storage, and to support innovation will come with fiscal costs in the short and medium terms, and they will have recurrent R&D and support programs and investment implications.
- **Domestic revenue mobilization will need to be strengthened and can be aided by carbon taxation.** Revenue mobilization in the Western Balkans is above the ECA average and slightly below the EU average. Yet it is below what is needed to meet the infrastructure deficit and the adaptation and mitigation needs and maintain a sustainable debt outlook. Revenues from carbon taxation can help meet some of these needs.

Beyond public spending, climate change will impose additional priorities for policy makers, requiring them to support and incentivize the responses of households and firms to adaptation and mitigation.

Governments will need to:

- **Realign incentives:** Policies and regulatory responses to reduce demand for high carbon energy systems: Countries implement an array of policies to reduce GHG emissions. Carbon pricing is considered the most efficient instrument, but other policies are needed and are often applied before carbon pricing.²⁰⁰
- **Create markets:** To enable the supply response, including through financial sector development and private capital mobilization: The business environment needs to be attractive for investors to shift to new sectors and adopt new technologies (imported or home grown). Enterprises will be required to invest in R&D and complementary infrastructure. SMEs will need to be incentivized to play a proactive role or make way for the private sector. The financial sector will need to respond to financing adaptation and mitigation needs. Funding from international partners is available in the short to medium terms, but substantial capital mobilization will be required from 2036 onward.

4.5. Financing needs and options

Financing needs are significant

Additional adaptation and mitigation needs, as estimated by separate (but parallel) modeling exercises, necessitate investments of around 1.3 percent and 1.9 percent of GDP (country-level average), respectively. The two modeling exercises relied on the same GDP baseline, trend growth, and optimistic growth projections. The adaptation modeling exercise yielded an average adaptation investment need of 1.3 percentage points per annum from 2025–50 for the Western Balkans (refer to Table 4-2). The mitigation modeling exercise yielded an average incremental investment of 1.9 percentage points per annum in this period. The two results should not be added for two reasons. First, the adaptation results refer to shares of GDP from a smaller economy than the mitigation exercise (refer to Figure 4-2, Figure 4-5, and Figure 4-6). 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, Table 4-2 and Table 4-3 are instructive in showing the scale of additional investments needed. It is important to recall that the adaptation investments are based only on three hazards of riverine floods, drought impact on maize and wheat, and floods, labor heat stress.

²⁰⁰ Other policies include regulatory instruments; grants, subsidies and other incentives; procurement and investment; research, development and deployment; voluntary agreements, information and education; and policy support (strategies and target setting). See Linsenmeier, Manuel, Adil Mohommed, and Gregor Schwerhoff. 2022. "Policy sequencing towards Carbon Pricing: Empirical Evidence from G20 Economies and Other Major Emitters." IMF Working Paper 22/66 (April). IMF, Washington, DC.

TABLE 4-2: ADAPTATION INVESTMENTS (HEAT STRESS, DROUGHTS, FLOODS): AVERAGE ANNUAL INVESTMENT, AS PERCENT OF GDP UNDER RCP 4.5 UNDER TREND GROWTH

	2025–30	2031–40	2041–50	2025–50
Albania	1.0	0.8	0.7	0.8
Bosnia and Herzegovina	1.7	1.6	1.5	1.6
Kosovo	1.6	1.4	1.3	1.4
Montenegro	0.9	0.6	0.4	0.6
North Macedonia	1.2	1.1	0.9	1.0
Serbia	2.4	2.4	2.3	2.3
WB6 Avg.	1.5	1.3	1.2	1.3

Source: World Bank.

TABLE 4-3: NET ZERO INCREMENTAL INVESTMENTS AS PERCENT OF GDP UNDER TREND GROWTH

	2025–30	2031–40	2041–50	2025–50
Albania	0.2	3.0	3.5	2.5
Bosnia and Herzegovina	0.4	1.9	2.5	1.8
Kosovo	1.2	3.0	3.9	2.9
Montenegro	0.1	0.4	0.1	0.2
North Macedonia	2.5	3.2	2.1	2.6
Serbia	-0.3	1.2	3.1	1.6
WB6 Avg.	0.7	2.1	2.5	1.9

Source: World Bank.

The total investment (including households and firms) on energy systems required under the NZE scenario with trend growth from 2026–50 is US\$890.78 billion (not discounted). Figure 4-11 shows the total energy system investment under the NZE scenario, split by sector. The major investment tickets from 2026–50 include transport (US\$461.4 billion, 51.8 percent of the total, 90.1 percent private investment and 9.9 percent public investment); residential and commercial buildings (US\$267.3 billion, 30.0 percent of the total, 94.3 percent private investment and 5.7 percent public investment); and power (US\$127.6 billion, 14.3 percent of the total, 55.2 percent private investment and 44.8 percent public investment). Importantly, the areas for investment between the public and private sector are expected to differ. The private sector is expected to focus on road passenger²⁰¹ and freight transport, residential and commercial buildings, and renewable power generation. By contrast, the public sector investment is expected to focus on transmission lines, charging infrastructure, and rail transport. Figure 4-12 shows the difference between NZE and RS investments at the sector level through 2050 in discounted US\$. The incremental government investment is expected to be front-loaded and largely focused on rail transport, while the incremental private investment is backloaded and largely focused on wind and solar power, although decarbonization of transport and industry become more important after 2036.

Structural reforms and realignment of incentives are needed to drive the creation of contestable markets that attract and incentivize private investment. Structural reforms and fiscal incentives are needed to (i) develop contestable markets and (ii) to overcome market failures. For adaptation, an adjustment of incentives is needed to ensure adequate investment in adaptation and to adjust behaviors toward mitigating the impacts of physical risks. In addition, innovations in financing mechanisms will be required. For mitigation, the purpose of reforms will be to increase investment in the energy system (broadly defined as all sectors that produce and use energy) through the introduction of carbon pricing instruments, green subsidies and industrial policies, at the same time as reducing fossil fuel subsidies and ensuring SOEs contribute to decarbonization. In addition, a higher skilled labor force will be necessary to respond to evolving private sector needs in a green transition.

²⁰¹ It is important to note that about half the transport investment is in private vehicles (replacing internal combustion engines vehicles with electric vehicles -this investment in consumer durables is by households)

FIGURE 4-11: WB6 TOTAL ENERGY SYSTEM INVESTMENT UNDER NET ZERO WITH TREND GROWTH, 2020 US\$ BILLIONS (NOT DISCOUNTED)

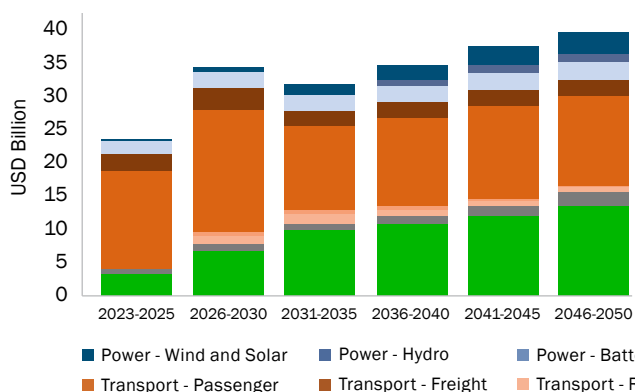
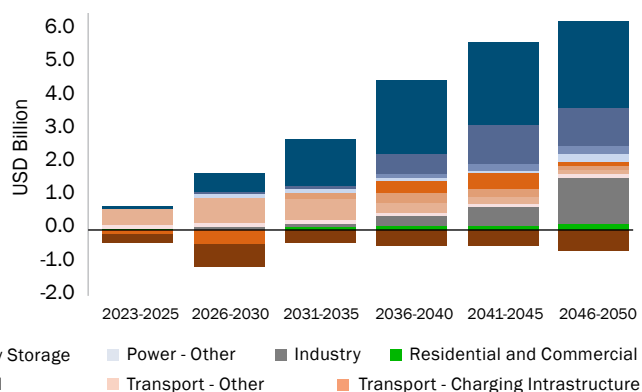


FIGURE 4-12: WB6 INCREMENTAL (NZE VS RS SCENARIO) ENERGY SYSTEM INVESTMENT, 2020 US\$ BILLIONS (NOT DISCOUNTED)



Note: Total energy system investment refers to average annual energy system investment for each period. The level of investment shown herein is investment by households and firms. It is not intended to be equivalent to the national accounts definition of investment. Source: KINESYS-WB6 Model. Numbers represent undiscounted annual investment, averaged over the period.

Financing options

Meeting the growing investment needs will require accessing multiple funding sources. Given the limited public resources available, Western Balkans countries will have to access multiple sources of funding to meet their green investment needs. The region can complement local public resources with available EU pre-accession funds, it can mobilize cross-border funds with the support of guarantees and mobilize private investment via PPPs. The remaining, and overwhelming, amount of financing will need to come from domestic and international sources, through financial sectors and FDI. Yet, domestic financing sources will need to be managed to mitigate the impact of climate change on their portfolios (refer to Box 4-2). This will require banks and the non-bank financial sector—particularly, capital markets—to play a critical role in stepping up financing green investments and providing long-term financing through new instruments.

The Western Balkans are in a privileged position regarding access to EU funds. In November 2023, the European Commission adopted the New Growth Plan for the Western Balkans that added €6 billion to the existing IPA funds. Previously, in 2020, the Commission adopted a comprehensive *Economic and Investment Plan 2021-2027*, supporting a green transition and regional integration with 10 investment flagships and up to €9 billion in EU funds.²⁰² The flagships align with the needs highlighted in the CCDR: the first three focus on transport (east to west, north to south, and coastal); the next two on renewable energy and coal transition; and others on building renovation, waste management, digital infrastructure, private sector competitiveness, and skill-building and quality employment for the youth. Additionally, the EU Western Balkan Guarantee Facility aims to mobilize up to €20 billion in investments, thereby reducing financing risks.

PPPs could play an important role in crowding-in private sector investment, but improvements are needed in their underlying governance structures. Most Western Balkan countries have introduced a legal framework for PPPs; however, many gaps remain in the underlying governance structure compared to internationally established benchmarks. Improvements are needed to do the following: (1) strengthen the institutional control over PPPs, in particular by establishing common public investment planning processes for both PPP and traditional public procurement projects, and providing the Minister of Finance with effective powers to ringfence PPP risks; (2) enhance competitive procurement processes by restricting the scope for direct negotiations or unsolicited proposals; (3) ensure more resilient contracts by spelling out specific criteria for contract renegotiation; and (4) further improve the management and reporting of fiscal costs and risks, particularly related to the accounting for and disclosure of PPPs.

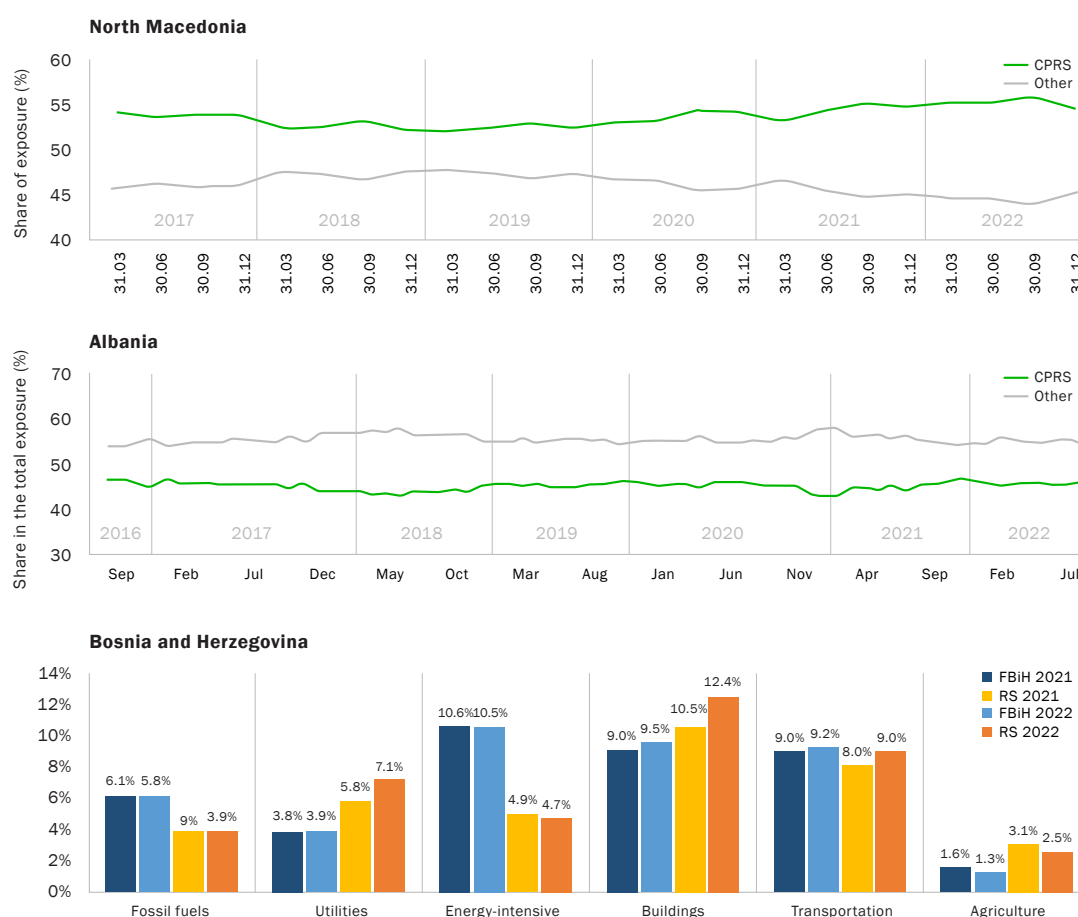
²⁰² These funds are part of the EU Instrument for Pre-accession Assistance (IPA III), included in the multiannual financial framework period 2021-2027. IPA III has a budgetary envelope of €14.162 billion, most of which is for the Western Balkans. The predecessors IPA and IPA II had a budgetary envelope of €11.5 billion and €12.8 billion, respectively. They covered the periods 2007-2013 and 2014-2020.

