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WESTERN BALKANS 6

Montenegro
Country Compendium

World Bank Group

COUNTRY CLIMATE AND DEVELOPMENT REPORT

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Acknowledgments

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Abbreviations

A&R	Adaptation & Resilience
AAL	Average Annual Losses
AFIR	Alternative Fuels Infrastructure Regulation
AKIS	Agriculture Knowledge and Information Innovation System
ALMP	Active Labor Market Policies
BCR	Benefit–Cost Ratio
BUR	Biennial Update Report
CAPEX	Capital Expenditure
CBAM	Carbon Border Adjustment Mechanism
CCDR	Country Climate and Development Report
CCIA	Climate Change Institutional Assessment
CCS	Carbon Capture and Storage
CEP	Clean Energy Package
CC-MFMod	Macro-Structural Model with Climate Module
CPAT	Carbon Price Assessment Tool
CPS	Carbon Pricing Scenario
DRF	Disaster Risk Financing
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EC	European Commission
ECA	Europe and Central Asia
EE	Energy Efficiency
EnC	Energy Commission
ETS	Emissions Trading System
EU	European Union
EU-27	The 27 EU Countries
€	Euros
EV	Electric Vehicle
EWS	Early-Warning Systems
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Geographic Information Systems
GW	Gigawatt
IEA	International Energy Agency
INDC	Intended Nationally Determined Contribution
IPARD	Instrument for Pre-Accession Assistance Rural Development Programs
IPPU	Industrial Processes and Product Use
KINESYS-WB6	Knowledge-Based Investigation of Energy System Scenarios for The WB6
LULUCF	Land Use, Land-Use Change and Forestry
MO	Poverty-Targeted Material Support
MRE	Monitoring, Recording and Evaluation
MRV	Monitoring, Reporting and Verification (of GHG Emissions)
$MtCO_2eq$	Million Tons of CO_2 Equivalent
Mtoe	Millions of Tons of Oil Equivalent
MW	Megawatts
NAP	National Adaptation Plan
NBS	Nature-Based Solutions
NCASPD	National Climate Actions Strategies and Policies Database
NCSD	National Council for Sustainable Development
NDA	Ministry of Sustainable Development and Tourism
NDC	Nationally Determined Contribution
NEAS	National Environmental Approximation Strategy
NECP	National Energy and Climate Plan
NGO	Nongovernmental Organization
NPV	Net Present Value
NZE	Net Zero Emissions Scenario
NZE-HG	Net Zero Emissions Scenario with Higher Growth
OECD	Organization for Economic Co-Operation and Development
OPEX	Operational Expenditure
PISA	Program for International Student Assessment
PPCA	Powering Past Coal Alliance
PPPs	Public–Private Partnerships
PPP	Purchasing Power Parity
PV	Photovoltaic
RCP	Representative Concentration Pathway
RE	Renewable Energy

RS	Reference Scenario
SDG	Sustainable Development Goal
SNG	Subnational Governments
SOE	State-Owned Enterprise
STEM	Science Technology Engineering Mathematics
SWIS	Social Welfare Information System
TEN-T	Trans-European Transport Network
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
US$	United States Dollar
WAM	With Additional Measures
WB6	The Six Western Balkan Countries: Albania, Bosnia And Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia
WBG	World Bank Group
WDI	World Development Indicators
WEM	With Existing Measures
ZHMS	Institute for Hydrometeorology and Seismology of Montenegro

Executive Summary

Montenegro is a small country in the Western Balkans that has significantly improved the living standards of its people in the past decade, but this has come with environmental and health impacts that are not altogether favorable. Among the six Western Balkan countries (WB6), Montenegro has the highest GDP per capita at purchasing power parity (PPP). With substantial investments in transport and tourism, the country's recent investment growth is roughly on par with that of the fast-growing East Asian economies. But its growth has been resource-intensive. Montenegro's carbon and energy intensities are both higher than the European Union (EU) average because of its reliance on the Pljevlja coal-fired power plant and inefficient practices in the industrial, building, and transport sectors. While its energy balance is mainly supported by hydroelectricity and wind power, the continued use of coal and firewood in heating has led to significant greenhouse gas (GHG) emissions and poor air quality, exacerbated by heavy vehicle traffic in populated areas. Although total GHG emissions have declined since 1990, with significant forested areas contributing to that decline, the country will need additional investments and policy measures to meet its climate targets.

Montenegro's climate change policies are, in part, shaped by various external drivers and international commitments; internally, it needs to make more progress by not only intensifying its own climate ambition but strengthening its capacity to actualize that ambition. Externally, the country is party to the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement. As a contracting party to the Energy Community Treaty, Montenegro has also committed to harmonizing its energy and climate legislation with the EU acquis.[1] Montenegro is one of the most advanced Energy Community contracting parties in its adoption of legislation related to climate change mitigation, but implementation and enforcement need further improvement. While the country has expressed its intention to take steps, along with the rest of the EU, toward achieving a carbon-neutral continent by 2050, it has not yet set an individual net zero target. Montenegro lags other WB6 countries in the development of its national energy and climate plan (NECP), but it leads the region in its ongoing development of a Low Carbon Development Strategy, and its membership in the Powering Past Coal Alliance (PPCA) is a sign of its commitment to joining other EU nations to transition away from coal. Montenegro has also been the frontrunner in carbon pricing with the implementation of an emissions trading scheme (ETS) in 2020, but the system has had significant challenges around price discovery and market liquidity. The World Bank's Climate Change Institutional Assessment (CCIA) for Montenegro states that the country is "emerging" in its institutional readiness to respond to climate change. Although it has legal and regulatory structures in place, policies need to be better integrated across ministries to ensure effective implementation. Additionally, the government needs to stress the importance of human capital because declining educational outcomes, persistent inequalities in education, and a high share of long-term unemployment undermine the country's ability to implement a green transition smoothly. Developing its human capital will be critical to ensure that Montenegro has the skills needed to respond to the evolving demands it will encounter on the path toward net zero.

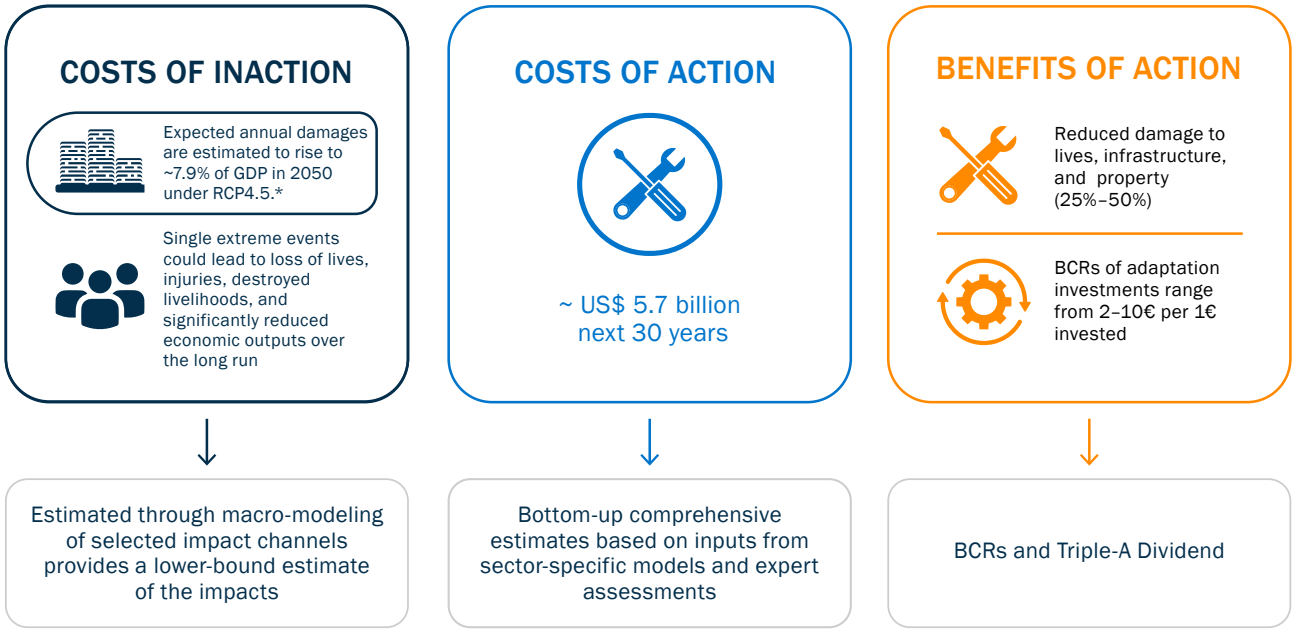
Montenegro is a small, predominantly mountainous country with high climate variability and frequent extreme weather events. Numerous parts of the country show high exposure to floods, earthquakes, and landslides. Between 1991 and 2013, Montenegro had six devastating floods, a worrisome pattern because 60 percent of its population reside in areas with a high probability of magnitude 8 or greater earthquakes on the Richter scale. Flooding affects about 10,000 people a year and cause an average of US$90 million in damage; earthquakes affect around 9,000 people and average US$70 million in damage. As much as 51.0 percent of the country's total area is susceptible to high or very high landslide risks. Because of climate change, heat stressors are also rapidly intensifying: droughts, wildfires, and heatwaves are already affecting an increasing number of people and sectors of the economy. Weather- and climate-related disasters have

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

already generated significant physical and economic losses in Montenegro, especially in major sectors such as agriculture and transport. The 2010 flood affected some 30,000 hectares of agricultural land, with losses of about €44 million. If no investments are made to adapt to the changing climate, natural hazards could lead to up to a 7.9 percent reduction in GDP, depending on the climate change scenario. The most significant economic damage will result from floods, but it is also expected that other impact channels like droughts and heat stress will negatively impact the economy, albeit at lower magnitudes.

The costs of investing in adaptation are undoubtedly high, but the costs of inaction are even higher, as are the benefits of action. Montenegro would need to invest in US$5.7 billion (in 2020 dollars, undiscounted) over the next decade to protect people and property from the damaging and escalating impacts of climate change (Figure ES.1). This initial comprehensive adaptation investment package would cost equivalent to around 1.5-2.3 percent of GDP per year until 2050. Investments in adaptation would yield a "Triple-A Dividend" of three types of benefit: (i) avoided losses, (ii) accelerated economic potential, and (iii) amplified social and environmental co-benefits. Implementing adaptation climate actions at the national level would greatly reduce the human and economic losses from disasters and climate events and facilitate human capital development.

FIGURE ES.1: SUMMARY OF ADAPTATION INVESTMENT NARRATIVE



Source: World Bank analysis.
Note: GDP = gross domestic product, RCP = representative concentration pathway, BCR = benefit-cost ratio.
* The macroeconomic model yields annual estimates for damages based on the expected annual loss from each climate hazard. The expected damages are projected to grow over time, reflecting increasingly unpredictable and volatile climate conditions. Combined damages from the drought impact on maize and wheat, heat stress on labor productivity, and riverine floods, are estimated to be 7.9 percent of GDP under RCP 4.5 in 2050 for Montenegro.

Adaptation investments and projects could also lead to employment growth, an improvement in skills, and increased trade opportunities. Investments such as enhancing urban adaptation would likely strengthen cities' resilience in the face of floods and other climate events while generating social and environmental co-benefits like enhanced energy efficiency, better air quality, spatial attractiveness, and protection of public health. In the capital city, Podgorica, a series of adaptation measures have been implemented, including both structural measures including green infrastructure, water system, urban structures, and building designs and nonstructural measures such as regulations and awareness raising campaigns. Moreover, investing in nature-based solutions (NBS) promotes adaptation while yielding substantial co-benefits for the ecosystem and local communities, especially the vulnerable and those in mountainous and downstream areas. NBS for

flood prevention can yield high net benefits, with benefit–cost ratios that are generally greater than 2, up to 12 for peatland restoration, and up to 18 for floodplain restoration. Lastly, investing in human capital helps adapt systems through improved education and productive skills, assists in identifying health issues early, and protects vulnerable populations from impoverishment.

With Montenegro's natural assets, in particular its large forestry carbon sinks, accelerating the energy transition to achieve economy-wide, net zero emissions by 2050 is feasible, but it will still require significant transformation and decisive action. An energy system modeling analysis carried out as part of the WB6 Country Climate and Development Report (CCDR) to assess sectoral decarbonization pathways for the WB6 countries showed that achieving economy-wide, net zero GHG emissions by 2050 would require a moderate to small expansion of investments (depending on the year) to decarbonize the power sector, compared to what would be expected without a net zero target. Electricity generation from coal would be substantially reduced but could still account for a small share of electricity generation by 2050 (offset by the carbon sink). Most of the electricity would be generated by wind and solar, with grid balancing supported by the country's existing hydroelectricity capacity. This hydro capacity will offset the intermittency of wind and solar, limiting the need for investment in battery storage. Achieving net zero would require ambitious policies to support significant energy efficiency improvements across all sectors, especially in buildings and industry. The transition of the heating and transport sectors toward electricity-based technologies will be critical in reaching this goal.