BOX 4-2: PRESERVING THE FINANCING CAPACITY OF THE BANKING SECTOR

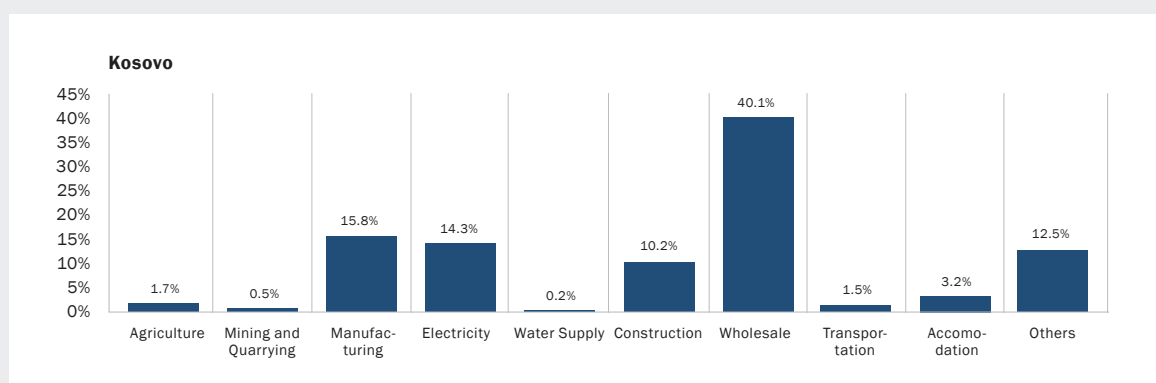
The banking sector portfolios demonstrate high exposure to physical risks and to transition risks.

Distribution of loans by sectors and regions provides a good overview of a potential double impact of climate change on banks, through geographic concentration (and natural hazards) and exposure to Climate Policy Related Sectors (CPRS). For the three countries for which geographic concentration data are available, geographic concentration is considered high. This is based on loan concentration in the capital city. The figures are as follows: North Macedonia 54 percent, Albania 81.5 percent, and Kosovo 65 percent. More granular analysis is needed to better utilize and overlap the natural hazard maps and banks' loan portfolio distribution by regions and sectors in each country. More granular work is needed to improve the hazard maps and include all potential hazards; certain hazards did not gain much attention in the past due to the lack of data and unavailability of the model, as is the case with droughts. With respect to transition risks, based on CPRS methodology, for the four Western Balkans countries for which data are available, the exposure of the banking sector's portfolio to climate risks is as follows: 55 percent in North Macedonia; 45 percent in Albania; 40 percent in Bosnia and Herzegovina, Republika Srpska 35 percent; and 56 percent in Kosovo.²⁰³

FIGURE 4B-1: SHARE OF BANKS' EXPOSURE TO CLIMATE POLICY RELATED SECTORS VS OTHER SECTORS



²⁰³ CPRS is an established methodology used to classify economic activities that could be affected positively or negatively (including being transformed into "stranded assets") in a disorderly transition. This classification provides a good approximation of banks' exposure to transition risks.



Source: Based on data from Central Banks and World Bank calculations.

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; set the division of labor; and ensure the coordination among key actors, including central banks, and ministries of finance and economy. Central banks typically have five stages in managing the climate-related risks in their financial systems: (1) risk assessment / surveys / data collection; (2) preparing regulations / 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 in the first phase; some of them advanced to second phase recently (e.g., North Macedonia).

Western Balkan countries can use EU funds to leverage private investment in critical infrastructure. EU funds can also be used in combination with other instruments, such as PPPs, to crowd-in private investment in sectors that can generate long-term revenue streams. Particularly good examples are rail and road transport, which are strategic decarbonization sectors for the Western Balkans (refer to Figure 4-11). EU funds can help increase affordability of the projects by lowering the required financing levels, while PPPs bring in private sector investment and expertise. The main challenge is to develop an efficient administrative structure that can handle the EU's heavy administrative load and the implementation of the different stages of the PPP process.

Mature renewable energy technologies, such as solar and wind power, can benefit from access to debt-based financial instruments. As the renewable energy sector has matured, global investment in solar and wind power has moved from mostly project-based to a majority of balance sheet-based financing in the past decade. Moreover, the maturation and consolidation of these technologies are allowing renewable investors to access debt-based instruments, because lenders are able to envision regular and predictable cash flows over the long term through power purchase agreements (PPAs).²⁰⁴ In this context, debt-based financing instruments such as corporate green bonds and loans are particularly suitable for solar and wind power investment. However, to capture this opportunity, Western Balkan countries need to further develop their green debt market.

Capacity building for local financial institutions could improve financing for renewables and energy-efficiency projects. Financial institutions perceive renewables projects to be riskier than conventional projects. Low understanding of the technical characteristics of renewables results in a relatively high cost of capital for renewables finance.²⁰⁵ Similarly, there are constraints to the access to affordable financial products to support energy-efficiency projects. Commercial banks and financial institutions offer financial products for energy efficiency to corporations, SMEs, households, and the public sector, but these are not necessarily accessible to beneficiaries on affordable terms. This situation reflects the challenges of creditworthiness, short loan tenors, restrictions on public borrowing, and perception of high risk, as well as the general unfamiliarity with energy-efficiency lending on the part of financial institutions.

²⁰⁴ IRENA and CPI. 2023. "Global Landscape of Renewable Energy Finance, 2023." International Renewable Energy Agency, Abu Dhabi.

²⁰⁵ OECD. 2022. "Multi-dimensional Review of the Western Balkans. From Analysis to Action." <https://www.oecd.org/governance/multi-dimensional-review-of-the-western-balkans-8824c5db-en.htm>.

Enabling the economy to efficiently allocate capital to low-carbon initiatives requires a coordinated green finance strategy. It also requires the creation of green taxonomy and development and the implementation of climate-related and environmental disclosure and reporting standards. The significant climate and development investment needs highlighted in Chapter 3 underline the importance of having access to finance and capital mobilization. The creation of climate finance markets requires an enabling policy environment, for which a national level overarching strategy and roadmap are essential. The national strategy and roadmap should outline the long-term strategic direction for greening the financial system in line with the country's priorities and needs. The responsible entities behind the development of the strategy and roadmap are typically the Ministry of Finance and the Central Bank, supported by the Ministry of Environment and other institutions responsible for finance and climate-related policies. These are the key institutions to lead initiatives to foster and enable the development of a green finance ecosystem. Some of the initiatives they could foster include the development of a green taxonomy, the adoption of disclosure and reporting standards, and the development of a green/social/sustainable bond framework.

Progress has been uneven in the green, social, and sustainability (GSS) bond market recently. Serbia entered the GSS market in September 2021 with a €1 billion oversubscribed issuance. North Macedonia followed with a €10 million green bond in October 2023. Montenegro has not issued GSS bonds yet, but it has the potential to do so, despite limited awareness and market depth. Albania, Bosnia and Herzegovina, and Kosovo face more significant challenges that include underdeveloped financial systems and lack of international market experience.

Scaling up renewable energy investment in the Western Balkans requires coordinated action on several fronts. Creating an enabling environment for green finance is a necessary but insufficient measure to attract low-carbon investment at scale. As the region moves toward EU integration, aspects such as the adoption of an ETS, carbon pricing coordination to limit the impact of the CBAM, and harmonization of the power sector's legal and regulatory frameworks for the integration into the pan-European electricity market are all relevant for investors. Thus, having a clear, coordinated, and consistent market reform plan will be crucial to boost confidence among investors and to scale-up renewable energy investment in the region.

Ministries of Finance take the lead in providing the enabling environment for green finance. A green taxonomy, which identifies green activities and assets, should be interoperable with the EU's taxonomy practices, as well as aligned with the climate-related national strategies, laws, and action plans of each country. Using this national green taxonomy, financial sector regulators could develop climate-related reporting and disclosure requirements for financial institutions and corporates. Subsequently, the ministries of finance could consider issuing mandatory sustainability disclosure requirements applicable to the largest corporations. Disclosing regulated, audited information on the sustainable credentials of corporations will be essential for banks and investors when assessing the different elements of corporate sustainability. Market regulators can be engaged to support the ministries of finance with the framework for green bonds.

Financing adaptation

Substantial investment needs are required for adaptation, but countries in the region must contend with limited or low financial capacities. National budget allocations to climate actions are limited,²⁰⁶ and adaptation finance relies heavily on the private sector, international donors, and EU fundings. In Montenegro, financial support for climate adaptation activities at national level is limited, and there are no allocations for climate actions within the relevant ministries' budgets.²⁰⁵ In Bosnia and Herzegovina and Kosovo, adaptation actions receive minimal funding from domestic public sources and depend largely on private and international donors.²⁰⁷ Accordingly, more concerted action will be needed, including strengthening capacities to access EU and other international donor funding, to better mobilize private financing, and to scale and better use public finances.

²⁰⁶ Alfthan, B., E. Krilasevic, S. Venturini, S. Bajrovic, M. Jurek, T. Schoolmeester, P. C. Sandei, H. Egerer, and T. Kurvits. 2015. "Outlook on Climate Change Adaptation in the Western Balkan Mountains." United Nations Environment Programme, GRID Arendal and Environmental Innovations Association. Vienna, Arendal, and Sarajevo. <https://climate-adapt.eea.europa.eu/en/metadata/publications/outlook-on-climate-change-adaptation-in-the-western-balkan-mountains#:~:text=Overall%2C%20climatic%20extremes%20are%20projected,projected%20to%20become%20even%20drier.>

²⁰⁷ Golić, S., et al. 2021. "Bosnia and Herzegovina National Adaptation Plan—NAP with proposed measures." UNFCCC. <https://unfccc.int/sites/default/files/resource/NAP-Bosnia-and-Herzegovina.pdf>; Republic of Kosovo, Ministry of Environment and Spatial Planning. 2018. "National Climate Change Strategy and Action Plan." https://konsultimet.rks-gov.net/Storage/Consultations/14-13-59-04102018/Climate%20Change%20Strategy%20and%20Action%20Plan_sep_2018.pdf.

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.²⁰⁸ Several adaptation projects have already been launched, such as the modernization and climate-proofing of a railway in Serbia and the implementation of wastewater treatment plants in urban areas of Kosovo and North Macedonia.²⁰⁹ In addition, with a total EU contribution of €7.6 million and an objective to enhance disaster and climate resilience, 15 DRM projects have been launched by the EC's Directorate-General for Civil Protection and Humanitarian Aid Operations DG ECHO in 2024 in 11 EU Member States and Participating States (MS/PS), including Western Balkan countries such as Albania and Montenegro.²¹⁰ The Strengthening Disaster Risk Management Capability at Local Level project will improve the overall preparedness and capacity to mitigate disasters in Albania's counties and municipalities; another project will help the government of Montenegro to set strategic and operational objectives for disaster risk reduction and climate resilience. Moreover, under the partnership between the EC, the World Bank, and the Global Facility for Disaster Reduction and Recovery (GFDRR), the Technical Assistance Financing Facility for Disaster Prevention and Preparedness (TAFF) program has been supporting the ability of countries to enhance DRM knowledge and capacities, with an initial funding of €4 million in 2024 (see also Box A1-2 in Annex 1).²¹¹ Other international donors can provide support for regional projects— for instance, the UNDP Adaptation Fund²¹² launched an integrated climate-resilient transboundary flood risk management project in the Drin River basin in the Western Balkans (Albania, Montenegro, and North Macedonia).²¹³ Other multilateral climate funds, such as the Green Climate Fund,²¹⁴ the Special Climate Change Fund,²¹⁵ and the Climate Investment Funds²¹⁶ are also available to enhance adaptation, nature-based solutions, and climate resilience.

At the private sector level, commercial banks and firms have much to contribute. The private sector can support adaptation measures by providing finance, adapting its own operations, and by offering good and services that can help others to adapt. For instance, companies can mainstream adaptation and climate-related activities into their business planning. North Macedonia has enacted several regulations to encourage the private sector to finance adaptation and provided financing through schemes as the Fund for Innovation and Technological Development.²¹⁷ Climate-focused PPPs could be used to leverage private investment in adaptation for financing, managing, and implementing adaptation projects in the future.²¹⁸ In the City of Belgrade, Serbia, a waste treatment project was implemented under PPP to improve the city's waste management and disposal practices to be compliant with national and EU legislation.²¹⁹ The market for climate adaptation is estimated to be worth US\$2 trillion annually within the next five years.²²⁰

²⁰⁸ European Commission. 2021. "Communication from The Commission to the he 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. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:82:FIN>.

²⁰⁹ Balkan Green Energy News. 2021. "EU Expects Western Balkan Countries to Offer Quality Projects for Financing under EUR 9 Billion Plan." <https://balkangreenenergynews.com/eu-expects-western-balkan-countries-to-offer-quality-projects-for-financing-under-eur-9-billion-plan/>.

²¹⁰ European Union. 2024. "Kick-off: Technical Assistance for DRM Projects Starting in 2024." <https://civil-protection-knowledge-network.europa.eu/stories/kick-technical-assistance-drm-projects-starting-2024>.

²¹¹ European Union. 2024. "Technical Assistance Financing Facility (TAFF). <https://civil-protection-knowledge-network.europa.eu/technical-assistance-financing-facility-taff>.

²¹² UNDP. 2023. "Adaptation Fund." <https://www.adaptation-undp.org/smallgrantaggregator/>

²¹³ UNDP. 2023. "Integrated Climate-Resilient Transboundary Flood Risk Management in the Drin River basin in the Western Balkans (Albania, the Former Yugoslav Republic of Macedonia, Montenegro)." <https://www.adaptation-undp.org/projects/integrated-climate-resilient-transboundary-flood-risk-management-drin-river-basin-western>.

²¹⁴ Green Climate Fund. 2023. Green Climate Fund Homepage. <https://www.greenclimate.fund/>

²¹⁵ Global Environment Facility. 2023. "Special Climate Change Fund—SCCF." <https://www.thegef.org/what-we-do/topics/special-climate-change-fund-sccf>.

²¹⁶ Climate Investment Funds. 2023. "Climate Investment Funds." <https://www.cif.org>.

²¹⁷ Food and Agriculture Organization of the United Nations. 2021. "Private Sector Engagement in Climate Action in the Republic of North Macedonia." <https://www.fao.org/3/cb3251en/cb3251en.pdf>.

²¹⁸ 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.

²¹⁹ ZeroWasteEurope. 2019. "The Belgrade Solid Waste Public Private Partnership." https://zerowasteurope.eu/wp-content/uploads/2019/12/zero_waste_europe_cs_the_belgrade_solid_waste_public_private_partnership_en.pdf

²²⁰ 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>.