The target of net zero by 2050 can be achieved with a small macro-fiscal impact on the economy's current potential growth. Overall, compared to a reference scenario (RS),[2] Montenegro would need to invest in the energy system an additional US$235 million until 2050 (expressed in present values and 2020 dollars) to achieve economy-wide net zero, equivalent to about 0.2 percent of GDP per year on average. This will be distributed unevenly over time, at around 0.1 percent of GDP on average until 2030, 0.4 percent of GDP during 2031-2040 and 0.1 percent of GDP during 2041-2050. Most of the incremental investment until 2050 would go to the power sector and would be directed mostly toward the scale-up of solar PV and wind capacity. The next major investment will be in transforming the transport sector, with significant investment needed in rail infrastructure. The impact of decarbonization investments on domestic output would be modest relative to the significant emissions reduction: GDP per capita would be only 0.7 percent lower in 2050 compared to the RS under trend growth.

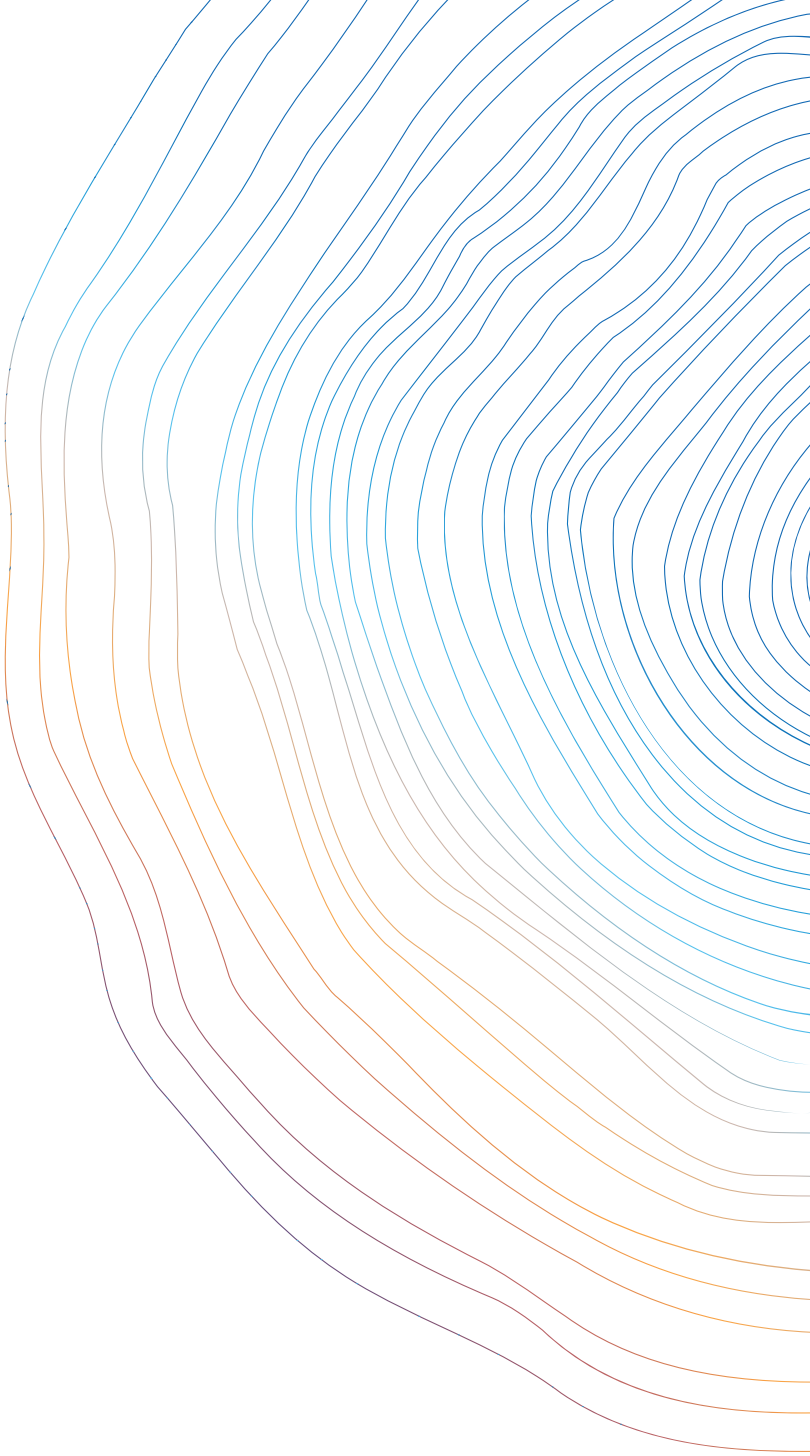
More than 70 percent of the additional capital investments needed to meet the decarbonization target could be undertaken by the private sector. Raising capital to finance climate change-related investments also requires creating an enabling regulatory environment. Mobilizing financing for the green transition would require issuing green bonds, accessing public–private partnerships (PPPs), and tapping into EU pre-accession financing, IFI financing, and guarantees.

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

[2] 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.

Adaptation and mitigation can be part of a sustainable growth strategy that delivers higher productivity. Montenegro can use the climate change adaptation and mitigation measures as opportunities to achieve a more sustainable growth model with higher productivity. To do so, it will need to (i) strengthen competition and improve the business environment (including improving the SOE governance), (2) better leverage foreign trade, (3) improve the quality of human capital, and (4) strengthen public sector capacity. The public sector's response needs to be three-fold. First, to adopt policies that mitigate the economic and social impact of climate change by incentivizing private sector and household action (i.e. zoning, insurance, financing instruments, carbon pricing, incentives for research and innovation, etc.). Second, strengthening efficiency of public spending (i.e. social assistance, education, pharmaceutical spending, etc.). Third, increase fiscal space by bolstering domestic revenue mobilization through, inter alia, taxation of environmentally- and health harmful products and activities, while reducing tax expenditures and increasing the tax base by reducing the informal economy. These would allow Montenegro to actively monitor and manage fiscal risks from climate change.

The report ends with a summary of recommendations for policy reform and investments, along with the complexities and timelines likely to be associated with implementation. The recommendations focus on what could and should be done in the short term (until 2030), with an eye to laying the groundwork for the scale-up of climate action in the subsequent decades. The recommendations span (i) resilience and adaptation, (ii) decarbonization and mitigation, (iii) macroeconomy and financing, and (iv) regulatory/institutional frameworks, education, and labor.



Chapter 1

Introduction: setting the scene

1.1. Climate and development context

Montenegro has made very significant efforts to improve its living standards in recent years. Economic growth has been driven by investments in large transport and tourism projects, undertaken primarily to overcome the natural challenges posed by the country's geography, and to capitalize on high-end tourism, which has supported the balance of payments. Gross fixed capital formation averaged 21 percent of GDP in 2009–2015 and 27 percent of GDP in 2016–2019, similar to levels achieved by fast-growing East Asian countries. As a result, per capita income in PPP terms (in constant 2017 dollars) rose from US$16,348 in 2009 to US$21,534 in 2019—a per capita growth rate that averages nearly 3 percent a year.

However, past growth strategies have left Montenegro with some significant vulnerabilities. Although the country has experienced growth spurts from time to time—for example, vigorous growth from its independence in 2006 until 2009, driven by large foreign real estate investments, and again from 2015 to 2019, driven by large public infrastructure investments and tourism—average growth has been limited by economic downturns that have been more severe than in peer countries. Additionally, these "boom period" investments tended to boost GDP growth mostly during the construction period itself, which meant the economic development tended to be short-lived and to create jobs in mostly low value-add sectors, with limited productivity spillovers to the rest of the economy. These investments also increased Montenegro's fiscal vulnerabilities because they necessitated large deficits and external imbalances because of their high import dependence. High capital inflows and public investments without commensurate productivity increases have therefore left the economy more vulnerable to external shocks.

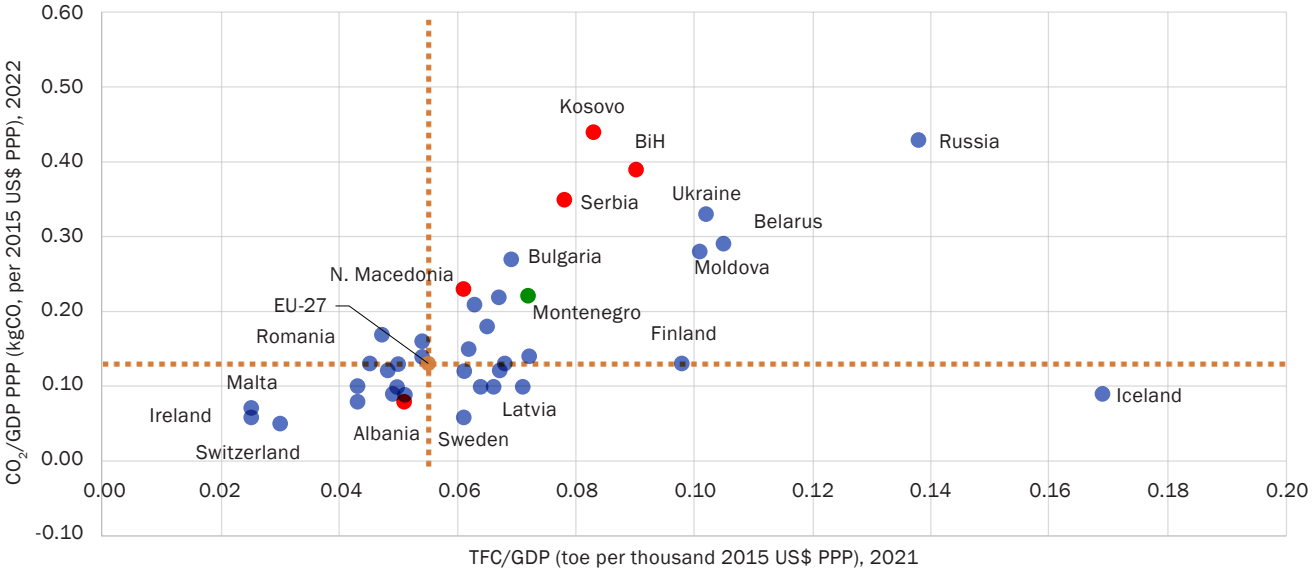
Montenegro's partial dependence on fossil fuels is holding back its energy transition and sustainable economic growth. As the smallest Western Balkan country, with a population of about 620,000, but with the highest GDP per capita at purchasing power parity (PPP), Montenegro has an ambition to accede to the EU. It has committed itself to achieving its growth ambitions sustainably, declaring itself an "ecological state" in the national constitution. Montenegro's carbon and energy intensities are lower than in three coal-dominated Western Balkan neighbors but higher than the EU average (Figure 1.1). This is driven not only by the dependence on the Pljevlja coal-fired power plant but also by widespread energy-inefficient practices in key sectors like industry, buildings, and transport. In continuous operation for the past 40 years, Pljevlja is Montenegro's only thermal power plant. The 230 MW plant typically provides 30–40 percent of the country's electricity but, depending on the time of year, can provide 100 percent. Montenegro's electricity balance is mainly supplied by hydro and wind, which account for 50 and 10 percent of total supply, respectively.[3] The construction of new hydropower plants faces public opposition and requires regional cooperation for managing the transboundary Drina River Basin, balancing the needs of the tourism, agriculture and energy sectors. The use of coal and firewood for household heating leads not only to GHG emissions but also to poor air quality, exacerbated by heavy traffic, especially in the capital and central areas.[4]

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, Montenegrin firms can seek EU funds for research, development, and innovation in green and digital technology. The EU Growth Plan for the Western Balkans incentivizes the region's preparations for EU membership and accelerates reforms via the €6 billion Reform and Growth Facility in 2024-2027, with €383 million tentatively allocated to Montenegro, subject to the achievement of the payment conditions. The EU Carbon Border Adjustment Mechanism (CBAM), on the other hand, may pose a risk for targeted industries, as well as an opportunity for accelerating their decarbonization (refer to Section 1.3.2 in the Western Balkans 6 CCDR report).

[3] REGAGEN, Energy Sector Report Montenegro 2021 (2022). https://regagen.co.me/en/main-documents/energy-sector-report-montenegro-2021/

[4] UNECE, UNDA Project: Montenegro – Improving air quality https://unece.org/environment-policy/environmental-performance-reviews/unda-project-1819ae-montenegro-improving-air

FIGURE 1.1: Energy intensity vs. carbon intensity of European countries



Source: IEA (2021); World Indicators; IEA (2022)

Located in South-Eastern Europe, Montenegro is a small, predominantly mountainous country highly exposed to overlapping natural and climate hazards, including floods, earthquakes, droughts and landslides. Floods, the main hazard in Montenegro, affect 10,000 people a year, causing an average annual loss of US$90 million. Meanwhile, under the effect of climate change, heat-induced hazards, such as droughts, wildfires, and extreme heatwaves, are also intensifying and lead to significant economic losses. Currently, 36.3 percent of Montenegro's forests are exposed to very high wildfire risk, and more than 18,000 hectares of forests were damaged or destroyed by wildfires between 2005 to 2015.[5] In 2019, weather-related damage accounted for 82 percent of costs in the transport and road network, while in 2022, droughts led to losses of €100 million in hydroelectric power generation.[6] In Montenegro, the effect of climate hazards is often localized and is influenced by factors such as urbanization, settlement patterns, and population growth. A significant number of people and their assets are exposed to a high risk of natural disasters because of unplanned urban development and land use. Densely populated urban areas and river valleys, and coastal areas where a large numbers unplanned and unregulated constructions have been built, are highly exposed to floods and other disaster risks. Montenegro's 25 municipalities also all face different levels of socioeconomic stresses that interact with, and are compounded by, climate shocks.