Much could be done to enhance public financing schemes and budgetary planning for adaptation. The government should allocate adequate financial sources to support adaptation, identify the responsibilities of relevant institutions, and mainstream climate into budgetary planning at the national and municipal levels. Albania mainstreams climate change into national development planning and budgeting, as well as fiscal policy options, through the implementation of the NAP.²²¹ The Environmental Protection and Energy Efficiency Fund of Republika Srpska and Environmental Fund of the Federation of Bosnia and Herzegovina covers the costs of setting up and operating a CCA monitoring and evaluation system and the implementation of adaptation measures.²²² Disaster risk financing (DRF) can enhance financial resilience to climate disasters and yield substantial benefits in terms of reducing the level of government liabilities. An EU-level funding gap assessment suggests that incentivizing disaster risk insurance programs could decrease government liabilities to €10 billion for small disaster events and halve them to €50 billion for very extreme scenarios.²²³

4.6. Enabling a private sector response and green growth opportunities

The Western Balkan countries are expected to experience varying degrees of economy-wide damage from climate hazards, alongside their mitigation efforts. The risks posed by climate change can be addressed through strategic investments and early interventions. To achieve a successful clean energy transition, a scaling-up-to-phase-down approach is recommended, with an 84:16 split between private sector and public funds. This investment composition necessitates reforms in sectors such as power, transport, agriculture, and waste management. Ensuring the right private sector environment for the net-zero transition is crucial.

A conducive private sector environment will require several building blocks. As per the framework set out in Box 4.1, a conducive environment for private investment will require contestable markets for new entrants to infuse new technology and innovation. It will also require that incumbents support and contribute to these goals. As a starting point, prices must be determined by competitive markets to attract investors, and explicit subsidies should be eliminated to ensure a level playing field and to reduce the fiscal burden, while also implementing social programs to support the most vulnerable. Entry to new markets needs to be open to small and large firms as well as incumbents, including SOEs. Research and development need to support the infusion and innovation of new technologies. Additionally, fiscal policy (refer to section 4.4) needs to set the right incentives through taxes and subsidies to deter high carbon activities and support infusion, innovation, and other activities, especially where market failures persist. Critically, the quality of human capital must evolve towards more technical streams (refer to Chapter 1). This section looks at prices and subsidies, SMEs and SOEs, and innovation. The next section looks at the integration into green value chains.”

Getting prices right

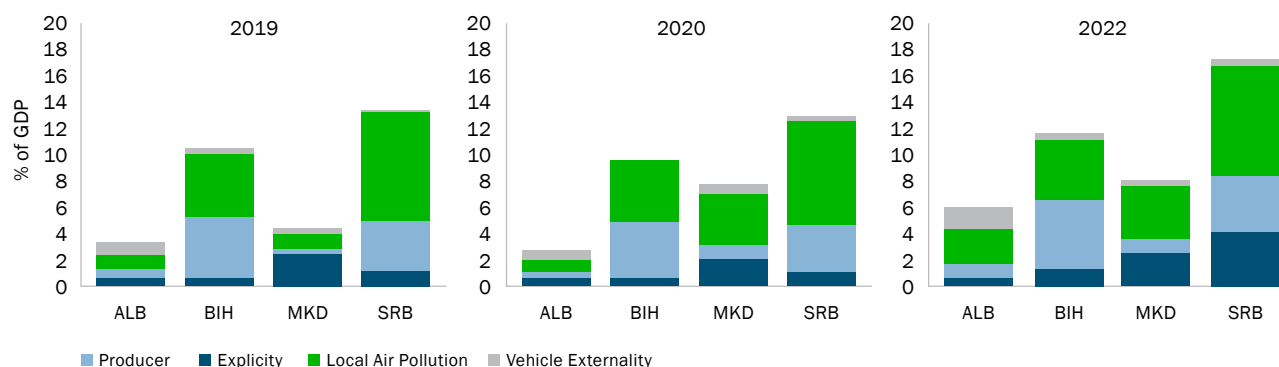
Several of the Western Balkans offer fossil fuel subsidies that run contrary to the objectives of the net zero transition. According to the IMF Fossil Fuel Subsidies Database, several of the Western Balkan countries have maintained both explicit and implicit subsidies (refer to Figure 4-13).²²² The explicit subsidies (supply cost minus retail price) for Albania pertain to tariffs for residential customers,²²³ while for Bosnia and Herzegovina and Serbia, they relate to natural gas prices for residential and industrial use. The implicit subsidies (monetary cost plus externalities minus retail price) are indicative of the misalignment in incentives between climate mitigation and other social goals (i.e., improving health outcomes by reducing air pollution) and underscore the important role for carbon pricing and other fossil fuel taxes in the future. Efficiency considerations suggest that eliminating explicit subsidies is the place to start, although policies to compensate vulnerable stakeholders for higher energy costs should accompany the phaseout of these subsidies.

²²¹ 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

²²² Bosnia and Herzegovina. 2021. “Bosnia and Herzegovina National Adaptation Plan—NAP with proposed measures.” https://unfccc.int/sites/default/files/resource/NAP-Bosnia-and-Herzegovina_.pdf

²²³ World Bank and European Commission. 2021. “Economics for Disaster Prevention and Preparedness: Financial Risk and Opportunities to Build Resilience in Europe.” <https://www.worldbank.org/en/news/feature/2021/06/04/economics-for-disaster-prevention-and-preparedness-in-europe>

FIGURE 4-13: WB6 EXPLICIT AND IMPLICIT FOSSIL FUEL SUBSIDIES BY COUNTRY, 2019-2022 (IN PERCENT OF GDP)



Source: IMF Fossil Fuel Subsidies Database 2023.

Adjusting energy prices to phase out explicit residential subsidies and reflect the cost of externalities would reduce fiscal impacts, create incentives for households and firms, and accelerate the energy transition. While carbon taxes, cap-and-trade systems, or regulatory actions should be part of a policy package that incentivizes a reduction in GHG emissions, research suggests that additional policy instruments would be needed to address imperfections in other markets. These additional instruments include tax breaks or public funding for research on GHG mitigation, risk-sharing to incentivize imperfect capital markets, public investment and clear policy direction to overcome coordination challenges across sectors and levels of government, as well as the establishment of network infrastructure).²²⁴

Structural reforms and the importance of innovation

The business environment and availability of skills remain challenges for the Western Balkan countries that could affect their ability to capitalize on the opportunities provided by adaptation and mitigation investments and to improve the productivity of their economies. The Western Balkan countries have made significant development progress and have benefited from rising per capita incomes; however, they face challenges in their business and regulatory environments that undermine their productivity and ability to attract private investment.²²⁵ These challenges include skills gaps at various levels (Albania and Serbia) and a strong state presence in the economy (all WB6), which undermine incentives for private investment, as well as regulatory consistency (for example, in Montenegro). In North Macedonia, access to finance is also a critical problem.

To capitalize on the investment opportunities presented by the green transition, the Western Balkans need to upgrade their innovation capabilities. Diverse strengths and challenges shape their innovation landscapes, as illustrated by the 2023 Global Innovation Index (GII).²²⁶ Albania, ranking 83 out of 132 globally, does well on institutional stability and market sophistication, but it grapples with deficiencies in education and research. Bosnia and Herzegovina, positioned at 77, exhibits market diversity and ecological sustainability, but it faces hurdles in institutional effectiveness and knowledge impact. Montenegro, at 75, boasts robust institutions and advanced infrastructure, but it needs to enhance its business environment and market sophistication. North Macedonia, ranking 54, excels in institutional quality and infrastructure, but it seeks to improve its business environment and knowledge outputs. Serbia, positioned at 53, stands out for its regulatory environment and infrastructure, but it aims to bolster its R&D investment and creative outputs. All Western Balkan economies are situated near the lower end of the spectrum within Europe, with each falling within the bottom 30 out of 39 European economies, suggesting common obstacles in their

²²⁴ Black, Simon, Antung Liu, Ian Parry, and Nate Vernon, 2023. "IMF Fossil Fuel Subsidies Data: 2023 Update."

²²⁵ Albania Country Economic Memorandum September 2021; Albania Systematic Country Diagnostic Update 2019; Bosnia and Herzegovina Country Economic Memorandum January 2024; Bosnia and Herzegovina Systematic Country Diagnostic 2020; Kosovo Country Economic Memorandum November 2021; Kosovo Systematic Country Diagnostic Update 2022; Serbia Country Economic Memorandum 2020; Serbia Systematic Country Diagnostic Update April 2020; Montenegro Country Economic Memorandum June 2022; Montenegro Systematic Country Diagnostic Update June 2021; North Macedonia Systematic Country Diagnostic 2023.

²²⁶ The Global Innovation Index ranks economies according to their innovation capabilities, consisting of roughly 80 indicators which are grouped into innovation inputs and outputs. The index aims to capture the multidimensional facets of innovation.

paths to innovation and development. Addressing these challenges while leveraging existing strengths will be pivotal for advancing innovation and fostering sustainable economic growth.

The role of SMEs and SOEs

As climate change adaptation and mitigation are whole-of-economy challenges, SMEs will need to play their role—but they do not seem to be ready. The majority of SMEs in WB6 countries do not monitor or actively manage their emissions, energy and water consumption, and wastewater and solid waste.²²⁷ For example, based on the 2019 World Bank Enterprise Survey, 86 percent of firms in Albania did not mention environment or climate issues in their strategic objectives. Some of the technologies are changing rapidly and can be prohibitively expensive. First, a concerted effort is required to overcome information failures, whereby SMEs might not be aware of the latest technologies or do not understand what they need to do to make the green transformations as required by the EU Green Deal. Second, SMEs need to have a better understanding of the necessity and benefits of investing in “green.” Third, certain government support programs might be needed to incentivize their investments. Such support programs can be technology extension services, skills training, and access to finance support, such as credit guarantee, matching grants, and green credits.

SOEs present the more challenging part of the spectrum of enterprises in the energy transition. They are an integral part of the energy system, but many face operating losses that undermine their ability to contribute to the transition. On the adaptation side, 62 percent of SOEs in the Western Balkans operate in highly vulnerable sectors, compared to global average of 44 percent and regional peer average of 48 percent.²²⁸ The share of SOEs in vulnerable sectors is highest in Montenegro (73 percent) and Kosovo (69 percent). At the same time, the Western Balkans score higher on the ND-GAIN climate vulnerability index than most of their peers. This finding suggests that they have higher adaptation needs because they are more vulnerable to climate change and have more SOEs in vulnerable sectors. Similar to SOEs in high-emitting sectors, 20–70 percent of SOEs in climate-vulnerable sectors are unprofitable, leaving them financially constrained to invest in the needed adaptation measures.

On the mitigation side, there is a high presence in power generation and transport. SOEs may present a challenge to the energy transition due to poor financial performance and complex state ownership. SOEs are also present in other sectors that emit high levels of GHGs, including crop and animal production. Of all the SOEs in high-emitting sectors, 23–53 percent are unprofitable, depending on the country. These SOEs would present a challenge in the energy transition if they do not have the cash flow or if they cannot access capital markets. Two-thirds (67 percent of loss-making SOEs in the high-emitting sector) is majority-owned or fully owned by the government; more than two-thirds is owned by the central governments and the rest is owned by subnational governments or other entities. Importantly, SOEs in high-emitting sectors are also significant job providers, in particular in Bosnia and Herzegovina (4.8 percent of all formally employed) and Serbia (2 percent).

Putting SOEs on a stable financial footing requires the right incentives, regulatory structure, and accountability. To make a positive contribution to adaptation and mitigation challenges—as SOEs have done in several countries including France and Mexico—they need to be on a stable financial footing, maintain accountable management structures, and have access to skills and financial resources without burdening the state. In terms of strengthening management structures, the Western Balkans may explore several approaches that draw on experience from other countries.²²⁹ Some countries have incorporated SOE guidance to reduce emission into legislative documents. Others have overarching ownership policies that guide SOEs,

²²⁷ Data from Enterprise Survey 2019, Green Module.

²²⁸ Here we use SOEs in a broad sense, meaning “Businesses of the State” (BOS). The term refers to all businesses owned by the state with a holding >10%, both directly or indirectly, for example, owned through subsidiary holdings, differentiating BOSs from state-owned enterprises (SOEs) which are often companies where the state has a controlling stake. The source of the statistics in this section is the World Bank BOS database.

²²⁹ Gonguet, Fabien, Claude Wendling, Ozlem Aydin, and Bryn Battersby. 2021. “Climate-Sensitive Management of Public Finances—“Green PFM.” IMF Staff Climate Note 2021/002, International Monetary Fund, Washington, DC.; De Kleine Fiege, Annette. 2021. “State-Owned Enterprises and Climate Action,” in *Securing a Sustainable Recovery: A Guide to Green Taxes and Spending*, Miria Pigato (ed.), World Bank; Benoit, Philippe, 2019. “Engaging State-Owned Enterprises in Climate Action.” Columbia SIPA Center on Global Energy Policy, September; Prag, A., D. Röttgers, and I. Scherrer. 2018. “State-Owned Enterprises and the Low-Carbon Transition,” OECD Environment Working Papers, No. 129, OECD Publishing, Paris, <https://doi.org/10.1787/06ff826b-en>; OECD. 2022. “Climate Change and Low-Carbon Transition Policies in State-Owned Enterprises.” OECD Business and Finance Policy Papers, No. 05, OECD Publishing, Paris, <https://doi.org/10.1787/e3f7346c-en>.

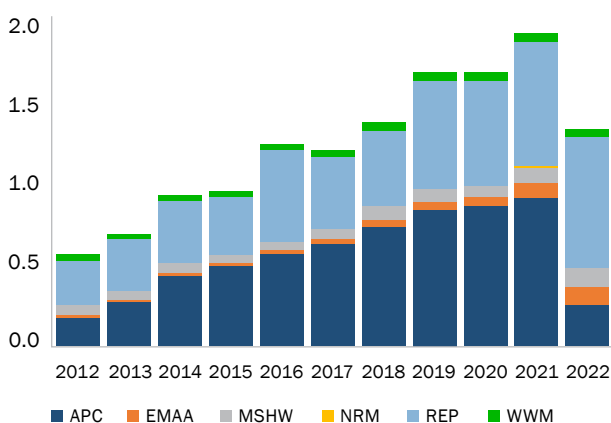
and other countries have individual SOE mandates (Hungary Lithuania, and Switzerland) for corporate plans. It is also possible to apply economy-wide legislative actions related to the low-carbon transition to SOEs and private companies equally. SOEs can be prompted to respond to climate change through the actions of their shareholders, who can also set up implementation and monitoring systems. Finally, as with the private sector, SOEs can be supported through subsidies and other programs for efficiency upgrades, renewable investments, and R&D, where relevant – however, such support measures should not carry the risk of impeding the entry of other market competitors or crowd out funding or innovation from private sector-led initiatives. Yet, even when under a stable financial footing, appropriate regulation is needed to ensure that SOEs work toward the goal of a net zero transition and do not prevent the private sector from playing a leading role in markets where it has a comparative advantage in skills, innovation, or flexibility.