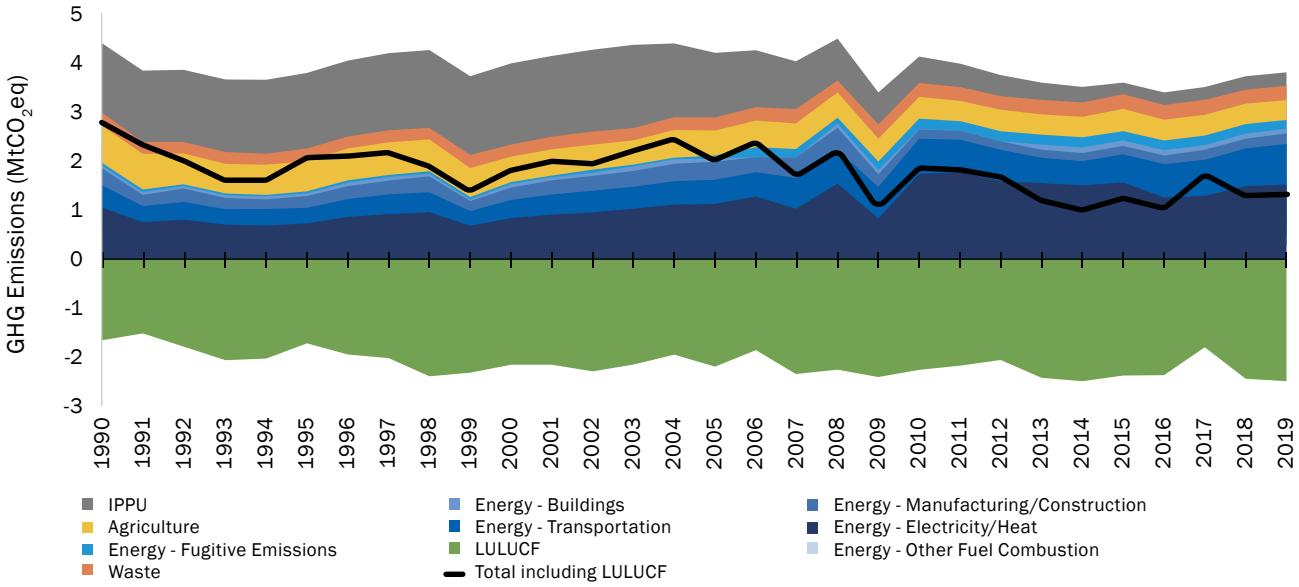
Montenegro has been decoupling its growth from emissions since 1990, with the carbon sink effect of the Land Use, Land-Use Change and Forestry (LULUCF) sector, and the closure or shrinking of several major industries, playing major roles in reducing emissions. Total greenhouse gas (GHG) emissions have declined since 1990 (Figure 1.2) even though GDP per capita has increased—evidence of the decarbonization of the economy. Montenegro emits less GHG than any other WB6 country: approximately 3.8 $MtCO_2eq$ without LULUCF (1.3 $MtCO_2eq$ with LULUCF) in 2019.[7] The biggest emissions sectors are electricity and heating (40 percent of total emissions without LULUCF), transport (21 percent), and agriculture (10 percent). Since forests cover nearly 62 percent of the country, LULUCF is the most important component of Montenegro's GHG emissions profile, unlike in the other countries in the region, and its role has grown since 1990 through various forest management programs (Figure 1.2). Emissions from industrial processes and product use (IPPU) fell significantly because of Montenegro's deindustrialization after gaining independence in 2006.

[5] Regional Fire Monitoring Center, Forest Fire Country Studies: Montenegro (2015), https://gfmc.online/intro/2015/update-1052/RFMC-REC-Country-Report-Forest-Fires-2015-Montenegro.pdf

[6] Igor Todorović, "Drought to cost Montenegro's EPCG utility €100 million in third quarter," Balkan Green Energy News, August 1, 2022, https://balkangreenenergynews.com/drought-to-cost-montenegros-epcg-utility-eur-100-million-in-third-quarter.

[7] The CCDR analyzes WB6 emissions in 2019 because the data from 2020–2021 are not representative, owing to the COVID-related economic slow-down, or not available for Kosovo.

FIGURE 1.2: GHG emissions in Montenegro, by sector



Source: Source: CAIT (2023).

1.2.Climate change commitments and strategies

Montenegro's climate change commitments are primarily driven by its obligations under the United Nations Framework Convention on Climate Change (UNFCCC) and its orientation toward the EU. In June 2021, under the UNFCCC's Paris Agreement, Montenegro submitted an enhanced Nationally Determined Contribution (NDC), setting a more ambitious emissions reduction target (Table 1.1) and listing 18 mitigation policies and measures, 14 of which are related to the energy sector (including transport), followed by industry (2) and waste (2). Because of the country's ambitions for accession to the EU, it aims to align with the European Green Deal and contribute to achieving the target of Europe becoming the first climate-neutral continent by 2050. This was affirmed by becoming a signatory to the Sofia Declaration on the Green Agenda for the Western Balkans (2020). But Montenegro's legislation and policy documents have not yet set a net zero target. As a contracting party to the Energy Community Treaty, Montenegro must harmonize its energy and climate laws with EU legislation and adopt a National Energy and Climate Plan (NECP), with measures until 2030, consistent with the Clean Energy Package adopted by the Energy Community in December 2022 (Table 1.1). As of December 2023, Montenegro is the only WB6 country without an advanced NECP draft released for consultation. The key climate-related national laws and strategies are listed in Table 1.2.

TABLE 1.1: Key targets

Enhanced Nationally Determined Contribution, 2021	Clean Energy Package – 2030 targets for Montenegro			
GHG emissions reduction target for 2030 (excl. LULUCF)	**Net GHG emissions reduction by 2030 (with LULUCF)**	**Emissions level in 2030 $MtCO_2eq$**	**Share of energy from RES in gross final consumption in 2030***	**Final energy consumption in 2030 (Mtoe)**
-35% compared to 1990 level (vs. 30% in the first NDC, in 2017)	-55% compared to 1990 level	2.4	50% vs. the target of 33% by 2020	0.73

Sources: Montenegro's NDC; https://www.energy-community.org/implementation/package/CEP.html.
Mtoe = Millions of tons of oil equivalent.

Table 1.2: Key national laws and strategies

	Paris Agreement			Strategies				Laws			
	Entry into force	NDC last update	LT-LEDS	NECP	Climate Change Strategy	National Adaptation Plan	Energy Strategy	Law on Climate Change	Law on Air Protection	Law on Energy Efficiency	Law on Renewable Energy
Status	Nov 2016	Jun 2021	» (until 2050)	»	✓ (until 2030)	»	✓ (until 2030)	✓	✓ (needs to be aligned with EU acquis)	✓	✓

Source: World Bank compilation of various energy national laws and strategies. Note: Green: Document approved and valid. Blue: Draft document exists but has not yet been approved. Red: Document does not exist or has expired.

The strategic basis for adaptation to climate change is under development, and several other information assets are in place to address climate change risks. The Ministry of the Interior has finalized the Proposal of the Disaster Risk Reduction Strategy 2025-2030 with the Action Plan for 2025/2026. The strategy will contribute to disaster risk reduction, including the coordination and implementation of preventive measures, crisis management, and ensuring the safety and security of citizens during natural or induced disasters. The National Adaptation plan is under development, to be adopted in July 2024. The Ministry of Interior developed comprehensive national-scale hazard maps in 2021. Hazard maps are presented in digital form but not in the GIS format. Sea-level rise hazard maps have also been developed for the coastal region. An early-warning system exists mainly for hydrometeorological extreme events (events related to temperature, precipitation, storms, snowfalls, and so on) and is managed by the Institute for Hydrometeorology and Seismology.

Montenegro is one of the most advanced Energy Community contracting parties in terms of adopting legislation related to climate change mitigation, but implementation and enforcement need further improvements. The key policy instruments for managing climate action in Montenegro are the National Climate Change Strategy by 2030 (adopted in 2016), and the Law on Protection against Adverse Impacts of Climate Change (adopted in 2019 but expected to be amended to transpose the obligations related to MRV and governance).[8] A Low-Carbon Development Strategy to 2050 and its five-year Action Plan, expected to be finalized in 2025, are also being prepared with World Bank support. Montenegro has joined the Powering Past Coal Alliance (PPCA) and committed to participating in the "Coal Regions in Transition" initiative for the Western Balkans. The country has made significant progress in stimulating energy efficiency, notably in buildings, and has attracted high investor interest in both utility-scale renewable energy generation and small-scale prosumer installations. But it still needs to finalize national legislation and address existing barriers.[9]

Montenegro is a carbon pricing frontrunner whose challenging attempt to establish an Emissions Trading System (ETS) offers the whole region a set of valuable lessons and takeaways. Since 2020, the country has had an ETS that covers the power and industrial sectors. Auctioned allowances are subject to a minimum price of €24 per ton,[10] and revenues from the ETS are directed to an Eco Fund that supports environmental protection and climate change action. The government, supported by the World Bank, is reviewing the ETS framework because the existing system has struggled with price discovery and liquidity. The ETS covers only three entities but more recently it has covered just one because of the lower production levels at the other two. Lessons from Montenegro are particularly valuable because the Energy Community is considering introducing a regional-level ETS for the WB6. The difficulties with Montenegro's ETS highlight the importance of having of all the vital components in place—in particular, enough trading entities with good financial health for price discovery, a tight emissions cap aligned with climate goals, clear legislation on trading, free allowances, and revenue utilization, a realistic baseline year, and effective fines for noncompliance.[11]

[8] Energy Commission (EnC), Report on the Implementation of the Declaration on Energy Security and Green Transition in the Western Balkans (Vienna, Austria: Energy Commission Secretariat, 2023), https://www.energy-community.org/dam/jcr:2229718d-018e-4643-858f-3765129f8c04/ECS_Report_on_Declaration_WB6.pdf.

[9] EnC, Report on the Implementation of the Declaration.

[10] That said, two-thirds of the emissions from certain energy-intensive regulated entities, including a steel mill, an aluminum plant, and the Pljevlja coal plant, are allocated free allowances.

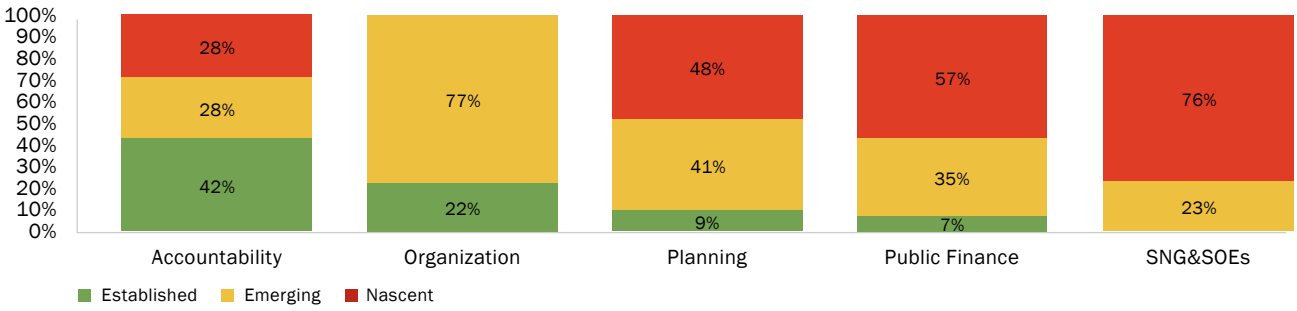
[11] Gallop, P., The cautionary tale of Montenegro's emission trading scheme, (2022) https://bankwatch.org/blog/the-cautionary-tale-of-montenegro-s-emission-trading-scheme

A monitoring, reporting, and verification (MRV) system is under preparation with an anticipated finalization in 2025. The Law on Protection from the Negative Impacts of Climate Change requires the establishment of an MRV system for GHG emissions, and Montenegro's Environment Protection Agency is responsible for the development of the GHG inventory.