4.7. Trade in environmental goods and green value chain

The Western Balkans are already highly integrated with the EU in terms of trade. Exports to the EU in 2022 constituted 73 percent of the total exports of the West Balkans, and imports from the EU accounted for 68 percent of the total imports to the Western Balkans. Manufactured products accounted for 77 percent of EU exports and 80 percent of EU imports from the Western Balkans in 2020 (refer to Figure 4-14 and Figure 4-15).²³⁰ Trade between the EU and the Western Balkans is due to geological proximity, as well as regional integration through several value chains, especially in the automotive sector, but also to the existence of several deep trade agreements.^{231,232}

Western Balkan countries have already embraced green trade opportunities;²³³ grew exponentially within a decade until 2022, driven primarily by renewable energy plant (REP) products. REP products accounted for 47 percent of total environmental goods [EG] imports in 2022; the share of REP products in total EG exports was 60 percent in the same year. While REP products dominate the exports of EGs the remarkable growth of EG exports over time is primarily attributed to air pollution control (APC) products. Figure 4-14 highlights the trade potential of this region during the green transition. The largest increases are attributable to rising EG exports from North Macedonia; they increased from 2 percent of 7 percent of GDP from 2012–21. Other WB6 countries managed to keep their export shares constant at about 1 percent of GDP or below from 2012–21.

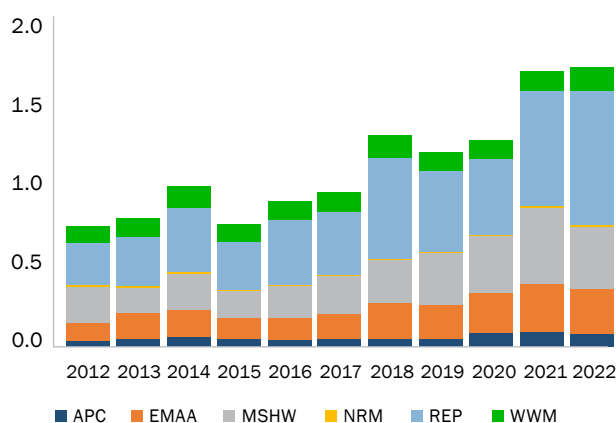
FIGURE 4-14: WESTERN BALKAN'S EG EXPORT BY GROUP (US\$ BILLION)



Source: WITS mirror data.

Note: APC = Air Pollution Control; EG = environmental goods; EMAA = Environmental Monitoring, Analysis and Assessment Equipment; MSHW = Management of Solid and Hazardous Waste and Recycling Systems; NRM = Natural Risk Management; REP = Renewable Energy Plant; WWM = Wastewater Management and Potable Water Treatment.

FIGURE 4-15: WESTERN BALKAN'S EG IMPORT BY GROUP (US\$ BILLION)



Source: WITS mirror data.

²³⁰ https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Enlargement_countries_-_international_trade_in_goods_statistics

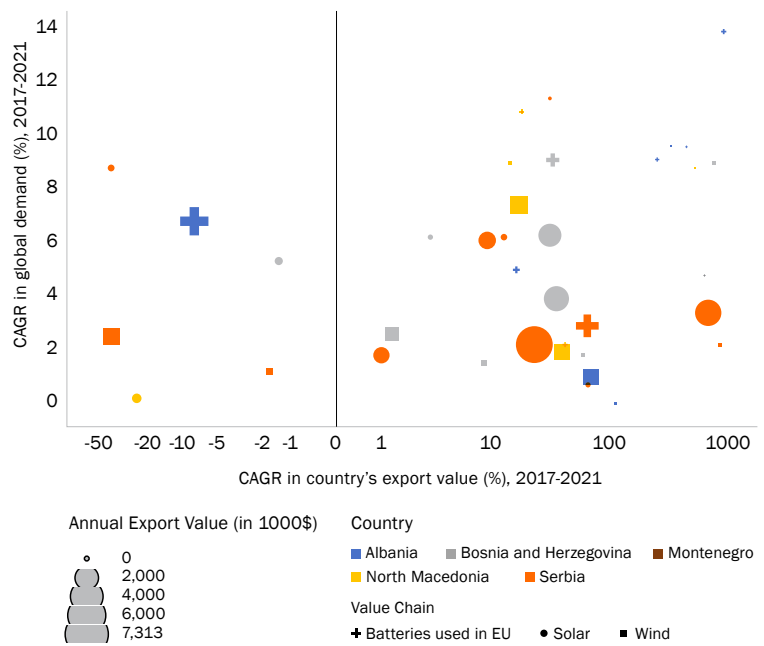
²³¹ The pan-Euro-Mediterranean system allows for diagonal cumulation (i.e., cumulation between two or more countries) between the EU, EFTA countries, Turkey, the Western Balkans, the Faroe Islands, Ukraine, Moldova, Georgia and any country that signed the Barcelona Declaration of 1995.

²³² See chapter 1 on the discussion of the impact of CBAM on Western Balkans trade with the EU.

²³³ Environmental goods in this section are based on the APEC list of 54 environmental goods. https://www.apec.org/meeting-papers/leaders-declarations/2012/2012_aelm/2012_aelm_annexc.

As countries in the region embark on the road to the green transition, they can further leverage their promising export strengths and growth opportunities in green product markets and value chains for decarbonization technologies. By specializing in products or components that feed into global value chains for critical green technologies, the countries can contribute to the global green transition while making the most of their competitive strengths and reaping the economic benefits associated with global value chain participation. Focusing on expanding manufacturing in more complex components and end products can also generate spillovers such as technological upgrading, skill-building, and higher future growth potential.

FIGURE 4-16: POTENTIAL OPPORTUNITIES IN THE WESTERN BALKANS IN THE WIND, SOLAR, AND EV VALUE CHAINS



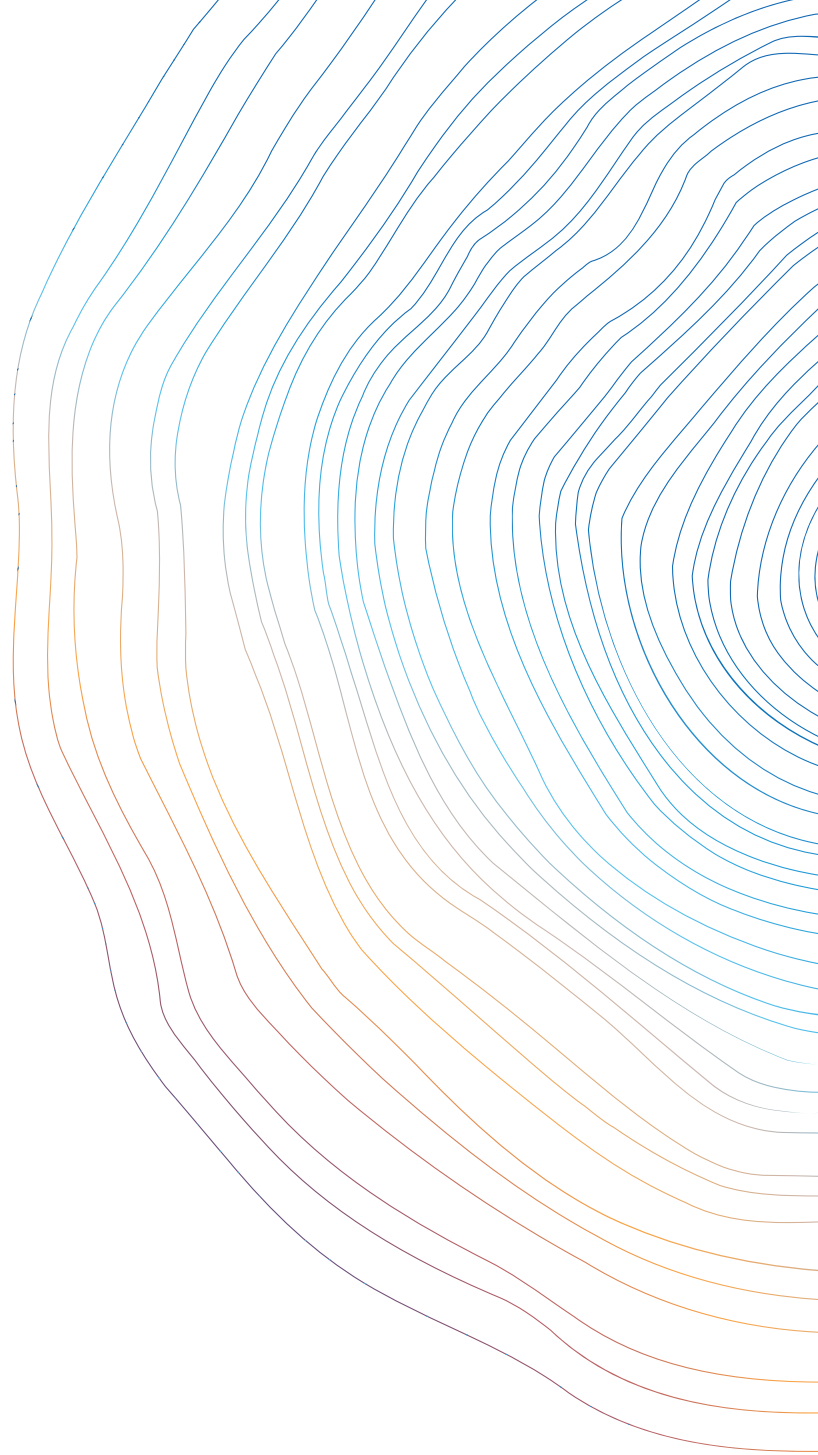
Source: World Bank staff, Green Transition Navigator.

A look into the WB6 trade patterns reveals that the region can benefit from export diversification opportunities in the wind, solar, and EV value chain (Figure 4-16).

Despite having contrasting economies with diverse production capabilities, these countries have promising export strengths and growth opportunities in green value chains. North Macedonia has a competitive advantage in ferro-nickel production used in the wind value chain; there was strong global demand in recent years, but growth in ferro-nickel exports has been relatively flat, revealing an opportunity for the country to capture this rising demand. Other products in the wind value chain are in growing demand globally and have relatively higher product complexity that Western Balkan countries can produce competitively, such as automatic regulating / controlling equipment in Albania and steel pipe fittings in Bosnia and Herzegovina. Solar value chain products from the region tend to be more complex and seem to have a more positive market potential relative to the wind value chain products. Products where countries from the region are most competitive in are ores and concentrates like zinc in Albania and North Macedonia and aluminum in Montenegro, as well as solar subcomponents in Bosnia and Herzegovina and Serbia. In the electrical vehicle (EV) chain, Bosnia and Herzegovina has a competitive advantage with aluminum hydroxide; North Macedonia is uniquely competitive in EV end products, including non-diesel-powered buses and lead-acid electric accumulators.

While the EU is already the main trading partner of the Western Balkan countries, the focus be on increasing the quality of the goods and services produced. WB6 countries can further capitalize on the geographical proximity to European markets that can offer access to investment, technology, and know-how, as greening the product and export mix will be an important precondition for growth during the green transition. Alignment with EU regulations and standards can improve the quality of goods and services produced and facilitate the movement of people and capital to and from this region.²³⁴ Reaping the benefits from the region's geographical position and EU accession agenda can be further exploited if barriers to trade in goods and services are addressed to allow entrepreneurs, investors, and firms to scale up the innovation and financing critical for the green transition.

²³⁴ World Bank, 2023. The Economic Effects of Market Integration in the Western Balkans.



Chapter 5

Conclusions and recommendations

Effective climate action requires both targeted policies and policies coordinated across sectors and geographies. In this CCDR, we categorize policies according to the **3 T's**: Transversal, Trans-boundary, and Targeted policies. **Transversal policies** cut across multiple sectors, recognizing the cross-sector nature of climate impacts and required actions. **Trans-boundary policies** cut across borders (national, state, and local), recognizing the need for regional cooperation on climate action. **Targeted policies** focus on sectors, issues, or locations. Priority transversal, trans-boundary and targeted policies are highlighted below, and a detailed breakdown of policies by area is provided in Annex 3. Detailed Recommendations on Priority Policy Actions and Investments.

Climate policies bring many benefits beyond compliance. Adaptation measures strengthen the resilience of economies and communities to environmental hazards that are expected to increase significantly in the region. Improving resilience, especially in vulnerable communities, reduces risks and improves social and development outcomes. Mitigation measures, while meeting climate commitments, contribute to better air quality and health outcomes, open economic opportunities, and improve the security and flexibility of the energy system. Implementing adaptation and mitigation measures together with economic reforms will align the WB6 more closely with the EU, strengthening the application for the accession of Western Balkan countries to the EU. Ultimately, these policies and measures will enable the development of sustainable and resilient economies in the region into the future.

The 1st T: Transversal policies

Transversal policies provide clear direction across institutions, avoiding duplication. Given the cross-sectoral nature of climate impacts, policy focused on overlapping sectors—such as water, agriculture, and hydropower generation—are more effective than policies implemented in isolation. The following recommendations will support the development of effective policies across sectors within the WB6.

- **Institutional coordination.** WB6 governments should establish coordination mechanisms at the highest levels of government to facilitate climate change adaptation and mitigation across the entire government. As highlighted in Section 2.2.2, the coordination of climate actions across government ministries is one of the key areas for development in terms of institutional capacity. Climate-focused agencies or commissions should enable coordination across ministries and should be designated as an advisory body on all issues related to climate change. Obligations could be implemented for other ministries to consider their policy recommendations. Data sharing on adaptation and mitigation risks and benefits of climate action need to be institutionalized.
- **Integrated planning.** Integrated planning of mitigation and adaptation policies is critical, especially in priority sectors such as agriculture and energy. Integrated planning involves developing integrated assessments of climate impacts, such as those presented in this CCDR, to understand the full extent of climate impacts and mitigation measures on the different sectors, including their economic impacts. Based on such assessments, policy can be developed to minimize the trade-offs between different policy objectives.
- **Adjusted incentives.** The national budget can be as an instrument to incentivize certain behavior from households and firms. Policy makers can realign incentives to encourage households and firms to invest in adaptation and low-carbon technologies, shifting away from carbon intensive investments, as outlined in Section 4.6. This means getting the prices right to ensure that environmental and social costs are included and strengthen regulatory and administrative capacities. On a practical level, this could include adjusting taxes and subsidies to incentivize clean development while disincentivizing dirty investments. This process will also prevent governments from significantly increasing public debt by financing all mitigation and adaptation investments themselves, which will support better fiscal prudence.
- **Structural reforms.** Structural reforms in governance, business regulation, infrastructure development, and digitalization will bring many benefits. These will attract more external financing through FDI and IFI finance, improve labor force participation, improve the level of human capital and productivity, and open new avenues for economic development.