1.3. Institutions, policies and capacities

Montenegro's institutional maturity for addressing climate change is characterized as "emerging," according to the World Bank's Climate Change Institutional Assessment (CCIA), which examines a country's capacity to plan, implement, and sustain climate change policies over multiple political cycles by analyzing 74 indicators across five pillars. The indicators score different aspects of countries' institutional maturity for climate action as "nascent," "emerging," or "established," with further breakdown within each of these categories. Since the CCIA is a point-in-time analysis, the findings may fail to capture certain recent developments because of the rapid pace of regulatory and institutional development across the region. Nevertheless, it serves as a useful empirical baseline to highlight achievements and gaps across the region, helping to inform peer learning and innovation in climate action. Annex A outlines the CCIA methodology and summarizes the CCIA results, which demonstrate that across three pillars — Organization, Accountability and Public Finance—Montenegro's institutional maturity is more advanced than the Western Balkans average, but it ranks as less advanced in the Planning pillar primarily because of the missing National Energy and Climate Plan. The level of ability and action varies from pillar to pillar, as demonstrated in Figure 1.3.

FIGURE 1.3: Montenegro's institutional maturity for climate action, by CCIA pillar



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

Montenegro has a legal and regulatory framework for climate action, but the institutional structures lack capacity. The Law on Protection from the Negative Impacts of Climate Change (2019) regulates key elements of Montenegro's climate policy and institutional framework, complemented by secondary legislation. The Ministry of Ecology, Sustainable Development and Northern Region Development is leading climate change actions, while several other ministries have an implicit mandate for mitigation or adaptation. Responsibility for disaster risk management is clearly assigned to the Ministry of Interior and local self-governments, which have different levels of capacity. To enable effective horizontal and vertical integration and implementation of climate change policies across sectors, the Ministry of Tourism and Ecology needs to strengthen its capacity and receive higher political support. The National Council for Sustainable Development (NCSD), headed by the prime minister, has an advisory role and is, in principle, responsible for sectoral coordination on issues including climate change and just transition, but in practice its mandate is limited. The overall need for increasing institutional capacities for climate action has been recognized and documented in the process of negotiating for EU accession.

Montenegro's public finance management framework does not include climate change considerations, but initial steps are being taken in this direction. The regulatory framework for public finance management does not foresee specific rules for tracking climate change revenues and expenditures. A donor-supported initiative aims to introduce budget tagging into national public finance management and link it to the national

MRV system. The law on public procurement prescribes the application of the principle of environmental protection and efficient use of resources, but green public procurement practices are not used in practice.

Montenegro's national climate finance mechanism is established and operational, but its operational practices need improvement. The Fund for Environment Protection, established in 2018 — the Eko Fund — is budgeted from the ETS and environmental tax revenues and finances green investments such as green transport, the development of renewable energy sources, and waste management. But there have been issues with the use of the funds, indicating that the transparency and efficiency of financing needs to be enhanced. There are no dedicated funds for climate change adaptation measures.

Montenegro has functioning systems for enabling access to climate change information and for stakeholder engagement, but there is room for strengthening accountability mechanisms. Current legislation prescribes obligatory public consultations for all policy documents, and a web portal for e-consultation has been established. The Parliament has a board for environmental protection but not for climate change, and there is no evidence of court authority to review climate inaction. According to publicly available information, the Montenegrin State Audit Institution has not reviewed the implementation of climate change policy *per se,* but its review of progress in achieving the United Nations sustainable development goals (SDGs) demonstrates that Montenegro is not on track, including SDG 13 — Climate action.

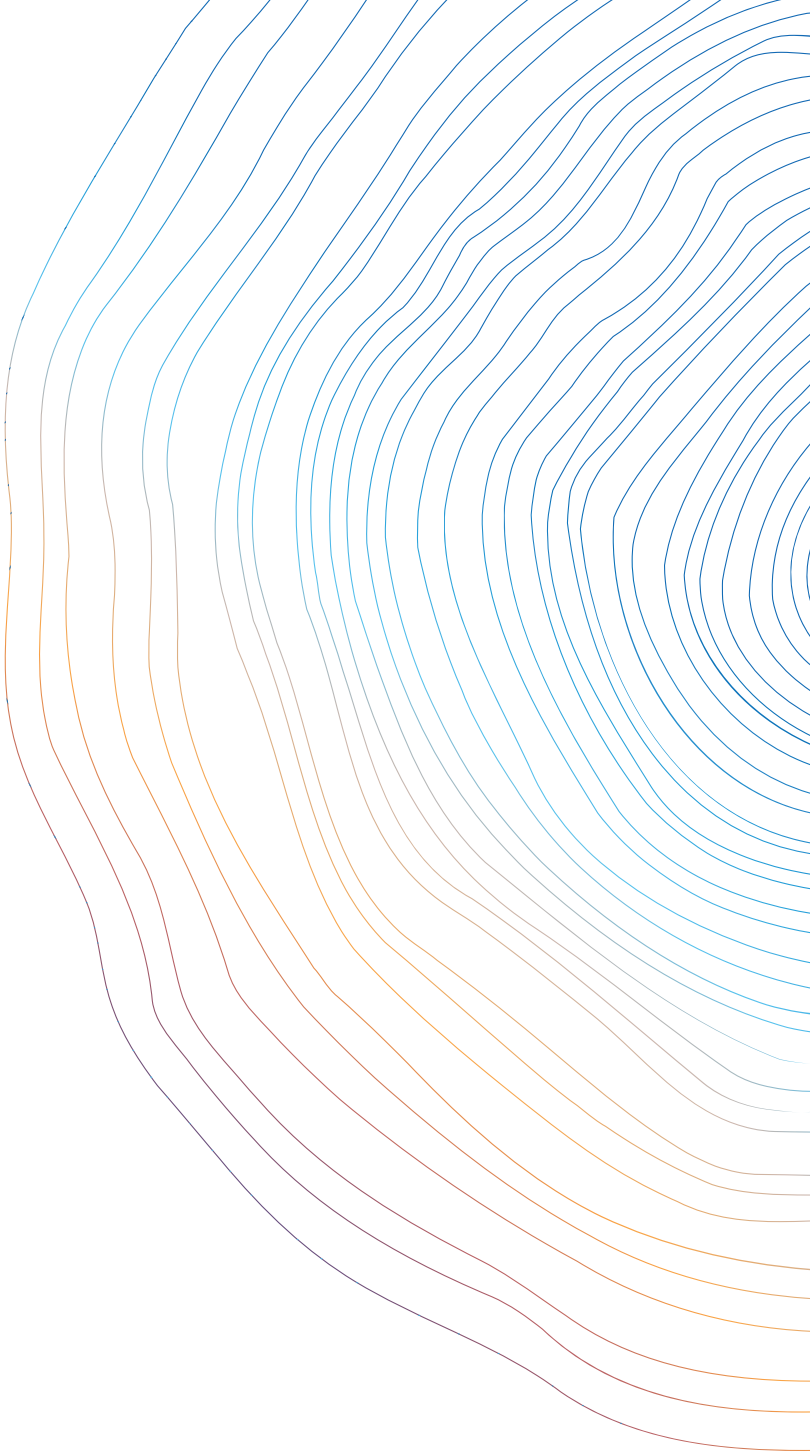
Human capital will be critical for climate action, but its development in Montenegro faces significant challenges. The country's Human Capital Index score is 0.63,[12] which means that almost a third of the human potential in the country is not being utilized. PISA 2022 assessment results for Montenegro released in 2022 showed declining performance, with below-average learning outcomes. Compared to 2018, the 2022 results were, on average, down in mathematics, reading, and science. Although inequalities in human capital outcomes persist, the 67-point difference in Montenegro between the top 25 percent most socioeconomically advantaged students and the bottom 25 percent in PISA mathematics scores is significantly smaller than the average difference between the two groups across OECD countries (93 points).[13] Despite almost universal health coverage and quite generous benefits packages, the health system is challenged by disparities in care provision between urban and rural areas, inadequate primary health care services, underdeveloped quality assurance systems, a growing need for long-term care and a shortage of human resources. In 2018, only 3.3 doctors and 5.2 nurses and midwives per 1000 population worked in the Montenegrin health care system, lower than the European average — 3.4 and 5.5, respectively.[14] These shortages are partly the result of the limited resources available for health care. For instance, in 2019 Montenegro's expenditure on health was just 5 percent of GDP.[15] Improvements in the labor market are reflected by growing employment rates, with 58 percent of the working-age population employed in 2022. However, the inactivity rate, although falling, remains high (32 percent), the country has some of the highest long-term unemployment rates in the Western Balkans (80 percent of total unemployed), and women continue to be 13 percentage points more likely to be inactive than men. Against this backdrop, investments in human capital are critical to ensure that Montenegro's labor force can respond to the changing demand for skills incurred by the green transition, discussed below.

[12] The index is a summary measure of the amount of human capital that a child born today can expect to acquire by age 18, given the risks of inadequate health and inadequate education that occur in the country where she lives.

[13] Organization for Economic Cooperation and Development (OECD), PISA 2022 Results (Volume I and II) - Country Notes: Montenegro, (2023) https://www.oecd.org/en/publications/pisa-2022-results-volume-i-and-ii-country-notes_ed6fbcc5-en/montenegro_84d80839-en.html#:~:text=In%20Montenegro%2C%2030%25%20of%20students,mathematics%20was%20412%20score%20points.

[14] Pacific Prime International, Healthcare system in Montenegro (2024) https://www.pacificprime.com/country/europe/montenegro-health-insurance-pacific-prime-international/#:~:text=Montenegro%20is%20said%20to%20have,backward%20health%20system%20in%20Europe.

[15] World Health Organization 2022. Health System in Action: Montenegro. https://iris.who.int/bitstream/handle/10665/362325/9789289059183-eng.pdf?sequence=1#:~:text=In%202019%2C%20public%20spending%20on,gross%20domestic%20product%20(GDP).



Chapter 2

Adaptation risks and opportunities

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

A small, predominantly mountainous country, Montenegro experiences high climate variability and frequent extreme weather events. Located in South-Eastern Europe, Montenegro has a Mediterranean climate characterized by dry summers and mild, rainy winters.[16] The country is experiencing increasingly extreme weather patterns, such as more frequent and intense heatwaves with high maximum and minimum temperatures, fewer cold days and nights, and a rise in droughts and forest fires.[17] There are more storms during the colder months, fewer consecutive rainy days, and less but more intense precipitation.[18] As temperatures continue to rise, the frequency and intensity of various climate events such as floods, droughts, wildfires, and storms are also expected to increase.[19] Montenegro is highly exposed and highly vulnerable to climate hazards, particularly the northern mountainous areas, which are highly susceptible to climate change.[20] Table 2.1 presents the hazards to which Montenegro is exposed, and their risk levels.

TABLE 2.1: Main hazards in Montenegro and their associated risk levels

HAZARD	RISK LEVEL
River floods	High
Urban floods	High
Landslides	High
Wildfires	High
Extreme heat	Medium
Coastal floods	Medium
Earthquakes	Medium
Water scarcity	Medium

Source: World Bank and GFDRR (2023)[21]

Many parts of the country show high exposure to floods, earthquakes, and landslides. Between 1991 and 2013, Montenegro experienced six devastating floods—a matter of concern because 60 percent of the population reside in areas with a high probability of magnitude 8 or greater earthquakes on the Richter scale.[22] As much as 51.0 percent of Montenegro's total area is susceptible to very high or high landslide risks.[23] Flooding affects about 10,000 people a year, with causing an annual average of US$90 million in damage, while earthquakes affect around 9,000 people a year, averaging US$70 million in damage.[24] In 2015, Bijelo Polje is the province that faced the greatest damage from floods (with 11% of annual average GDP

[16] Britannica Climate Montenegro https://kids.britannica.com/students/article/Montenegro/275915#:~:text=A%20cold%20climate%20dominates%20the,(380%20centimeters)%20a%20year.

[17] Montenegro Ministry of Ecology, Spatial Planning and Urbanism, United Nations Environment Programme (UNEP), and Green Climate Fund (GCF), National Programme of Priority Activities in the Field of Climate Change Mitigation and Adaptation to the Framework of Cooperation with the Green Climate Fund 2021–2023 (2021), https://www.sustainability.gov/pdfs/ggi-montenegro-priority-activities.pdf.

[18] Ministry of Ecology, UNEP and GCF, National Programme of Priority Activities.

[19] Green Climate Fund (GCF). 2020. "Enhancing Montenegro's capacity to integrate climate change risks into planning." https://www.greenclimate.fund/document/enhancing-montenegro-s-capacity-integrate-climate-change-risks-planning.

[20] Adaptation Fund, Adaptation to Climate Change and Resilience in the Montenegrin Mountain Areas – Gora (2023), https://www.adaptation-fund.org/project/adaptation-to-climate-change-and-resilience-in-the-montenegrin-mountain-areas-gora/.

[21] World Bank and Global Facility for Disaster Reduction and Recovery (GFDRR), ThinkHazard Report: Montenegro, (2021), https://thinkhazard.org/en/report/2647-montenegro.

[22] World Bank, Achieving Sustainable and Inclusive Growth amidst High Volatility: Montenegro Systematic Country Diagnostic (Washington, DC: World Bank, 2016), https://documents1.orldbank.org/curated/en/642701468179098025/pdf/105019-SCD-P151813-OUO-9-SecM2016-0165.pdf.