- **Liberalizing markets and removing subsidies.** Energy and transport fuel subsidies can hamper the development and deployment of cleaner technologies such as renewable energy and electric vehicles, as subsidized products hide their true costs to consumers. Liberalizing the energy market and strengthening regulations support the development of clean technologies as markets gradually reflect the true cost of environmental impacts. This can cause increased energy and fuel prices, disproportionately affecting already-disadvantaged communities.
- **Reevaluate the role of the state in the economy.** SOEs and BOSs maintain significant roles in key sectors across the region, including energy, transport, and forest management. Reforms to privatize such SOE-BOSs, partially or fully, could enhance their financial performance and help to align prices with the true costs, allowing further alignment with EU energy markets. Reforms could include phasing out fossil fuel subsidies, improving transparency in setting tariffs and establishing independent regulatory oversight in these sectors. It is also important to strengthen institutional capacity and develop a PPP framework that incentivizes private sector participation in critical areas while maintaining fiscal sustainability.
- **Prioritize reducing explicit subsidies and implement market mechanisms for implicit ones.** Shareholders can prompt SOEs to address climate change while policy makers may support them through subsidies and programs. These initiatives should, however, avoid creating an imbalance in the playing field that can disadvantage the private sector. SOEs should gradually align with market forces by reducing subsidies through addressing challenges related to the political influence and employment impact of SOEs, as well as by developing complementary fiscal measures to achieve social goals currently fulfilled by SOEs. Emissions trading systems and carbon pricing are effective tools in reducing implicit subsidies. Approaches in incorporating SOEs in climate action from other countries include incorporating emissions reduction requirements in legislative documents, providing overarching ownership policies (France, Norway, and Sweden), and adding individual SOE mandates (Hungary, Lithuania, and Switzerland) and corporate plans (Australia).
- **Green finance.** Issuing green bonds, social bonds, or similar debt instruments can significantly expand investments in the green transition while ensuring environmental responsibility. Ministries of finance are crucial in creating enabling environments for these instruments by adopting standard for the issuance of thematic corporate and sovereign bonds and by implementing sustainability disclosure requirements and working with market regulators. Developing a green taxonomy aligned with EU standards is essential to classify investments accurately. While national governments establish the regulatory framework, local governments play a vital role in mobilizing green finance. Subnational governments, particularly municipalities and major cities with good credit ratings, should be explicitly mandated to coordinate investments in green technologies.
- **Developing human capital.** The green transition will require retraining the workforce, especially in highly impacted sectors. Doing this will be necessary to counter the already-diminishing human capital in the region, as outlined in Section 1.1. Such retraining has multiple benefits: improved productivity, enhanced transferrable skills, behavioral change to more sustainable behavior, and more green innovation. Retraining occurs at multiple levels, including retraining of the existing workforce, changes to the educational curricula in schools, additional training for teachers, and the development of the research and development capacities of universities.
- **Accountability in climate action.** Transparency and accountability are critical to attract private investments and strengthen citizen awareness of climate change and the need to act. These can be improved by establishing a parliamentary committee on climate change that would ensure independent scientific advice to governments, clear mandates for state auditors, and enhanced citizen engagement approaches. This necessitates more effective public engagement and citizen participation to strengthen the public acceptance and the longevity of climate policies.

The 2nd T: Trans-boundary policies

While localized action is necessary, it is significantly enhanced by trans-boundary policies. Cross-border policies can leverage economies of scale to provide more efficient returns to investment in adaptation and mitigation. Many climate hazards are cross-border in nature, and many natural resources are shared. Some regional cooperation is already in place and has enabled more efficient cross-border resource management. The following recommendations will support trans-boundary climate action.

- **Regional early warning systems.** Early warning systems monitor and forecast the likelihood of natural disasters in at-risk regions. As shown throughout this CCDR, many at-risk regions in the WB6 are trans-boundary, such as the Drina River basin across Bosnia and Herzegovina, Montenegro, and Serbia that is prone to droughts and floods; the mountainous areas on the border of Albania and North Macedonia with high landslide risk; and the wildfire-prone areas between Bosnia and Herzegovina and Montenegro and between Albania and Montenegro. Investing in regional early warning systems avoids the duplication of efforts across countries; it will enable better protection of infrastructure and human lives, as well as better management of risks that are regional in nature. Strengthening regional drought monitoring will be critical to many sectors. Making it a priority will ensure more confidence in economic decision-making and support the economic security of these regions.
- **Carbon pricing.** Introducing carbon pricing in the power and gas markets would diversify the power mix, attract cleaner technology investments, and facilitate a smoother green transition and cross-border energy flows. It will support the phaseout of fossil fuels and will align the region with the requirements of the EU CBAM. Revenue recycling from the carbon pricing instruments could be implemented to provide targeted support to vulnerable groups. Choosing a specific instrument, such as a carbon tax, a carbon fee or national or regional carbon trading scheme, would require a detailed regional impact assessment. The benefits and implications of carbon pricing are covered extensively in Box 2-2.
- **Increasing regional economic integration.** Harmonizing energy, transport, and agricultural systems will enable WB6 countries to integrate their economies into global value chains by benefiting from economies of scale that individual countries cannot achieve alone. A larger electricity grid will facilitate more efficient balancing of intermittent energy supply and enhance energy security and create opportunities for international trade. Developing international rail corridors will make train transport more attractive, reducing the reliance on individual car travel and improving interconnectedness within the region and with neighboring countries. Increased trade in agriculture will diminish the need for imports from outside the region, lowering the carbon footprint of food and bolstering food security, and thereby positioning WB6 economies more competitively in global markets.
- **Alignment with EU accession goals.** Supporting climate mitigation measures is crucial for the WB6 to align with the EU Green Deal and maintain access to the EU market. The EU's environmental requirements for exporters necessitate greater efforts in climate mitigation. To sustain and enhance market access and meet EU accession commitments, WB6 must invest more in sustainable practices. Strengthening WB6's commitment to greening agriculture is vital for transforming the sector and fostering jobs, growth, and climate resilience. Export-oriented producers in WB6 should continue to adapt to comply with new EU standards. Policy makers should aim at accelerating critical reforms and fulfilling legislative priorities for EU accession.

The 3rd T: Targeted policies

Targeted policies ensure that adaptation and mitigation efforts are delivered in the most effective way.

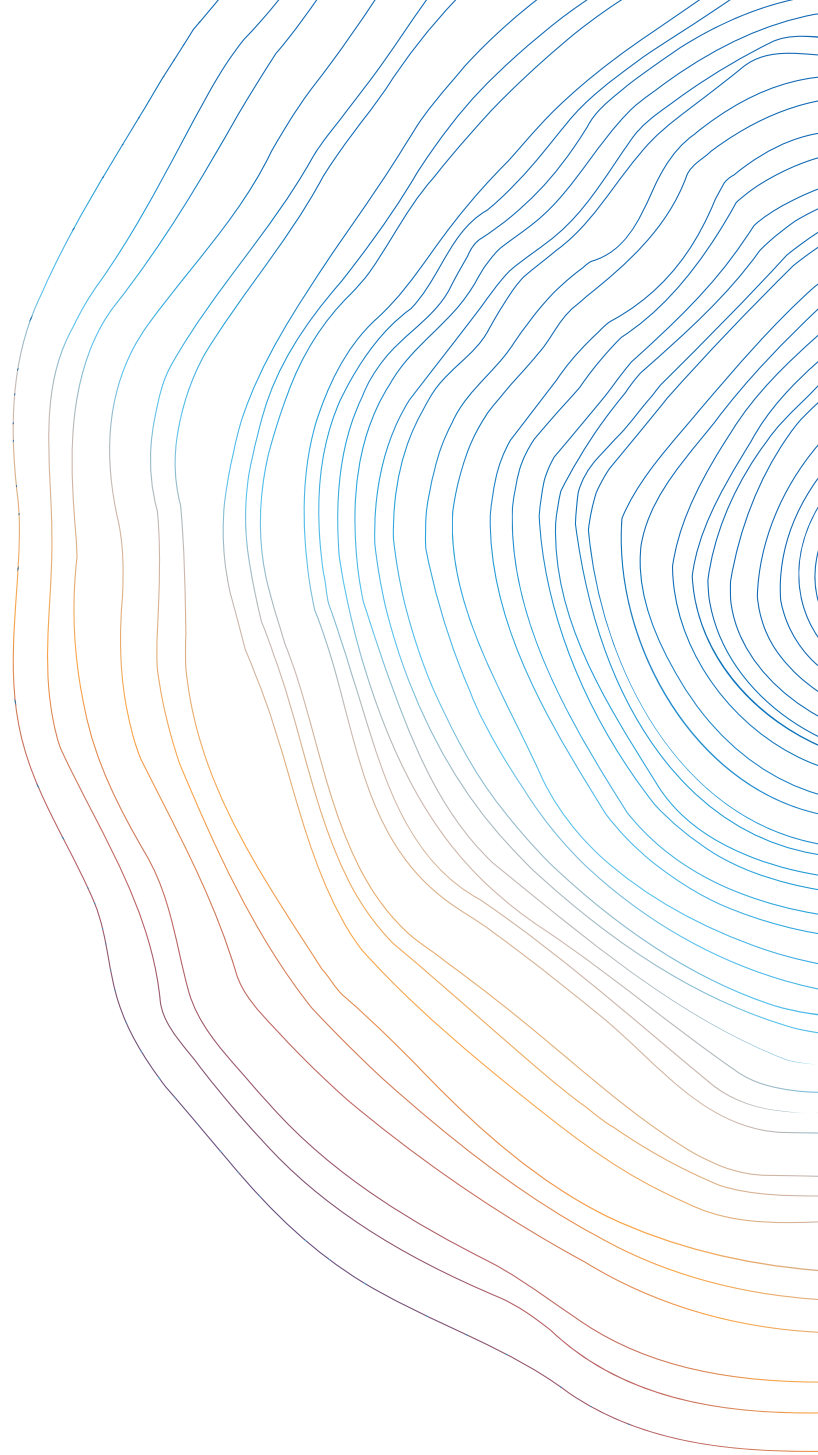
“Targeting” can apply to sectors, communities, or locations. Sector targeting ensures that mitigation efforts deliver the best bang-for-the-buck by targeting sectors with the highest emissions. Targeting communities allows social policies to enhance the resilience of those communities most affected by climate hazards or changing economic conditions. Targeting locations is important in light of the localized impact of climate hazards. Key targeted policies are as follows:

- **Disaster Risk Management.** The WB6 countries need to enhance their risk management capacities. Key examples of disaster risk management (DRM) actions for governments include improving regional contingency planning and coordination for the quick deployment of rescue services to remote areas based on crisis scenarios, strengthening building codes to align with EU standards on disaster resilience for public buildings, and implementing capacity-building programs and public awareness campaigns for rescue services and communities to address the needs of high-risk and vulnerable populations. Additional crucial steps include establishing a regional approach to disaster resilience and climate-proofing for buildings, upgrading multi-hazard information systems for effective decision-making, enhancing resource pre-positioning for emergency response, and developing investment packages to strengthen infrastructure and community resilience in high-risk cross-border areas.
- **Power sector transformation.** Significant investments in upscaling renewable energy are necessary, complemented by support for coal phaseout. Considerable progress is being made in investments in renewable energy, but regulatory environments and grid infrastructure should be upgraded to meet future needs. Coal phaseout strategies should ensure a Just Transition for those communities most affected by the phaseout. A detailed description of how the power sector can transform is outlined in Section 3.2.3.
- **Transport sector investments.** The transport sector is one of the biggest contributors to GHG emissions in the region. Decarbonizing the sector requires policies to incentivize cleaner transport habits and the transition to more efficient vehicles. Urban design and planning can reduce the need to use fossil fuel-based transport. Freight modernization and integration with regional transport systems will facilitate emissions reductions. Regulations targeting the efficiency of vehicles and fuels will encourage investment in cleaner transport, which can be coupled with incentives to invest in EVs. Strategic policies in the transport sector could include the development of national EV rollout strategies, implementing road asset resilience management systems, and integration into the Trans-European Transport Network (TEN-T).
- **Remodeled cities.** Cities are the basis for much economic activity and represent high-risk areas for climate hazards. Remodeling cities to be greener and more adaptable to climate risks provides an opportunity to develop resilience while improving living conditions overall. Current urban planning policies are primarily regulatory in nature and do not attract private sector investments in building greener cities. Zoning rules and land use regulations can ensure that people are protected from significant climate impacts, as well as incentivize green investments and reduce long-term emissions. A detailed description of how to remodel cities in this way is provided in Section 3.1.3.
- **Energy efficiency and electrification in end-use sectors.** Emissions can be reduced significantly by improving the efficiency of technology in the residential and industrial sectors, as well as by electrification. Several WB6 countries have implemented energy-efficiency programs in public buildings, and the expertise developed in such projects should be extended to further programs. Energy efficiency improvements will lower energy demand and reduce potential energy supply shocks, subsequently reducing energy poverty concerns in vulnerable communities. Specific potential policies include stricter efficiency and emissions standards, stricter enforcement of these standards, financial support programs, strategic communication, and awareness campaigns.
- **Agricultural sector reform.** The WB6 agricultural sectors are susceptible to climate shocks and need significant investments to improve their adaptive capacities and reduce carbon emissions. Modernizing

the agricultural sector, improving the efficiency of irrigation systems, rehabilitating drainage systems, implementing climate-smart agricultural practices, and developing insurance schemes will ensure the future resilience to climate shocks.

- **Education for a diverse economy.** Providing education and training to those in the most affected communities will enhance the resilience of vulnerable communities to food and income security concerns. Such policies can transform local communities and develop a diverse economy that is more innovative and able to withstand shocks. This diversity will help to reduce environmentally induced migration and the need for fiscal stimulus in times of economic downturn.
- **Targeted protection for vulnerable communities.** Social protection measures should complement market liberalization and specifically target the most impacted communities. Revenue recycling from carbon pricing could be employed to limit the additional fiscal burden of this social protection. The funds generated from carbon pricing initiatives could be redirected to support programs that help low-income households and vulnerable populations cope with higher energy costs. Additionally, direct subsidies or cash transfers could be provided to these communities to offset the financial burden.