[23] European Landslide Susceptibility V2 (ELSUS v2) at 200m resolution.

[24] World Bank and Global Facility for Disaster Reduction and Recovery (GFDRR), Montenegro—Ready 2 Respond Diagnostic Report: Emergency Preparedness and Response Assessment (Washington, DC: World Bank, 2021), https://documents1.worldbank.org/curated/en/727791621920082705/pdf/Montenegro-Ready-2-Respond-Emergency-Preparedness-and-Response-Assessment-Diagnostic-Report.pdf.

affected), while Budva was most susceptible to earthquakes, and Podgorica was exposed to both floods and earthquakes.[25] Driven by increased asset exposure, Montenegro's flood risk—measured as average annual loss (AAL)—is expected to increase in all the three possible future scenarios (Representative Concentration Pathways, [RCP] 2.6, 4.5 and 8.5) shown in Table 2.2.[26] The intensity of heat-related stressors is expected to rise rapidly in all three hypothetical future scenarios, including drying, and in line with trends in other countries in the region.

Table 2.2: Montenegro flood risk assessment

Scenario	AAL (US$, million)	Loss Ratio (%)	Average Population Exposed
Baseline	72,096,165.79	0.28	4,526
RCP 2.6	94,348,187.51	0.27	3,721
RCP 4.5	79,995,602.75	0.23	3,156
RCP 8.5	78,878,144.91	0.22	3,160

Heat stressors are intensifying rapidly in Montenegro. Droughts, wildfires, and heatwaves are already affecting many sectors and more and more people. Reduced summer rainfall and additional days with high daytime temperatures make Montenegro highly vulnerable to drought.[27] The 2011 drought led to an extreme hydrological deficit in Montenegro's two largest agricultural areas, Zeta and Bjelopavlici.[28] The 2012 heatwave affected 4,500 people. Drought intensity in 2017 and 2018 varied from moderate, to very dry, to extremely dry, significantly affecting the water levels of the Morača and Zeta rivers and in Skadar Lake.[29] This in turn had adverse effects on fisheries, agriculture, and electricity generation. These extremely dry conditions exacerbated forest fires. Forests cover 54 percent of Montenegro, 36.3 percent of the forest is exposed high or very high wildfire risk. Between 2005 to 2015, about 800 large forest fires destroyed more than 18,000 hectares of forests.[30] Forest fires are becoming not only more frequent but larger in scale and impacting physical infrastructure such as roads, which in turn affect agricultural production, commerce, and trade routes.

Key economic sectors, particularly agriculture, have experienced losses from weather- and climate-related disasters, with large spatial and year-to-year variability. Although 70 percent of Montenegro's GDP is derived from the service sector, of which tourism is a large subsector,[31] agriculture remains an important sector within the national economy, especially for rural residents.[32] Changes in weather patterns and climate have increased the sensitivity of crop production to variations in temperature and precipitation.[33] These, in turn, have reduced the available agricultural land and lowered the organic matter content in the soil, depressing agricultural yields.[34] The 2010 flood affected about 30,000 hectares of agricultural land with losses of about €44 million.[35] The valley area of the River Zeta, the Skadar Lake area, and the Golubovac area suffered the most.[36]

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[25] World Bank Group, Disaster risk profiles—Montenegro. (2017) https://documents.worldbank.org/en/publication/documents-reports/documentdetail/283041493722051753/disaster-risk-profiles-montenegro

[26] According to the Intergovernmental Panel on Climate Change (IPCC), Representative Concentration Pathways (RCPs) are "scenarios that include time series of emissions and concentrations of GHGs" and usually refers to "the portion of the concentration pathway extending up to 2100". RCP 2.6, 4.5, and 8.5 represent scenarios with low, intermediate, and high GHG emissions. See IPCC. 2023. Definition of Terms Used Within the DDC Pages. https://www.ipcc-data.org/guidelines/pages/glossary/glossary_r.html

[27] World Bank and GFDRR, Montenegro—Ready 2 Respond Diagnostic Report.

[28] Government of Montenegro, Ministry of Sustainable Development and Tourism, Montenegro National Drought Plan (2020), https://www.unccd.int/sites/default/files/country_profile_documents/Montenegro%20national%20drought%20plan_0.pdf

[29] Government of Montenegro, Montenegro National Drought Plan.

[30] Regional Fire Monitoring Center, Forest Fire Country Studies: Montenegro.

[31] Ministry of Ecology, UNEP and GCF, National Programme of Priority Activities.

[32] World Bank and GFDRR, Montenegro—Ready 2 Respond Diagnostic Report.

[33] World Bank, Montenegro Systematic Country Diagnostic.

[34] World Bank, Montenegro Systematic Country Diagnostic.

[35] EM-DAT, 2019. in Ministry of Ecology, UNEP and GCF, National Programme of Priority Activities. https://www.sustainability.gov/pdfs/ggi-montenegro-priority-activities.pdf

[36] Ministry of Ecology, UNEP and GCF, National Programme of Priority Activities. https://www.sustainability.gov/pdfs/ggi-montenegro-priority-activities.pdf

Extreme climate events have an immediate and negative impact on transport and road infrastructure, increasing travel times, the frequency of accidents, and infrastructure damage. Because of the increase in flash floods and heavy rains, rural roads in the northern mountainous regions of Montenegro have greatly deteriorated.[37] Many of them are now impassable in winter, aggravating the social, economic, and health challenges of isolated rural communities, and adding to the cost of maintenance and repairs. According to studies, weather-related damage accounts for a substantial share of the cost of maintaining and repairing transport infrastructure. Because of extreme weather, such damage can be expected to increase by 30–50 percent a year, which would translate into an additional €3.3 million per year in costs.[38] If adaptation measures are not developed, then by 2050 infrastructure damage could, on average, lead to a nearly 124 percent rise in annual maintenance costs, equating to an increase of €10.2 million per year in the Montenegrin budget.[39]

Exposure and vulnerability to climate hazards are influenced by urbanization, settlement patterns, and population growth. Owing to unplanned urban development and land use, a significant number of people and their assets are exposed to a high risk of natural disasters. Particularly at risk are regions such as Skadar Lake, the Bojana River area, and the capital city, Podgorica, primarily because of its dense population.[40] Despite the relatively small size of river valleys, they host the largest settlements. The coastal region faces its own challenges, especially as the loss of space, disappearing biodiversity, and beach erosion that can be attributed to rising sea levels and sea temperatures. [41] Mean annual air temperatures in Montenegro range from 4.6°C (40.3°F) in the Žabljak area to 15.8°C (60.4°F) on the coast. In the pursuit of economic prosperity, numerous unplanned and unregulated constructions have been built, especially in the coastal region, which is vulnerable not only to seismic activity but also to floods.[42]

Exposure to climate change and related hazards profoundly affect human health in Montenegro. Between 2007 and 2010, over 7000 individuals were affected by floods.[43] Notably, in November 2022, three people lost their lives from floods near Podgorica,[44] and in January 2023, adverse weather and high waves in Herceg Novi resulted in the death of a child.[45] In 2019, the combination of strong winds and heavy downpour led to four fatalities on Lake Skadar.[46] Heat stress from extreme temperatures has become prevalent in Montenegro, and this has led to fatalities among vulnerable groups such as the elderly, outdoor workers, and individuals with comorbidities.[47] Montenegro faces deteriorating air quality from a combination of climatic conditions, ongoing industrial operations, congested traffic, and coal heating.[48] According to the European Environmental Agency (EEA), in 2010 approximately 513 individuals died prematurely from high levels of particulate matter (PM) and ozone that exceed the acceptable limits set by the EU and the World Health

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37 World Bank and GFDRR, Montenegro—Ready 2 Respond Diagnostic Report.

38 G. Gelete and H. Gokcekus, "The Economic Impact of Climate Change on Transportation Assets," Journal of Environmental Pollution and Control 1, no. 1 (2018): 105, https://www.annexpublishers.com/articles/JEPC/1105-The-Economic-Impact-of-Climate-Change-on-Transportation-Assets.pdf.

39 European Bank for Reconstruction and Development, Climate Resilience in the Montenegrin Road Network: Climate Resilience Strategy and Action Plan (2019), https://wapi.gov.me/download-preview/05073489-49d9-4af2-8285-e7e5ad1fd51d?version=1.0.

40 World Bank and GFDRR, Montenegro—Ready 2 Respond Diagnostic Report.

41 World Bank, Montenegro Systematic Country Diagnostic.

42 World Bank, Montenegro Systematic Country Diagnostic.

43 World Bank, Climate Change Knowledge Portal: Montenegro (n.d.). https://climateknowledgeportal.worldbank.org/country/montenegro/vulnerability.

44 Fjori Sinoruka, Milica Stojanovic, Samir Kajosevic and Xhorxhina Bami, Floods Cause Six Deaths in Montenegro, Albania, Serbia, (2022) https://balkaninsight.com/2022/11/21/floods-cause-six-deaths-in-montenegro-albania-serbia/

45 Samir Kajosevic, Milica Stojanovic, Xhorxhina Bami, Fjori Sinoruka and Azem Kurtic, Floods in Western Balkans Cause Huge Damage, Drownings, (2023) https://balkaninsight.com/2023/01/20/floods-in-western-balkans-cause-huge-damage-drownings/

46 Reuters, Four drown in Montenegro as bad weather hits Western Balkans, (2019) https://www.reuters.com/article/us-weather-balkans-idUSKCN1PS0LZ/

47 ClimateChangePost, Health Vulnerabilities Montenegro, https://www.climatechangepost.com/montenegro/health/#:~:text=Heat%20stress&text=Montenegro%20can%20expect%20a%20further,for%20chronic%20patients%20(5).

48 UNECE, UNDA Project: Montenegro – Improving air quality https://unece.org/environment-policy/environmental-performance-reviews/unda-project-1819ae-montenegro-improving-air

Organization.[49] For example, in Pljevlja, a lignite power plant that has been a major contributor to pollution has led to premature deaths, hospitalizations, and various other health impacts.[50],[51] Demographic groups such as infants, pregnant women, and people already suffering from respiratory ailments are especially vulnerable to the negative effects of poor air quality,[52] But they are not the only ones. In 2013, about two-thirds of the population in Montenegro's industrial cities were exposed to elevated pollutant levels, posing a significant risk of respiratory complications.[53] Climate change has increased the incidence of hemorrhagic fever with renal syndrome (HFRS). Between 2004 to 2014, the rise in average annual temperatures, and the reduction in annual rainfall, were correlated with the incidence of HFRS.[54]Hot weather is a perfect condition for nuts to grow in many areas of Montenegro, and this attracts yellow-necked mice, one of the main vectors of the HFRS virus.[55] The highest number of HFRS cases, peaking in 2014, occur during the hot season.[56] Climate change hazards have affected water availability and quality, especially in the southern regions.[57] The rise in average monthly temperatures is also expected to increase the frequency of waterborne diseases such as salmonella and diarrhea.[58]

Exposure to natural hazards is linked with, and exacerbates, existing socioeconomic vulnerabilities. Montenegro's 25 municipalities (opštine) faces different levels of socioeconomic stresses that interact with, and are compounded by, climate shocks. Population decline will represent an increasingly significant challenge. According to World Development Indicators (WDI) data, over the past seven years Montenegro has slid into a negative demographic trend, and the population is now close to its 2007 levels. At a disaggregated level, 60 percent of all municipalities have shrunk in population in the last two decades, implying that the country's earlier population growth was concentrated in Podgorica and nearby areas (Tuzi, Zeta) before plateauing and now declining. The municipalities facing demographic decline are also among the most isolated (their access to market has been measured to be roughly half that of non-declining municipalities). The average declining municipality has a 10 percent higher exposure to both wildfires and landslides than then average growing municipality.[59] Floods are in general a less significant hazard in the country, with only Zeta municipality displaying relatively high average exposure. Nonetheless, in each municipality it is possible to find areas of extreme localized flood exposure.