Implementing these transversal, trans-boundary, and targeted measures will allow the WB6 to develop sustainable and resilient economies. Significant investments are necessary, but this CCDR shows that these investments are feasible if the countries develop enabling regulatory environments to encourage private sector participation. Simply put, public and private sector actors must collaborate better to ensure the success of the green transition. Enabling a Just transition will require ambitious commitments and cooperation among countries, ministries, and local communities; this cooperation will ultimately ensure the future prosperity and climate security of the region. A detailed breakdown of priority policies, by area, is provided in Annex 3. Detailed Recommendations on Priority Policy Actions and Investments



Annexes

ANNEX 1.

WB6 climate change action: background and case studies

BOX A1-1: FRAMEWORK AND EXTERNAL DRIVERS FOR WB6 CLIMATE CHANGE ACTION

All Western Balkan countries, except Kosovo, are parties to the United Nations Framework Convention on Climate Change (UNFCCC) and to the Paris Agreement, a legally binding international treaty on climate change that was adopted in 2015. The goal of the Paris Agreement is to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels” and pursue efforts “to limit the temperature increase to 1.5°C above pre-industrial levels.” As required by the Paris Agreement, countries develop and submit their nationally determined contributions (NDCs), that is, national plans for climate actions to (1) reduce their GHG emissions and (2) build resilience to adapt to the impacts of climate change. NDCs are expected to be updated regularly to reflect an increasingly higher degree of ambition. The Paris Agreement also invites countries to adopt long-term low GHG emission development strategies (LT-LEDS) that provide the long-term horizon to the NDCs. Unlike NDCs, the LT-LEDSs are not mandatory; countries formulate them to place NDCs into the context of long-term planning and development priorities. Meanwhile, for adaptation, the UNFCCC encourages countries to submit National Adaptation Plans (NAPs) under the Cancun Adaptation Framework (CAF), with the objective of reducing risks and vulnerability to climate change impacts by enhancing the adaptive capacity and resilience and integrating adaptation into policy and investment decision-making.

Alignment with the EU serves as another strong incentive for the WB6 countries to take climate actions. WB6 countries all have signed Stabilization and Association Agreements (SAA) with the EU, which aim to align the region with EU standards. The Energy Community Treaty provides the overarching framework for the alignment with the EU energy policies and the creation of an integrated European energy market. As Contracting Parties to the Energy Community Treaty, the WB6 countries have legally binding commitments to adopt core EU legislation (*acquis communautaire*), including the EU Clean Energy for All Europeans Package (2019).²³⁵ This package requires countries to submit their national energy and climate plans (NECPs) until 2030; these plans reflect efforts to achieve their energy and climate objectives. Additionally, by signing the Sofia Declaration²³⁶ to align with the EU Green Deal²³⁷ (2020), the Western Balkan countries have agreed to align with the EU Climate Law, the EU Strategy on Adaptation to Climate Change, and the EU vision of achieving climate neutrality by 2050 by adopting the Green Agenda for the Western Balkans (GAWB)²³⁸ and the Action Plan (2021).²³⁹ The Energy Community’s Decarbonization Roadmap (2021) outlines a pathway to 2030 energy and climate targets and climate neutrality by 2050. As the Energy Community Treaty and *acquis* evolve constantly to align with the changing EU legislation, the WB6 will be expected to adopt the EU Fit for 55 package, which aims to translate the ambitions of the Green Deal into law.

²³⁵ The Clean Energy for All Europeans includes directives and regulations on energy efficiency, renewable energy deployment, market design, and governance.

²³⁶ Regional Cooperation Council. 2023. “Green Agenda for the West Balkans.” ([rcc.int](https://www.rcc.int)), <https://www.rcc.int/flagships/9/green-agenda>

²³⁷ <https://www.consilium.europa.eu/en/policies/green-deal/#what>.

²³⁸ Regional Cooperation Council. 2020. “Sofia Declaration on the Green Agenda for the Western Balkans.” <https://www.rcc.int/docs/546/sofia-declaration-on-the-green-agenda-for-the-western-balkans>

²³⁹ Regional Cooperation Council. 2021. Action Plan for the Implementation of the Sofia Declaration on the Green Agenda for the Western Balkans 2021-2030. <https://www.rcc.int/docs/596/action-plan-for-the-implementation-of-the-sofia-declaration-on-the-green-agenda-for-the-western-balkans-2021-2030>.

BOX A1-2: CROSS-BORDER COOPERATION IN CLIMATE CHANGE ADAPTATION AND FLOOD RISK MANAGEMENT SUPPORTED BY THE WORLD BANK

The West Balkans Drina River Basin Management project was launched by the World Bank in 2016 with the objective of enhancing flood and drought risk management and adaptation in the Drina River Basin area and promoting transboundary cooperation and communication among Bosnia and Herzegovina, Montenegro, and Serbia.²⁴⁰ The Drina River Basin, located in the cross-border region of the three countries, is ecologically rich and has substantial economic potential, but it is highly prone to flood and drought risks. Moreover, in recent years, the effect of climate change has led to prolonged and intensified extreme wet and dry episodes, which further increase the impacts and losses of disasters in the region. Nevertheless, limited cross-border capacity in flood risk reduction and adaptation, as well as the region's history of conflict, have limited collaboration among the countries and hindered effective water resource management and disaster prevention. With a total investment of US\$8.63 million and under the partnership of the World Bank, the European Union, the Global Environment Facility, and the UNFCCC's Special Climate Change Fund, the West Balkans Drina River Basin Management project effectively enhances joint water resource planning and transboundary flood and drought risk management among the countries. Under the project, a Strategic Action Plan was endorsed at the ministerial level in all three countries; it establishes an integrated environmental monitoring system at the basin level, promotes coordinated management of groundwater resources, and conserves natural values. Moreover, the project enhanced trans-boundary water management by implementing new hydro-meteorological monitoring equipment and data collection services and forming the Drina Task Force (DTF) as an interagency and international channel for cooperation. The project also promotes climate adaptation and ecosystem conservation through pilot projects, small grants, and public awareness campaigns. The project directly benefited 500,000 members of communities prone to flood and drought risks in the basin, as well as residents of the 33 riparian municipalities that profit from the project's pilot investments, small grants, and public awareness campaign.

With a total investment of US\$159.81 million, the Sava and Drina River Corridors Integrated Development Program was launched in 2019 to enhance flood protection in the Sava and Drina Rivers Corridors and strengthen trans-boundary water cooperation among Bosnia and Herzegovina, Montenegro, and Serbia.²⁴¹

The Sava and Drina River corridor, with untapped potential to economic growth and job creation, is highly prone to floods, droughts, and other extreme weather events under the effect of climate change. Therefore, it is crucial to implement no-regret interventions to manage floods and strengthen economic and climate resilience. In this context, the World Bank program aims to develop an integrated river basin plan that strengthens flood protection, forecasting, and response and climate change adaptation capacity. In addition, it helps promote climate mitigation and sustainable management of environmental assets in the Drina River corridor. The program strengthens flood protection and landscape management in the cross-border area, and it yields co-benefits in climate adaptation, environmental management, and tourism.

BOX A1-3: JUST TRANSITION FRAMEWORK: HIGHLIGHTS OF KEY CHALLENGES BY PILLAR

Enabling a Just Transition requires that governments to have a comprehensive national vision for phasing out coal, considering three key pillars: (1) institutional governance, (2) people and communities, and (3) environmental reclamation and repurposing of assets. The WB6 face significant challenges across these three pillars.

Pillar 1 (institutional governance): The WB6 region lacks clear governance frameworks to ensure that the Just Transition is collaborative and inclusive. The World Bank's Just Transition work in Bosnia and Herzegovina²⁴² revealed the need for high-level political decision-making to drive the overall transition strategy;

²⁴⁰ World Bank. "Flood Protection and Climate Adaptation for the Drina River Basin." Results Briefs. World Bank, Washington, DC.

²⁴¹ World Bank. 2019. "Sava and Drina River Corridors Integrated Development Program (P168862)." Project Information Document (PID). Report No: PIDC25739. World Bank, Washington, DC.

²⁴² World Bank. 2022. *Support to a Just Transition in Coal Regions of Bosnia and Herzegovina*. Roadmap under revisions by Government, pending adoption by the Cabinet.

it also highlighted that the entity-level, cantonal and municipal authorities should play important roles. A hybrid governance model has been proposed by World Bank consultants, which would include multiple levels of government and all impacted stakeholders. The proposed structure would assign specific responsibilities to various bodies, such as strategic planning and knowledge sharing, interentity coordination, fundraising and financing, technical expertise on jobs, community development, and land asset management and repurposing, as well as transition project management and stakeholder engagement. This comprehensive approach seeks to address the multifaceted aspects of a Just Transition, including economic, social, and environmental considerations.

Pillar 2 (people and communities): Engagement with stakeholders to build awareness of the benefits of a Just Transition is lacking. Transitioning from coal-based energy is disruptive to workers in the coal sector value chain and to local economies and communities dependent on coal-related activities. Supporting a Just Transition of affected workers requires understanding the skills of those affected and designing passive and active labor market programs to cushion the adjustment and facilitate worker transitions to alternative livelihoods. Engagement with stakeholders beyond affected workers is important for building awareness of the Just Transition process and the potential opportunities it can bring. A study conducted by the University of Belgrade showed low levels of institutional and interpersonal trust, as well as limited citizen engagement. In Serbia, the legal framework allows for citizen participation, but it does not guarantee active involvement, and the most impacted coal communities were found to be underrepresented. As these communities lack exposure to the success stories of other coal-transition regions, they struggle to develop a positive sentiment to the transition. The primary concerns in such communities are based on the need for adequate alternative opportunities and fair compensation for all people. These concerns extend beyond economic issues to include social dynamics, such as the trend of youth and affluent individuals migrating to explore better prospects in larger cities. To ensure effective citizen participation, it is necessary to address these quality-of-life concerns and build trust among all stakeholders in the Just Transition process. Communication with stakeholders needs to be clear and coordinated across the relevant government ministries. Climate action needs the whole of society to create awareness, understanding, and acceptance for change and transition.

Pillar 3 (environmental reclamation and repurposing of assets): The legal basis for land repurposing in the region is complex. The World Bank²⁴³ recently examined mining laws at different governmental levels, including entities and cantons in Bosnia and Herzegovina. The regulations covered mine closure, land reclamation, and repurposing, as well as ancillary laws related to agriculture, urban and spatial planning, and the environment. The complexity lies in the fact that different responsibilities lay with different levels and branches of government. Standards for post-mining land reclamation and remediation are detailed in existing regulations across multiple entities, legal procedures for land repurposing differ by land type, and permitting processes differ depending on the intended use of the land post-reclamation. These procedures are lengthy, especially when spatial plans need modification due to changes in land use, adding to the overall complexity of and time required for the process. Overall, more emphasis needs to be placed on developing a comprehensive Just Transition approach in coal-dependent countries across the region.

²⁴³ World Bank. 2022. Support to a Just Transition in Coal Regions of Bosnia and Herzegovina. Roadmap under revisions by Government, pending adoption by the Cabinet.

ANNEX 2.

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 macroeconomic implications. The model allows users to trace the flow of funds by mapping out the main identities of the economy (national accounts, balance of payments, labor markets, 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 on each economy through 2050. The model tracked macroeconomic dynamics while retaining a simpler structural representation relative to general equilibrium models.

Trend growth and optimistic growth are two growth scenarios used to assess the impact of climate change on Western Balkan economies. Trend growth is a business-as-usual scenario, extending historical policy trends observed into the projection horizon through 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. Populations 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, and improve market competition and support private sector participation; 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 in light of the EU aspirations of the Western Balkan countries. Table A2-1 shows assumptions for the trend and optimistic growth scenarios.

TABLE A2-1: AVERAGE ANNUAL GDP GROWTH RATES, 2025–50

	Albania	Bosnia and Herzegovina	Kosovo	Montenegro	North Macedonia	Serbia	WB6
Trend growth	1.5	2.2	2.6	1.7	1.5	1.7	1.9
Optimistic growth	3.2	4.4	4.0	4.1	4.2	4.0	4.0

Source: World Bank.

The macroeconomic impact of climate change was assessed relative to a baseline. Each of the two growth scenarios was used to assess separately 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, and heat stress and assessed the impact on GDP (and other macroeconomic variables) of these damages 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. For each growth scenario,

the report presents the cost of the NZE scenario relative to the RS. 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, i.e. of 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 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.

The macroeconomic impact of mitigation analysis found small impacts of the net zero scenario on GDP per capita, Table A2.2 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 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. Third, North Macedonia is the country that has consistently negative impact on the GDP per capita growth and the GDP per capita level; Montenegro's level of GDP per capita decreases, in part, because the population increased early in the projection period. For the average growth rate, 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 A2-2: 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
Albania	-0.031	0.219	-0.102	-0.183	0.157	-0.014
Bosnia and Herzegovina	0.022	0.353	-0.108	0.167	0.018	-0.351
Kosovo	0.004	0.047	-0.002	0.013	0.043	0.030
Montenegro	0.291	-0.068	0.004	0.254	-0.056	0.011
North Macedonia	-0.038	-0.053	-0.011	-0.032	-0.067	-0.025
Serbia	-0.001	-0.003	-0.027	-0.004	0.057	-0.005
Differences in levels (percent difference between NZE and RS)*						
	Trend growth			Optimistic growth		
	2030	2040	2050	2030	2040	2050
Albania	-0.130	-0.200	-0.039	-0.872	-0.812	-0.395
Bosnia and Herzegovina	-0.090	-0.798	-1.167	-0.069	-0.891	-1.180
Kosovo	0.069	0.004	-0.122	-0.156	-0.459	-0.252
Montenegro	-0.842	-0.378	-0.662	-0.908	-0.448	-0.668
North Macedonia	-0.365	-0.888	-0.783	-0.311	-0.968	-0.725
Serbia	0.223	0.103	-0.436	0.203	0.083	-0.397

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.

ANNEX 3.

Detailed Recommendations on Priority Policy Actions and Investments

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 closely linked to the requirements and commitments of the WB6 countries as part of the EU accession process or the Energy Community Treaty.