Yet despite the population decline, Montenegro's urban areas have all been expanding geographically, despite no pressing need to accommodate a growing population. This has significantly increased the exposure of the urban areas to floods and landslides. Of the 18 urban areas in Montenegro with a population larger than 5,000[60] only 7 of these have been growing in population in the last two decades, yet nearly all 18 have increased their urban footprint. This suggests that cities in Montenegro have been expanding inefficiently (although the extent of their urban sprawl is, on average, lower than in most other WB6 countries). Besides the spatial inefficiency, urban expansion in the last two decades has occurred on city parcels whose average exposure to floods is 61 percent higher than previously existing urban built-up areas. This has resulted in a

[49] NSW Government, Particulate matter (PM10 and PM2.5), (2020). https://www.health.nsw.gov.au/environment/air/Pages/particulate-matter.aspx

[50] Cuita, Ioana, Under heavy skies: dire results from first independent pollution monitoring in Montenegro, (2017) https://bankwatch.org/blog/under-heavy-skies-dire-results-from-first-independent-pollution-monitoring-in-montenegro

[51] Government of Montenegro, Third Biennial Update Report of Montenegro, (2021) https://unfccc.int/sites/default/files/resource/BUR3_Montenegro%20-%2024.%20Jan%20-%20FINAL.pdf

[52] HEAL, Air Pollution and Health in Montenegro, (2014) https://env-health.org/IMG/pdf/heal_briefing_air_mng_eng.pdf

[53] HEAL, Air Pollution and Health in Montenegro, (2014) https://env-health.org/IMG/pdf/heal_briefing_air_mng_eng.pdf

[54] Vratnica, Zoran, et al., Haemorrhagic fever with renal syndrome in Montenegro, 2004–14, (2017) https://academic.oup.com/eurpub/article/27/6/1108/4372139

[55] Vratnica, Zoran, et al., Haemorrhagic fever with renal syndrome in Montenegro, 2004–14, (2017) https://academic.oup.com/eurpub/article/27/6/1108/4372139

[56] Gledovic, Z, et al., Hemorrhagic fever with renal syndrome in Montenegro, (2008) https://pubmed.ncbi.nlm.nih.gov/18806348/

[57] ClimateChangePost, Fresh Water Resources, https://www.climatechangepost.com/montenegro/fresh-water-resources/

[58] ClimateChangePost, Health, https://www.climatechangepost.com/montenegro/health/#:~:text=Heat%20stress&text=Montenegro%20can%20expect%20a%20further,for%20chronic%20patients%20(5)

[59] World Bank analysis (CIMA data); European Land susceptibility (ELSUSV2).

[60] See chapter 3 of the WB6 Regional Report for further details on identification of urban areas.

16 percent increase in exposure to floods, on average. Exposure to the risk of landslides has also increased, albeit at a lower rate: on average, new expansion in urban areas faces 6 percent more exposure than older built-up areas, resulting into an average increase in exposure of about 1 percent.

Modeling the effects of climate change on GDP—whether shocks or slower-moving stressors—is a tricky science, even with state-of-the-art econometrics tools. The channels via which impacts take place are difficult to account for in an exhaustive way. This is further compounded by the uncertainties in climate and exposure data especially when projected, and the difficulty of calibrating vulnerabilities. For instance, although overall flooding risks are expected to fall in Montenegro, the incidence of flash floods is expected to rise. More generally, modeling fails to capture the impacts of certain extreme events. Wildfires are a case in point. Historical data quickly becomes sparse as one goes back in time, impact channels are multifaceted and seldom well understood, and projections of the hazard in question are often yet to be tested. Modeling impacts at the annual level is next to impossible for highly nonlinear climate shifts whose dynamics are not yet fully captured in climate models—the hydrological cycle, for instance—and they yield large uncertainties, once again expensive to propagate. Finally, as discussed earlier, climate hazards interact with and compound one another; yet models, at best, capture the dynamics of a single climate hazard, missing the complexity of the links. Nonetheless, chapter 4 attempts to provide the very best possible assessment of the potential lower-bound magnitudes of damage and their impacts on GDP. Interpreting these estimates should be contextualized by an understanding of the extreme and often unpredictable nature of climate shocks and stressors, as described in this section.

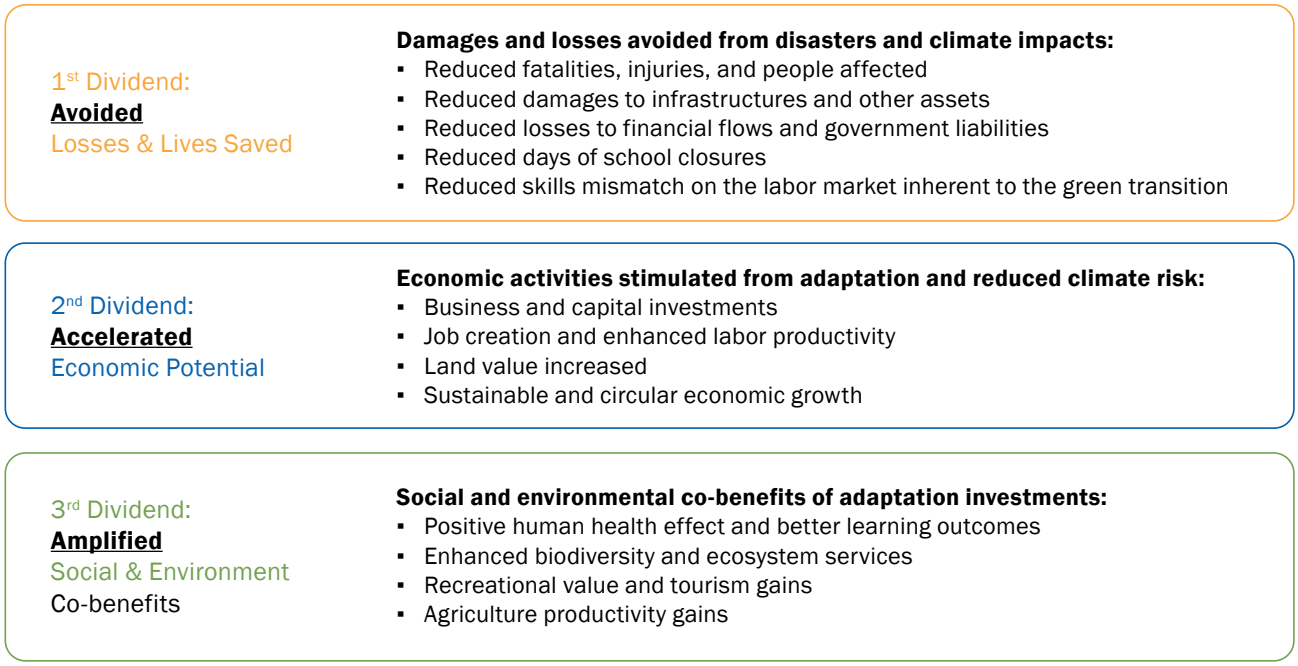
To counter the growing risks linked to the changing climate, Montenegro will need to consider large investments in adaptation—investments that will come with large benefits (see section 2.2). The total cost of the proposed policy actions and investments for an initial adaptation package is approximately US$5.7 billion (see section 5.1). By sector, the estimates are US$2.963 billion (DRM), US$333.3 million (urban), US$548.2 million (water), US$371.7 million (forestry and biodiversity), US$58.3 million (agriculture), US$1.35 billion (transport), US$21.4 million (education, skills and labor markets), US$25.3 million (social protection systems), and US$19.0 million (health system). Multiple sources of information were used to estimate the needs and costs, including the national strategic document, supplemented by inputs from local and international sectoral experts, and validated with costs from previous projects, such as those previously financed by the World Bank Group. Annex B details the methodology employed. The proposed measures cover a range of adaptation needs such as policies and hard and soft infrastructure, with varying timelines and complexities depending on the focus area. Chapter 5 elaborates on these.

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

Investing in adaptation can yield substantial social, economic, and environmental benefits that can be expressed using the Triple-A Dividend framework: i) avoided losses and lives saved during a disaster or climate event; ii) accelerated economic benefits as a result of stimulated investments and bolstered economic activities due to the reduction in background climate and disaster risks; and iii) amplified social and environmental spillovers in the form of the co-benefits of adaptation investments (Figure 2.1).[61]

[61] The Triple-A Dividend framework synthesizes perspectives from the humanitarian, environmental, and economic fields. The original term, “Triple Dividend of Resilience,” has been modified here to ”Triple-A Dividend of Resilience“ to hint at the potential financial dividends from these economic and other co-benefits. The framework was developed and described in Tanner et al., The Triple Dividend of Resilience: Realizing Development Goals through the Multiple Benefits of Disaster Risk Management (London and Washington, DC: Overseas Development Institute and World Bank, 2015).

FIGURE 2.1: The Triple-A Dividend of Resilience framework



Source: Authors, adapted from an original figure in Tanner et al. (2015[62]).

***Avoided losses*: Investing in adaptation to climate risks and in financial preparedness for it can greatly reduce the human, physical, and financial losses of natural and climate disasters.** Reports have estimated that investing in adaptation globally could generate total net benefits of US$7.1 trillion and an average BCR (benefit–cost ratio) of 4. (BCRs typically range from 2.5 to 5.5 but some can exceed 10.)[63] Under Montenegro's National Plan of Adaptation to Climate Change, adaptation measures have been implemented in priority areas such as water, agriculture, tourism and health.[64] Evidence from European countries suggests that these measures could yield high net benefits by reducing damage and losses from climate and natural hazards. For instance, in the UK, a nature-based river restoration project yielded a high BCR of 18, while a structural measure for adaptation and flood risk reduction also generates/ generated high net benefits and lead/led to a BCR ranging between 13.7 and 14.1.[65] Meanwhile, no-regret soft measures, such as climate insurance schemes, capacity building, and awareness-raising campaigns in local communities, can substantially reduce climate damage and human losses at relatively low costs, which is highly beneficial in the case of a limited budget and inadequate institutional capacities.[66] Financial preparedness for disasters is also crucial: a high-liability scenario for France shows that, for a 1-in-100-year disaster event, disaster risk financing (DRF) instruments like catastrophe insurance can lead to a €3.6 billion reduction in government liabilities.

***Accelerated economic potential:* Investing in climate change adaptation also provides new opportunities for economic development, investments, and job creation.** In Montenegro, an external assessment of

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

[63] 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

[64] UNDP. 2023. National Plan of Adaptation to Climate Change (NAP).

[65] World Bank. 2021. Economics for Disaster Prevention and Preparedness. https://documents1.worldbank.org/curated/en/280321622578148100/pdf/Background-Report.pdf

[66] Alfthan, B.; Krilasevic, E.; Venturini, S.; Bajrovic, S.; Jurek, M.; Schoolmeester, T., Sandei, P.C., Egerer, H, and Kurvits, T. 2015. Outlook on climate change adaptation in the Western Balkan mountains. United Nations Environment Programme, GRIDArendal and Environmental Innovations Association. Vienna, Arendal and Sarajevo. https://www.researchgate.net/publication/307570598_Outlook_on_climate_change_adaptation_in_the_Western_Balkan_mountains.

several hard and soft adaptation measures in the agriculture, energy, and industrial sectors (such as agro-ecological measures and energy efficiency improvement) predicts positive net benefit of €72.31 million in 2024 to €1187.88 million in 2040.[67] These benefits include not only enhanced climate-resilience but also direct economic benefits and positive effects on GDP and employment. For instance, it is estimated that, in 2040, the adaptation measures could generate a direct economic benefit of €296.42 million, an employment effect of €34.54 million, and a GDP effect of €63.99 million. In addition, under the European Commission's Economic and Investment Plan for the Western Balkans, several projects have been launched to upgrade and create new transport infrastructure in Montenegro, with a focus on ports and railway networks.[68] These are improving travel and regional trade links between Montenegro and neighboring countries, bringing new trade and investment opportunities to the country. Investing in adaptation also supports employment and sustainable and climate-resilient urban development, although education and training systems will need to adapt to equip learners with the skills required by these investments.[69] Inevitably, some jobs will be lost in the process, but the net effect is expected to be positive. There will also be significant changes in many jobs that are expected to require additional (green and other) skills.[70] Increased retraining and overall improvement in education may also benefit the Montenegrin economy. According to a recent study, a year of education strengthens pro-climate beliefs, stimulates pro-climate change behaviors and policy preferences, and promotes green voting, with voting gains of a substantial 35 percent increase.[71]

***Amplified social and environmental co-benefits*: Finally, climate adaptation actions can yield substantial social and environmental co-benefits.** Within Montenegro's National Programme of Priority Activities in Climate Change Adaptation for Cooperation with the Green Climate Fund, several projects have been launched to enhance the country's climate resilience, with a total investment of US$176 million. The development of a National Action Plan to enhance the resilience of health care institutions also yields co-benefits in human health, especially for the vulnerable groups. Meanwhile, the implementation of nature-based solutions and risk mapping and alert systems are also proving to be cost-effective by building resilience and adaptation to climate change and providing social and environmental benefits. With a total investment of €76 million, a new wastewater treatment plant project was launched in Podgorica and is expected to be fully operational by 2040. The objectives are to ensure that wastewater treatment in the city is in line with EU standards and, second, safeguard people's health and bring environmental benefits to surrounding rivers and lakes.[72] Adaptation plans have also been implemented at the city level, generating positive impacts on the urban area and its citizens. For instance, in the capital city of Podgorica, a series of adaptation measures have been implemented under the city's Climate Change Adaptation Vulnerability Assessment and Adaptation Action Plan, which includes structural measures (such as green infrastructure, water system, urban structures, and building designs) and nonstructural measures (such as regulations and awareness-raising campaigns).[73] The measures not only enhance the city's resilience in the face of floods and other climate events, but also improve its energy efficiency, air quality, spatial attractiveness, and protection of public health.

67 Djurovic, G. et al. 2017. The Paris Agreement and Montenegro's INDC: Assessing the Environmental, Social, and Economic Impacts of Selected Investments. Pol. J. Environ. Stud. Vol. 27, No. 3 (2018), 1019-1032 https://www.pjoes.com/pdf-76308-24325?filename=The%20Paris%20Agreement%20and.pdf

68 European Commission. 2020. Economic and Investment Plan for the Western Balkans. https://www.wbif.eu/storage/app/media/Library/economic-and-investment-plan-brochure.pdf

69 Gajšak et al. 2022. Study on the Climate-resilient Infrastructure in North Macedonia. https://api.klimatskipromeni.mk/data/rest/file/download/b8600f4a08a5020202a2deb79ef7b893eecb7173c1f001c5c96d9c1c791e5f0d.pdf

70 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.

71 Angrist, N., W, Winseck, K., Patrinos, H.A. & J.S. Graff Zivin (2023). Human Capital and Climate Change, NBER Working Paper no. 31000 https://www.nber.org/papers/w31000

72 The Western Balkans Investment Framework (WBIF). 2023. Podgorica Wastewater Treatment Plant. https://www.wbif.eu/project/PRJ-MNE-ENV-002

73 Podgorica Climate Change Adaptation Vulnerability Assessment and Adaptation Action Plan. https://www.giz.de/de/downloads/Report%20%E2%80%93%20Vulnerability%20Assessment%20and%20Adaptation%20Action%20Plan%20for%20Podgorica%20Montenegro%20(2015).pdf

2.3. The human capital angle of adaptation

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

Education and science play an important role in adaptation to climate change, but more attention is required at the national level. The education system issues to be tackled in Montenegro include quality of teaching,[74] digitalization and digital skills, the quality and relevance of vocational education and training, curricula modernization, access and equity, financing, governance, and early childhood education.[75] The results of the 2022 OECD PISA[76] showed that significant work needs to be done in Montenegro to improve declining and below-average performance in learning outcomes and mitigate the aftereffects of the COVID pandemic. Educational improvement will require preparing all teachers in Montenegro for green education and may cost between US$0.8 and US$2.5 million. Higher education and science would also need to play a significant role in advancing mitigation in the Western Balkans. Given the many common challenges and the limited resources, more collaboration projects among the Western Balkan countries should be promoted and supported. The role of higher education in providing skills and undertaking research and innovation in support of climate change adaptation could thus be strengthened. As part of the adaptation, the country will need to consider greening its schools and health facilities.[77]

The government of Montenegro remains committed to developing a strategy that will allow for the national health system to adapt to changes in climate,[78] but beyond that, there is still much to do. The strategy will involve strengthening the capacity for understanding the health risks posed by climate change while responding to early warnings and having an emergency plan in place.[79] Although the government has made strenuous efforts to combat the health consequences of climate change, Montenegro's health system remains vulnerable. Montenegro also faces challenges in raising its own funds for climate financing and relies heavily on multilateral funding to mitigate the effects of climate change.[80] Indeed, between 2010 and 2019, US$1.3 billion was injected into West Balkan countries, including Montenegro, to finance resilience measures, including investing in new low-carbon infrastructure and monitoring services for climate-related diseases.[81] Additionally, there is no evidence that Montenegro has formally set up a tracking system to monitor data on climate emergencies. But as of 2021, the United Nations Development Programme (UNDP) is working closely with Montenegro to establish a transparent system for monitoring, reporting on, and verifying issues related to climate change hazards.[82] There are additional challenges in the country's health system that

[74] Almeida, Avitabile and Shmis, Beyond the learning drop: Why countries in Eastern Europe and Central Asia should act now to avoid a teacher crisis, (2023) https://blogs.worldbank.org/education/beyond-learning-drop-why-countries-eastern-europe-and-central-asia-should-act-now-avoid

[75] OECD. 2022. Multi-dimensional Review of the Western Balkans: From Analysis to Action. Paris: OECD.

[76] Organization for Economic Cooperation and Development (OECD), PISA 2022 Results (Volume I and II) - Country Notes: Montenegro, (2023) https://www.oecd.org/en/publications/pisa-2022-results-volume-i-and-ii-country-notes_ed6fbcc5-en/montenegro_84d80839-en.html#:~:text=In%20Montenegro%2C%2030%25%20of%20students,mathematics%20was%20412%20score%20points.

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

[78] World Health Organization (WHO), Experts to work on Montenegro's health system strategy to adapt to climate change, (2014) https://www.preventionweb.net/news/experts-work-montenegros-health-system-strategy-adapt-climate-change

[79] World Health Organization (WHO), Experts to work on Montenegro's health system strategy to adapt to climate change, (2014) https://www.preventionweb.net/news/experts-work-montenegros-health-system-strategy-adapt-climate-change

[80] Green Climate Fund, Montenegro, (2024) https://www.greenclimate.fund/countries/montenegro

[81] Sandi Knez, Snežana Štrbac & Iztok Podbregar, Climate change in the Western Balkans and EU Green Deal: status, mitigation and challenges, (2022) https://energsustainsoc.biomedcentral.com/articles/10.1186/s13705-021-00328-y

[82] United Nations Development Programme (UNDP), Creating transparent system for monitoring, reporting and verification (MRV) in the area of climate change, https://www.undp.org/montenegro/projects/creating-transparent-system-monitoring-reporting-and-verification-mrv-area-climate-change

pose a challenge to its climate resilience. In the first six months of 2019 alone, 265 hospital infections were recorded because the hospital in question lacked basic hygiene protocols.[83] Montenegro should adopt a multifaceted strategy to tackle gaps in financing and data access concerning climate-related hazards. First, to enhance disease surveillance and monitoring, there is a need to enhance institutional coordination and the technical capabilities of the various government bodies responsible for sustainable development, agriculture, tourism, health, and so on. Second, a strategy should be developed to acquire funding for adaptation that would not only help tackle climate-related hazards and other health emergencies but also respond to the changing disease burden. Attempts should be made to partner with the private sector to address climate vulnerabilities and risks, possibly through training and resource provision.

Montenegro has an established social protection system, but it does not fully support households affected by climate-related shocks. Montenegro's well-established social protection system comprises over 30 programs covering different groups of people—more than half of the population. Although a range of new social assistance programs have recently been introduced, the main poverty-targeted program known as Material Support (locally referred as "MO") has been shrinking (despite its ability to accurately reach the poorest) because the increased funding has been going to other (non-poverty targeted) social assistance programs.[84] Because contributory pensions and categorically targeted social assistance programs like veteran, disability and child allowances dominate the social protection system, its ability to respond to climate change-related shocks is limited. Unemployment benefits are available to a limited group and one-off assistance is not an established part of disaster response. Post-disaster assistance is typically provided in an ad hoc manner by local municipalities. During the COVID-19 pandemic, the government did respond quickly, but a lack of shock-responsive mechanisms prevented an expansion of support to newly poor households. But there are opportunities to develop this shock response capacity. The foundation for this is the government's social welfare information system (SWIS), which includes data on most of Montenegro's population. Figure 2.2 below shows the average rating attained in Montenegro by each building block of the social protection system which are the core aspects of the system (namely programs and delivery system, data and information, financing arrangements and institutional arrangements), according to the Social Protection Stress Test.

FIGURE 2.2: Montenegro's social protection system could be much better harnessed to protect households from climate-induced shocks while also promoting their resilience

Source: Fizgibon C. and Coll-Black S., Findings of the World Bank Stress Test in the Western Balkans, draft (Washington DC: World Bank, 2023).

[83] The Borgen Project, 3 Factors Affecting Healthcare in Montenegro, (2020) https://borgenproject.org/healthcare-in-montenegro/

[84] World Bank and UNICEF. Montenegro Social Protection Situational Analysis. https://openknowledge.worldbank.org/server/api/core/bitstreams/03382077-6525-4e15-aa34-f7db5674a5e8/content

Montenegro's social protection system can be better harnessed to protect poorer households from climate-induced shocks while also promoting their resilience. Montenegro needs to reform its social assistance programs to better target the poorest and most vulnerable households. It could examine options to modify the poverty-targeted material support or introduce some form of scalable, temporary social assistance to support households affected by shocks and disasters, given the growing evidence globally on how social assistance programs can be leveraged to effectively provide such support. To this end, it should utilize the social welfare information system (SWIS) and work with DRM agencies to improve poverty and vulnerability mapping to climate shocks and disasters. New strategies and regulations are required to permit the timely expansion of social protection programs to reach newly vulnerable populations in a crisis. To be effective, the government will need to examine strategies and options for expanding disaster risk financing mechanisms to increase its preparedness to respond rapidly to affected populations when needed.

2.4. What is Montenegro doing, and how well?

Montenegro has established emergency management legislation that regulates the functioning of the rescue and protection system. Laws have been implemented, including the Strategy for Disaster Risk Reduction, the Law on Protection and Rescue, the Law on Local Governance, and plans for protection and rescue against different types of natural and man-made disasters.[85] The 2007 Law on Rescue and Protection and its amendments form the legal backbone for any work in emergency preparedness and response in the country.[86] Additional laws and bylaws have been developed, with the most recent being the 2019 Law on Critical Infrastructure, which is currently being implemented.[87] Rescue and protection plans are defined at the national, municipal, and operational levels, but preparedness plans at the municipal level need to be strengthened. Montenegro adopted a Strategy for Disaster Risk Reduction for 2018–2023 to transition from response-concentrated practices to a culture of prevention and preparedness. [88] But there is a need to further implement the strategy and increase awareness of disaster risk reduction.

Specific DRM policies are targeted to address natural hazards like wildfires, extreme temperatures, floods, erosions, and weather events. Several laws assign responsibilities and actions to various institutions at the different levels of government, emphasizing the importance of coordination and collaboration in effectively preparing for and responding to disasters. The Law on Forests[89] mentions the obligation of the Forestry Directorate and private forest owners and users to enhance fire prevention and preparedness during periods of increased forest fire risk. The Law on Water[90] includes a plan to protect people and assets from the harmful effects of water. It includes preventive measures for flood and erosion protection, methods for monitoring and recording, early warning arrangements for disaster events, and the role of relevant institutions. At the national level, the Directorate for Water and the Ministry of Agriculture and Rural Development are responsible for protection and operational activities, while local authorities have local operational plans. The Law on Hydro Meteorological Services[91] and the Law on Hydrographic Services[92] outline the responsibility of the Institute for Hydrometeorology and Seismology of Montenegro (ZHMS) including weather and water monitoring, data collection and assessment, and providing forecasts and early warnings of extreme weather events and other emergency situations.

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85 European Commission. 2023. Montenegro. https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/national-disaster-management-system/montenegro_en

86 Government of Montenegro. 2007. Law on Protection And Rescue. Official Gazette of Montenegro, 13/07 of 18 December 2007. https://disasterlaw.ifrc.org/sites/default/files/media/disaster_law/2020-08/Montenegro_Law%20on%20Protection%20and%20Rescue.pdf

87 World Bank and GFDRR, Montenegro—Ready 2 Respond Diagnostic Report.

88 World Bank and GFDRR, Montenegro—Ready 2 Respond Diagnostic Report.

89 Official gazette. RM, no. 74/10 and 47/15

90 Official gazette. RM, no. 27/07 and 48/15

91 Official gazette RM, no. 26/10

92 Official gazette RM, no. 26/10

Montenegro is also making efforts to develop strategies and legal frameworks that are more focused on climate change adaptation. The National Climate Change Strategy until 2030 primarily emphasizes harmonization with EU climate change legislation, but it needs more specific details on adaptation.[93] The National Strategy with Action Plan for Transposition Implementation and Enforcement of the EU Acquis on Environment and Climate Change 2016–2020 (NEAS) was designed to support the EU Environmental Acquis.[94] The 2019 Law on Protection against Adverse Impacts of Climate Change establishes the legal framework for both adaptation and mitigation actions in the country, including the protection of the ozone layer.[95] It also outlines a strategy for low-carbon development and a climate change adaptation plan. The updated Nationally Determined Contribution (NDC) was adopted in 2021,[96] and the development of the National Adaptation Plan,[97] which aims to assess vulnerability and climate change risks and define potential mitigation measures, is ongoing.

Montenegro lacks effective financial management policies for climate change adaptation. Montenegro lacks a national financial risk management strategy, the climate risks and the estimated costs of adaptation for the country are projected to surpass government budgetary capabilities. The country has yet to optimize national and alternative sources of finance for adaptation investments; it has failed to explore co-investment and lacks a strategy to incentivize crucial investments.[98] Although Montenegro has personal risk-transfer programs for frequent hazards like earthquakes and floods, they are not mandatory for the population and are only offered as add-on packages with fire and household insurance schemes.[99] At the level of households and small- and medium-size enterprises, the penetration of insurance coverage for floods and earthquakes is low.[100] The country lags the rest of the Western Balkans region in this area. For budgetary reasons, the Government of Montenegro has not joined the property casualty reinsurer Europa Re.[101] Public insurance and alternate sources of funding need to be developed, improved, and promoted.