Policy Actions	Investments	Prioritization
Resilience and Adaptation		
Policy area: RA1: Disaster risk management ²⁴⁴		
<ul style="list-style-type: none"> Enhance contingency planning and coordination mechanisms at the regional level to ensure quick and effective deployment of national and local rescue services to remote areas based on different crisis scenarios. EU Implement improvements to building codes and enforcement for existing and new buildings to support convergence with EU standards and enhanced resilience to disasters and climate change, especially for public buildings (e.g., emergency response buildings, education, and health services). EU 	<ul style="list-style-type: none"> Implement capacity building programs and public awareness campaigns targeted to national and local rescue services and communities to effectively address the needs of people in high-risk cross-border areas and vulnerable populations (including ethnic minorities, disabled, and elderly) with adapted materials for last-mile communication (translated material, drills, simulations, and programs in schools). EU Establish a regional approach to disaster resilience (including seismic), climate proofing, and EE in public and private buildings. EU 	Urgency ●●● Ease of implementation ●●●
<ul style="list-style-type: none"> Upgrade and interlink regional multihazard information management and early warning systems to support DRM and sectoral decision-making (with particular attention to drought, storm, flood, heat, and wildfire EWS to strengthen usefulness/relevance for practitioners). EU 	<ul style="list-style-type: none"> Enhance pre-positioning and cooperation on resources and finance for emergency response, particularly in cross-border areas at high risk (such as capacity, equipment, common standards for emergency response and joint procurement, and shelter), including the development of the Cross-Border Mutual Aid Agreements that will allow neighboring regions to request aid during events. EU Develop and implement an investment package to enhance the resilience of infrastructure and communities in cross-border areas at high risk of multiple hazards (slope strengthening and stabilization, drainage systems, fire breaks and interventions on assets/infrastructure at risk, such as power networks and roads, as required). EU 	Urgency ●●● Ease of implementation ●●●

²⁴⁴ 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), 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).
Strategies, frameworks, programs and best practice networks: EU Adaptation Strategy (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), 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), 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).
 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
Policy area: RA2: Urban		
<ul style="list-style-type: none"> Set up a technical support program to be hosted in existing or new facilities to support the prioritization, costing, and implementation of investments in green and resilient cities, with a focus on secondary cities. ^{EU} 	<ul style="list-style-type: none"> Develop a package of infrastructure investments and sectoral reforms to improve waste management and handling of hazardous waste at the municipal level. Interventions could include the development of comprehensive plans to manage nonhazardous industrial solid waste and municipal solid waste; improve waste collection and management strategies; strengthen regulations and fines against open dumping and burning of waste; develop and launch educational awareness campaigns and open dialogues with citizens and private sector; and invest in disaster-resilient facilities and create contingency measures to avoid waste pollution and promote safe disposal in case of disasters. ^{EU} 	<p>Urgency ●●●●</p> <p>Ease of implementation ●●●●</p>
Policy area: RA2: Urban		
<ul style="list-style-type: none"> Strengthen the capacity of local governments to develop and manage information systems and share information effectively with constituencies, including vulnerable population groups, to take risk-informed decisions, including by establishing effective participatory citizen engagement platforms to identify constituencies' priorities and invest in effective measures that mitigate risks and build community resilience and green livelihoods. ^{EU} 	<ul style="list-style-type: none"> Develop a package of interventions to build local resilience and create vibrant, green urban centers that are at high risk of multiple hazards, e.g., floods / heat / wildfires. Interventions could include the development and management of shelters, investments in compact city development, management of common water resources and critical infrastructure, and investment in adaptation (green / white / blue measures) and urban mobility. ^{EU} 	<p>Urgency ●●●●</p> <p>Ease of implementation ●●●●</p>
Policy area: RA3: Water		
<ul style="list-style-type: none"> Improve water security based on the integrated river basin management approach to meet water demand and increase resilience against floods and droughts. Further strengthen transboundary water cooperation in the framework of the International Sava River Basin Commission (ISRBC), the International Commission for the Protection of the Danube River (ICPDR), and other existing bi- and multilateral cooperation frameworks for water management and pursuing transboundary agreements where they are still lacking. ^{EU} Develop the regional action plan for the Western Balkan countries for the reduction of the high levels of non-revenue water in the water supply systems to increase water supply efficiency and resilience. 	<ul style="list-style-type: none"> Establish and update internationally coordinated River Basin and Flood Risk Management Plans in transboundary basins. Strengthen the Drought Management Centre for South-East Europe (DMCSEE). 	<p>Urgency ●●●●</p> <p>Ease of implementation ●●●●</p>
Policy area: RA4: Forestry and Biodiversity		
<ul style="list-style-type: none"> Improve regional monitoring systems and research on climate impacts on forest ecosystems, including through extreme events such as wildfires, with a particular focus on cross-border protected areas. Enhance monitoring of and research on wildfire-related air pollution and health impacts, with a particular focus on vulnerable populations. 	<ul style="list-style-type: none"> Establish regional approaches and standards for climate-resilient afforestation and reforestation. Mainstream considerations for resilient forest and landscape management into wildfire prevention investment and capacity-building programs. Enhance shares of protected areas based on information on threats from climate change impacts and biodiversity loss. 	<p>Urgency ●●●●</p> <p>Ease of implementation ●●●●</p>













Policy Actions	Investments	Prioritization
<ul style="list-style-type: none"> Promote cross-institutional and cross-sectoral training on climate-resilient afforestation and reforestation practices that also support wildfire prevention and carbon sequestration. 		
Policy area: RA5: Agriculture and Food Systems		
<ul style="list-style-type: none"> Shift to decouple farm support and continue reducing the direct payments (subsidies) envelope of national measures programs in favor of rural development (e.g., advisory, farm extension services, and research and development). Link policy objectives of national farmer support programs to cross-compliance, with a stronger focus on measures to increase the adoption of climate-smart agriculture innovations. Improve the targeting of rural development policies by addressing regional and size disparities among farmers; provide incentives for technical change and the adoption of climate-smart agriculture practices to mitigate the impact of GHG emissions from farms and increase climate adaptation and productivity. Work with local banks and IFIs in the creation of concessional credit lines to support adaptation investment in the agriculture sector (e.g., irrigation infrastructure, CSA, and drip irrigation). 	<ul style="list-style-type: none"> Undertake a rural development policy that stimulates public-private partnerships and climate-resilient investments that significantly increase the focus on the sustainable management of natural resources, green and resilient agricultural diversification, environmentally friendly and organic farming, and climate resilient agri-food value chains with more farm and agri-food processing innovations. Substantially increase both institutional capacities to implement EU IPARD funds (€560 million for 2021–27) and farmers' uptake of rural development measures and available budget for investments on greening the agriculture in the WB6 countries. ^{EU} Develop Agriculture Knowledge and Information Innovation Systems (AKIS) based on stronger cooperation between the private and public sectors, and promote climate-smart agriculture investments. Align the knowledge agenda with climate resilience and improved access of farmers to agroclimatic information to further improve the sustainability of their investments. 	<p>Urgency ● ● ●</p> <p>Ease of implementation ● ● ●</p>
Policy area: RA6: Transport		
<ul style="list-style-type: none"> Upgrade regional transport networks (rail and roads, with a focus on critical nodes) to maximize resilience against multiple hazards. 	<ul style="list-style-type: none"> Use public-private partnerships to incentivize private sector investment in climate-resilient roads. Use EU funds combined with guarantees for de-risking the projects. 	<p>Urgency ● ● ●</p> <p>Ease of implementation ● ● ●</p>
Policy area: RA7: Health systems		
<ul style="list-style-type: none"> Improve data sharing with other sectors on surveillance and monitoring of emerging new diseases and climate-related health emergencies. Create plans for health system responses to health emergencies, including climate-related ones with special focus on vulnerable groups such as the elderly, disabled and children. Continue structural health sector reforms (organizational, financial, human resources) to respond to climate-related health emergencies and changes in the burden of disease, with support for a Just Transition in view. ^{EU} 	<ul style="list-style-type: none"> Establish technical prerogatives for robust connections with other sectors for surveillance and monitoring. Make strategic investments to strengthen responses to climate-related hazards and other health emergencies, including enabling health facilities to rapidly expand bed capacity. Invest in capacity building of health staff and health facilities to support the Just Transition and related migrations. 	<p>Urgency ● ● ●</p> <p>Ease of implementation ● ● ●</p>

Policy Actions	Investments	Prioritization
Policy area: RA8: Education, skills, and labor markets		
<ul style="list-style-type: none"> Develop national plans to foster green values, attitudes, and behaviors from an early age and throughout the education and training systems. Decarbonize education delivery and adapt school infrastructure to climate change, create modern learning environments. Promote science and R&D to adapt to climate change. Reform education and training systems to prepare the flow and the supply of workers with skills needed for new jobs, by increasing the links between the education and training system and the labor market, including through increased involvement of the private sector. Reform the financing and design of upskilling and reskilling programs to expand the opportunities for lifelong learning, including on-the-job learning. Assess the fit of current labor regulations and tax and benefit systems to balance the need for flexibility for firms to adapt to economic changes with the protection of workers. 	<ul style="list-style-type: none"> Support projects in education, curriculum, and teacher training to foster behavior change. Invest in green school infrastructure – including energy-efficient buildings and compact structures – and embed energy-efficient technology in the curriculum to foster climate education. Invest in R&D and innovation to facilitate adaptation to green economy. Establish mechanisms (e.g., skills development funds) co-led by the private sector to support reskilling and upskilling at a larger scale. Invest in the conditions needed for more labor-market-responsive and larger scale training (curricula, teachers/instructors, infrastructure, and equipment). Establish labor market observatory to identify on a regular basis change in skills demand associated with the greening of the labor market. Invest in labor mobility schemes to support the geographical reallocation of jobs and workers. Invest in education from kindergarten through higher levels as part of UNICEF’s regional strategy on climate change²⁴⁵ and prioritize the Comprehensive School Safety Framework to protect all school community members and ensure continuous learning amidst various threats, while promoting resilience and sustainable development skills. 	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>
Policy area: RA9: Social Protection systems		
<ul style="list-style-type: none"> Modify legislation to (1) allow social protection programs to expand coverage to additional people in response to disasters and climate impacts; and (2) establish mechanisms to respond to localized shocks rapidly through the social protection system in a transparent manner. Align social protection, disaster risk management, and climate change legislation to (1) recognize the role of social protection in supporting adaptation; (2) strengthen the use of early warning system to inform a scaling-up of social protection programs; and (3) enable disaster risk financing or prepositioned resources to be channeled through these programs to directly reach affected-people. Strengthen labor income protection systems, including for informal workers, to respond to a likely increase in job-related shocks. 	<ul style="list-style-type: none"> Put in place social protection delivery systems to enable the quick identification of people in need of support, their enrollment and payment, supported by robust complaints and grievance mechanisms. This includes (1) investments in the interoperability of social protection information systems with other government databases to allow for rapid identification of eligibility; (2) investments in integrated social registries, where appropriate; and (3) establishment of standard operating procedures to ensure system capacity during disasters, supported by capacity building and staff training. Provide additional support to households and communities adversely affected by climate change, as well as by the green transition. Support dedicated outreach by social protection systems to poor and vulnerable population groups and communities to ensure their understanding of the benefits available to support climate adaptation. Invest in efforts to better understand the individual, household, and community impacts of disasters and climate impacts, including through the tracking of damage and losses. 	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>



²⁴⁵ UNICEF. 2023. “Harnessing the transformative potential of education for the climate”. <https://www.unicef.org/eca/reports/harnessing-transformative-potential-education-climate>.

Policy Actions	Investments	Prioritization
Decarbonization and Mitigation		
Policy area: DM1: Energy pricing		
<ul style="list-style-type: none"> Gradually complete the liberalization of the electricity and natural gas markets and strengthen regulatory institutions. This includes allowing customers to choose suppliers and removing price subsidies to reflect real cost of supply. ^{EU} Ensure cost reflectivity of tariffs and coverage of supply cost to guarantee the financial viability of the power sectors. ^{EU} Increase fuel levies and other environmental taxes to EU levels. ^{EU} Pursue targeted social protection measures in parallel with price reforms, in combination with broader strengthening of the social protection system (see RA8). ^{EU} Pilot carbon pricing instruments with revenue recycling to help vulnerable and low-income groups. ^{EU} 		<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>
Policy area: DM2: Power sector		
<ul style="list-style-type: none"> Develop spatial plans to identify priority zones for RE development, including depleted mines to support Just Transition in coal-mining regions. ^{EU} Prepare a pipeline of RE projects with clear timelines and support schemes. ^{EU} Strengthen planning capacity for grid integration of RE, both at the transmission and distribution levels. ^{EU} Develop the legal and regulatory framework for battery storage. ^{EU} Continue the efforts towards electricity market coupling and full integration into the EU electricity market. ^{EU} 	<ul style="list-style-type: none"> Develop and implement national transmission grid modernization programs to enable the grid to integrate renewable electricity. ^{EU} Support investments in battery storage with the help of EU funds and private sector participation using public-private partnerships, bonds, and commercial loans. Support investments in hydropower rehabilitation and expansion to fully exploit the available potential. Support investments led by the private sector based on competitive selections (e.g., RE auctions) in solar and wind capacities. 	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>
Policy area: DM3: Just Transition from coal		
<ul style="list-style-type: none"> Adopt a Just Transition framework/strategy for coal mine closures (including labor and social mitigation measures and land rehabilitation), and take into account local communities indirectly affected by the closure. Establish mechanisms to coordinate among mines/TPP, local employment services, other municipality services, and trade unions to facilitate labor transition. Launch a broader coal mine closure plan, accompanied by the decommissioning of coal plants that become redundant. 	<ul style="list-style-type: none"> Provide continued support to projects for the rehabilitation of abandoned coal pits and the reskilling of workers. Start pilot projects to close a few unprofitable coal pits or mines. Start pilot projects to support job creation in select coal communities, in advance of coal mine closures. Strengthen public employment services, increase the offer of upskilling/retraining for occupations in demand, and invest in ALMPs in coal areas. Cover the social debt of utilities/mines to mine employees. 	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>





Policy Actions	Investments	Prioritization
Policy area: DM4: Transport sector		
<ul style="list-style-type: none"> ▪ Transition to concession-based models for public transport where providers are paid based on performance-based contracts, to improve service and accelerate the transition to e-buses. Increase the bankability of bus concessions through the standardization at national and regional levels. ▪ Improve coordination of rail freight traffic at the corridor level. ▪ Open the regional rail market by 2025 (per the Western Balkans Sustainable and Smart Mobility Strategy). ^{EU} ▪ Introduce fuel efficiency standards for vehicles, and tighten second-hand import regulations. ^{EU} ▪ Introduce carbon-differentiated vehicle taxation to incentivize the adoption of cleaner vehicles. ▪ Introduce regulatory requirements for early electrification of highly utilized fleets (e.g., buses, taxis, car-sharing, and public fleets). ▪ Establish a clear policy framework for the deployment of charging infrastructure, facilitating private sector participation. ▪ Prioritize collective and active mobility over private motorized transport in urban and metropolitan areas. ▪ Improve governance and enforcement of emission testing in roadworthiness inspections. 	<ul style="list-style-type: none"> ▪ Finance pilot projects to start developing EV charging infrastructure along main corridors. ▪ Support low-interest finance for the early e-mobility transition of highly utilized fleets. ▪ Introduce dedicated infrastructure for exclusive circulation of public transport vehicles along key urban corridors. ▪ Invest in continuous, integrated, and safe non-motorized transport infrastructure. ▪ Use public-private partnerships in combination with EU funds to attract private investment in areas that can generate long-term revenue streams, such as rail transport. 	<p>Urgency  Ease of implementation </p>
<ul style="list-style-type: none"> ▪ Introduce minimum regulatory requirements for the rollout of publicly accessible EV charging points, gradually converging with those of the EU AFIR for both light- and heavy-duty vehicles. ^{EU} ▪ Introduce low-emission zones with gradual and growing levels of restriction over time. ▪ Implement parking management strategies to discourage private car use and recover public space, including controlled parking zones and parking charges. ▪ Explore alternative financing schemes for urban mobility, such as land value capture for transformative projects. ▪ Expand private sector participation in infrastructure, services, and emerging transport modes (e.g., Mobility as a Service (MaaS) and urban logistics) through public-private partnerships. ▪ Improve the market orientation of transport operators, and encourage private participation. ▪ Reform transport SOEs, enable their access to finance, appoint professional boards of directors, and divest state-owned enterprises of non-core business activities. ^{EU} 	<ul style="list-style-type: none"> ▪ Invest in improved public transport and pedestrian and cycling accessibility. ▪ Support, with decreasing participation over time, the rollout of publicly available charging infrastructure for electric mobility. ▪ Upgrade and expand infrastructure at border-crossing points on critical transport corridors within WB6 to achieve fully functioning one-stop shops, and between the WB6 and EU neighbors. ^{EU} 	<p>Urgency  Ease of implementation </p>

Policy Actions	Investments	Prioritization
<ul style="list-style-type: none"> Introduce the gradual phaseout of ICE vehicles among new registrations. 	<ul style="list-style-type: none"> Revitalize and expand rail infrastructure through investment, improving service quality and competitiveness for both passenger and freight transport. Make the Core rail network compliant with TEN-T standards by 2035 (per the Western Balkans Sustainable and Smart Mobility Strategy). 	Urgency  Ease of implementation 
Policy area: DM5: Residential and commercial sector		
<ul style="list-style-type: none"> Enhance EE standards for buildings and reinforce compliance.  Develop a roadmap for sustainable heating. 	<ul style="list-style-type: none"> Set up national programs for public building energy-efficient (EE) social housing. Provide incentives for EE and distributed RE in private buildings, including electrification of heating through heat pumps and installation of rooftop solar PV systems. 	Urgency  Ease of implementation 
Policy area: DM6: Industry		
<ul style="list-style-type: none"> Enhance EE standards for industry and reinforce compliance.  Facilitate the use of rooftop photovoltaics on industrial/commercial facilities. Stimulate replacement of old and inefficient production technology. 	<ul style="list-style-type: none"> Provide favorable green credit lines with performance-based grant component. 	Urgency  Ease of implementation 
	<ul style="list-style-type: none"> Provide incentives for selected pilot investments for industrial CCS and green hydrogen production. 	Urgency  Ease of implementation 
Policy area: DM7: Agriculture and Food Systems		
<ul style="list-style-type: none"> Improve policy actions to support mitigation options that reduce the GHG intensity of agriculture and livestock, by changing agricultural production and cattle-farming practices without harming yields and productivity and by shifting demand to lower-GHG intensive agricultural and livestock products. Support the long-term management and preservation of soil carbon as a critical mitigation measure for agricultural productivity because it increases soil fertility, reduces erosion, and increases moisture retention. Reduce livestock methane emissions by investing in manure management practices (e.g., anaerobic digestion, daily spread, pasture-based management, composting, and manure drying practices). Enable the transition to decarbonized power systems in agriculture, including for agricultural production, processing, and agrolistics. 	<ul style="list-style-type: none"> Invest in soil health and fertility by reducing emissions and enhancing soil carbon sequestration-nitrogen management and reducing nitrous oxide (e.g., minimize nitrogen application rates, apply fertilizers during periods of rapid crop growth), increase plant matter with practices such as no till or reduced cultivation, plant cover crops, and encourage compost application. Invest in Irrigation efficiency to reduce fossil fuel consumption and GHG emissions (e.g., drip irrigation and planting cover crops). Support investments in on-farm renewable energy production (e.g., solar panels, wind turbines, minimizing the use of petroleum-based pesticides and fertilizers and reducing dependence on fossil fuel for farming, processing, storage, and transportation). Support investments in agricultural landscape management (e.g., reforest rangelands, restore riparian zones, plant perennial trees, shrubs, and woody vegetation to store carbon, conserve water, and protect the soil from erosion). 	Urgency  Ease of implementation 

Policy Actions	Investments	Prioritization
Policy area: DM8: Education, training and skills		
<ul style="list-style-type: none"> Retrain current workers to develop skills necessary for the transition. Support the mitigation studies and research activities, including scientific research on decarbonization, absorption, forestry, and nature preservation. Systematically incorporate green skills and values into curricula throughout the education system. Reform vocational training and tertiary education by focusing on transferable skills across sectors transformed by the green transition (e.g., construction, renewables, environmental services, forestry, agriculture, engineering, and digital technologies). Use upskilling and reskilling to improve employability of the labor force and mitigate climate change in key sectors of the economy. 	<ul style="list-style-type: none"> Invest in the education and training system, in particular, cognitive skills and STEM curricula, as well as the socioemotional skills critical for the green transition. Invest in upskilling and reskilling to improve the employability of the labor force and mitigate climate change in key sectors of the economy, and retrain the most vulnerable occupations for safe or green occupations. Invest in R&D in the area of mitigation. Implement the investments listed in RA8: many of them will facilitate not only adaptation but also mitigation and decarbonization. 	<p>Urgency ● ● ●</p> <p>Ease of implementation ● ● ●</p>
Policy area: DM9: Urban		
	<ul style="list-style-type: none"> Invest in fuel management, compact city development, green and seismic-resilient buildings, and green public transport. 	<p>Urgency ● ● ●</p> <p>Ease of implementation ● ● ●</p>
Economic Management, Financing, and Institutional Readiness		
Policy area: EF1: Macroeconomic Stability		
<ul style="list-style-type: none"> Maintain fiscal policies to deliver sustainable debt levels. ^{EU} Create fiscal buffers to better manage uncertainty while balancing support to priority policies and investments. Manage fiscal risks to contain impact on public debt. 	<ul style="list-style-type: none"> Strengthen the institutional capacity to implement fiscal rules. Strengthen economic modeling and climate modeling capacities Enhance the quality and accuracy of the medium-term macroeconomic framework to better reflect climate considerations. Conduct fiscal risk assessments that include climate impacts. Include climate-related contingent liabilities (explicit and implicit) in budgets and fiscal projections to be better prepared when they occur. 	<p>Urgency ● ● ●</p> <p>Ease of implementation ● ● ●</p>
Policy area: EF2: Fiscal Reforms (mix of support programs and taxes to incentivize adaptation and mitigation)		
<ul style="list-style-type: none"> Remove explicit subsidies in the energy system. ^{EU} Scale up social safety nets to provide comprehensive support for vulnerable populations during times of economic transition and changes to the climate. Reduce tax expenditures and increase broad-based revenue mobilization to create fiscal space for adaptation and mitigation needs (support programs, investments). 	<ul style="list-style-type: none"> Enhance analytical capacity and strengthen institutions to deliver fiscal reforms. Enhance institutional capacity in revenue administration. Enhance outreach to stakeholders affected by climate change to tailor support programs. 	<p>Urgency ● ● ●</p> <p>Ease of implementation ● ● ●</p>

Policy Actions	Investments	Prioritization
<ul style="list-style-type: none"> ▪ 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. ▪ Develop policies and support programs to facilitate the energy transition by incentivizing research and development (including adoption) of green technologies. ▪ Invest in public infrastructure to support the integration of new technologies in electricity grids, public transport, broadband, recycling, planning of cities, etc. ▪ 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. ^{EU} ▪ Use part of carbon tax revenues to support social and economic programs for those affected by climate change or to incentivize changes (revenue recycling). ▪ Develop risk sharing/reduction programs through guarantees, long-term contracts based on the government's convening power for co-financing. 		
Policy area: EF3: Public Finance Management		
<ul style="list-style-type: none"> ▪ Re-evaluate the role of SOEs with a focus on aligning price incentives correctly, especially in competitive markets. ^{EU} ▪ Systematically integrate climate risk assessments in budgeting procedures to ensure public sector actively prepares for challenges posed by future climate change impacts. ▪ Introduce public financial management systems for climate budgeting to identify, allocate, and track spending-related climate mitigation and adaptation efforts. ▪ Conduct periodic reviews of social policies to ensure that new needs emerging from physical risks and transition risks are met. ▪ Strengthen public investment appraisal and implementation to include assessment of physical and transition risks from climate change. ▪ Improve the utilization of public funds for agricultural development by learning from the EU's green transition and Common Agricultural Policy (CAP). ▪ Adopt/enhance and implement Green Public Procurement. 	<ul style="list-style-type: none"> ▪ Strengthen analytical capacity and institutional ability to deliver public financial management reforms. ▪ Develop and implement robust climate budgeting and tracking mechanisms to monitor the effectiveness of climate-related spending and enhance transparency in resource allocation. ▪ Prioritize investments in low-carbon and resilient infrastructure projects to promote sustainability and climate resilience. ▪ Develop subnational planning and budgeting capacities and revenue collection modalities. ▪ Introduce and implement climate budget tagging. ▪ Develop a disaster risk financing plan, which considers risk layering and regional pooling, to manage contingent liabilities and protect. 	<p>Urgency </p> <p>Ease of implementation </p>

Policy Actions	Investments	Prioritization
Policy area: EF4: Climate Financing		
<ul style="list-style-type: none"> ▪ 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. ▪ Mobilize green financing through the issuance of debt instruments. ▪ Promote green financing by creating incentives for both private and public investments in green projects, sustainable technologies, and climate-resilient businesses. ▪ Promote the adoption of climate insurance across multiple sectors. ▪ Strengthen the public-private partnerships and concession policy framework to facilitate and streamline investments in green and climate-resilient projects. ▪ Develop the market for green bonds. ▪ Develop the Green Equity Fund. ▪ Consider mechanisms that allow quick financial response to disasters and access to social protection payments. 	<ul style="list-style-type: none"> ▪ Invest in green bonds issued by governments, municipalities, and corporations to finance environmentally friendly projects. ▪ Invest in measures to mitigate climate change impact on the financial sector to increase resilience and reduce risk premiums associated with climate related events. ▪ Develop and deepen local capital markets to support the issuance GSS bonds and trading in secondary markets. 	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>
EF5: Financial Sector Regulatory and Supervision Framework		
<ul style="list-style-type: none"> ▪ 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. ▪ 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. ▪ For financial sector and private sector update accounting and auditing legislation to capture exposure to climate risks 	<ul style="list-style-type: none"> ▪ 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. ▪ Establish a comprehensive national strategy and roadmap for green finance. ▪ 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. 	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>
Policy area: EF6: Resilient and Sustainable Growth		
<ul style="list-style-type: none"> ▪ Provide policy certainty for investors in climate responsive sectors, by regularly updating them on adaptation and mitigation policies and plans. ▪ Strengthen contestability in the economy, especially for sectors that are critical to respond to climate change; ensure regulatory frameworks are in place. ▪ Capitalize on policies and support programs to incentivize investment in adaptation and mitigation (see EF2). ▪ 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. ^{EU} 	<ul style="list-style-type: none"> ▪ Develop an open data system to track adaptation and mitigation challenges, making it valuable for consumers, entrepreneurs, and investors. For energy, provide detailed information on grid capacity and demand, particularly addressing price uncertainty, to inform energy and infrastructure planning. ▪ Appraise entrepreneurs, especially SMEs, on evolving needs for energy efficiency and for adaptation action. ▪ Promote training programs for green jobs to prepare the workforce for sustainable employment opportunities and the transition to a green economy. ▪ Enhance the EV supply chain by developing skills, improving regulations, and supporting SMEs through targeted programs. ▪ Develop R&D and support the commercialization and transfer of technologies specifically aimed at climate change solutions. 	<p>Urgency ●●●</p> <p>Ease of implementation ●●●</p>

Policy Actions	Investments	Prioritization
<ul style="list-style-type: none"> 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. Prepare in advance for the advent of CBAM through the use of cleaner energy. 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. Ensure policies for skills development, regulatory improvements, and SME capabilities are aligned to supporting green growth (see DM8). 		
Policy area: EF7: Planning and Coordination for Adaptation and Mitigation		
<ul style="list-style-type: none"> Strengthen integrated planning and cross-sectoral alignment of adaptation and mitigation policies for key priority sectors such as agriculture and energy, e.g., the coordination of climate matters at the highest government level through the prime minister's office. ^{EU} Ensure that national climate change committees/councils have an advisory role. Introduce an obligatory review of policy documents by such councils and the obligation for the government to consider their recommendations. Assign an active role for climate action to the subnational level. Introduce an obligation for LSGs to set GHG emission reduction targets and prepare GHG inventories. Explore the possibility of the Regional Cooperation Council to act as a hub for developing regional green innovation instruments to foster collaboration on climate. Establish monitoring, reporting, and verification (MRV) systems in compliance with EnC requirements. ^{EU} 	<ul style="list-style-type: none"> Allocate sufficient financing to ensure that the line ministries, subnational governments, and other relevant institutions have adequate staff to deal with climate change and continue to increase their technical capacities. Set up a capacity building/training plan, and introduce climate change training modules for the public administrations. 	<p>Urgency  Ease of implementation </p>
Policy area: EF8: Accountability and Citizen Engagement		
<ul style="list-style-type: none"> Set up a parliamentary committee for climate change. Set up mechanisms to provide independent advice to the government on climate matters. Introduce a clear mandate for the state auditors to review the implementation of climate policy. Facilitate citizen engagement and participation in the development of climate-related policies. 	<ul style="list-style-type: none"> Invest in the development of a Citizen Action Plan. Invest in partnerships and regular dialogue with stakeholders and civil society organizations to inform policies and investment decisions. Establish/enhance platforms and mechanisms to enable public access to reliable information on climate change. 	<p>Urgency  Ease of implementation </p>