There is a need to improve the institutional arrangements for mainstreaming climate change adaptation into work programs at the sector level. Adaptation has only lately been acknowledged as a national and sectoral priority,[102] so the coordination framework for adaptation planning and action is only partially established and is not performing optimally. Many institutions are not functioning as intended owing to a lack of effective organizational design, clear roles and responsibilities, and insufficient capacity and information. There is limited technical capacity within government agencies to collect, generate, use, and disseminate climate information and services. The Ministry of Sustainable Development and Tourism (the NDA), the National Council for Sustainable Development, the Working Group on Mitigation and Adaptation to Climate Change, along with other ministries and agencies, lack the required technical and human capacity, tools, and approaches to identify, assess, and prioritize risks, and implement adaptation actions. At the national level, there is limited specialized capacity to implement adaptation projects and monitor their success.[103]

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93 Climate Change Laws of the World. National Strategy for Sustainable Development to 2030. Montenegro 2007. https://climate-laws.org/document/national-strategy-for-sustainable-development-to-2030_5ace

94 Climate Change Laws of the World. National Strategy with Action Plan for transposition, implementation and enforcement of the EU acquis on Environment and Climate Change 2016-2020. https://climate-laws.org/document/national-strategy-for-sustainable-development-to-2030_5ace

95 Climate Change Laws of the World. Law on Protection from the Negative Impacts of Climate Change. Montenegro 2019. https://climate-laws.org/document/law-on-protection-from-the-negative-impacts-of-climate-change_2c3c

96 UNDP. Enhancing Montenegro's nationally determined contribution (NDC). Climate promise initiative. https://www.undp.org/montenegro/projects/climate-promise-initiative

97 Green Climate Fund. NAP Project. https://napmontenegro.me/en/homepage-english/

98 Green Climate Fund and United Nations Development Programme. 2020. "Enhancing Montenegro's capacity to integrate climate change risks into planning." https://www.greenclimate.fund/document/enhancing-montenegro-s-capacity-integrate-climate-change-risks-planning

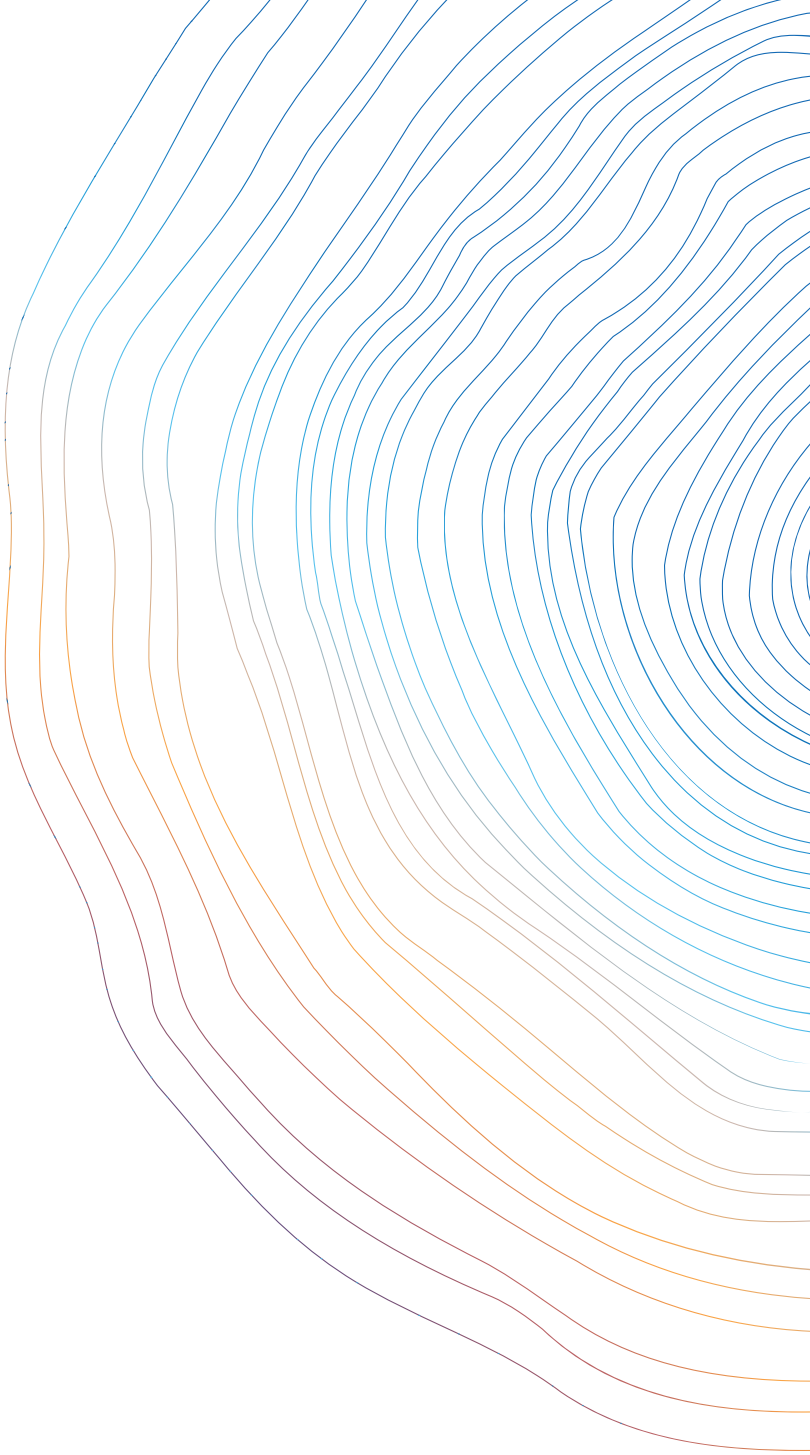
99 World Bank and GFDRR, Montenegro—Ready 2 Respond Diagnostic Report.

100 World Bank and GFDRR, Montenegro—Ready 2 Respond Diagnostic Report.

101 World Bank and GFDRR, Montenegro—Ready 2 Respond Diagnostic Report.

102 Green Climate Fund and United Nations Development Programme. 2020. "Enhancing Montenegro's capacity to integrate climate change risks into planning." https://www.greenclimate.fund/document/enhancing-montenegro-s-capacity-integrate-climate-change-risks-planning

103 Green Climate Fund and United Nations Development Programme. 2020. "Enhancing Montenegro's capacity to integrate climate change risks into planning." https://www.greenclimate.fund/document/enhancing-montenegro-s-capacity-integrate-climate-change-risks-planning



Chapter 3

Mitigation risks and opportunities

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

The analysis relied on the KINESYS-WB6 (Knowledge-Based Investigation of Energy System Scenarios for the WB6) model, a global energy system model based on TIMES (The Integrated MARKAL-EFOM1 System) and applied to the WB6. KINESYS-WB6 explicitly covers GHG emissions from fuel combustion, and fugitive emissions from fossil fuel extraction and from transport. To set economy-wide GHG emissions targets to model quantity-constrained scenarios, projections from official government strategies — in the case of Montenegro, the biennial update report (BUR)—were used for the sectors not included in the KINESYS-WB6 model to set targets for the energy-related sectors. The main scenarios modeled included (i) the Reference Scenario (RS), an unconstrained least-cost development scenario - this scenario is incompatible with the WB6 countries' aspirations of EU integration and their existing climate change commitments, but it provides a comparable baseline across the six countries for the decarbonization scenarios described below, (ii) the Net Zero Emissions scenario (NZE), in which GHG emissions constraints are imposed to achieve economy-wide net zero by 2050, (iii) the Net Zero Emissions scenario with Higher Growth (NZE-HG),[104] which is similar to the NZE but assumes higher GDP growth rates for the WB6, and (iv) the Carbon Pricing Scenario (CPS), a price-constrained scenario in which the WB6 countries are assumed to adopt an emissions trading scheme covering all sectors of the economy, with an allowance price in line with the European Commission's projections for the EU ETS price in a net-zero-by-2050 scenario. All scenarios rely on the same assumptions on technology availability and costs. All scenarios except for the NZE-HG rely on trend GDP growth assumptions. Further details on the modeling approach and assumptions are presented in the WB6 CCDR and in the Mitigation Background Note accompanying the CCDR.

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

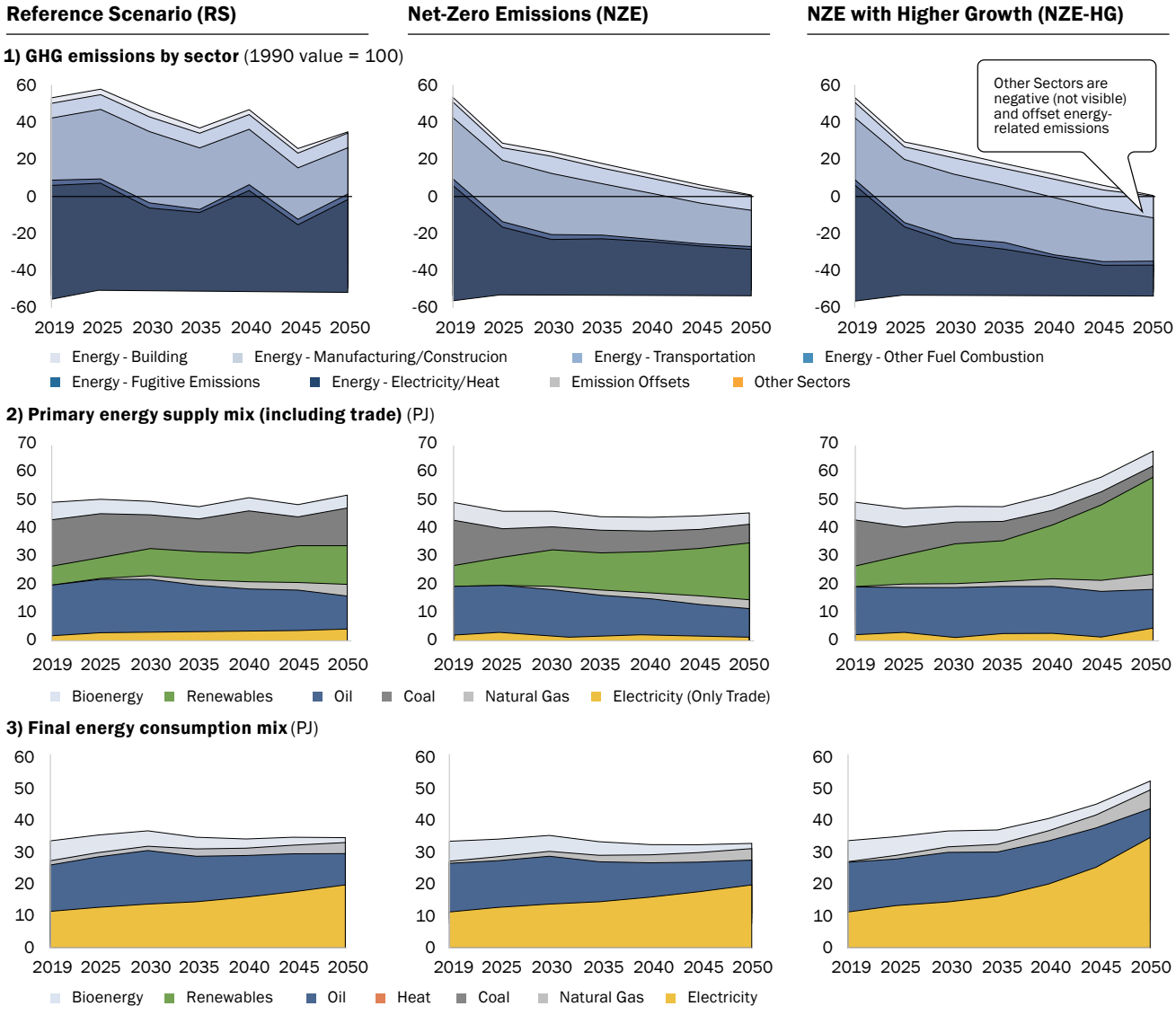
In the RS, economy-wide GHG emissions (that is, including sectors outside the model's scope) for Montenegro would reach about 1 $MtCO_2eq$ in 2050 (65 percent lower than 1990 emissions, see row 1, Figure 3.1), thanks mainly to a partial coal phase-out. Montenegro's energy mix would not change drastically over the next decades, with limited penetration of renewable energy (RE) and bioenergy (that is, biomass and biofuel) sources. The primary energy supply mix would continue to be dominated by fossil fuels (see row 2, Figure 3.1). In 2050, coal would still account for about 25 percent of the total primary energy supply (versus 34 percent in 2019). Between 2019 and 2050, natural gas would increase from zero to 7 percent, while oil would decrease from 36 percent to 25 percent. Bioenergy (that is, biomass and biofuels) and renewables (mainly hydro, solar, and wind) would show relatively modest growth, increasing from 27 percent of the total primary energy supply in 2019 to 36 percent in 2050.

In the power sector, the growth of solar PV would support a partial coal phase-out in the RS, but coal would continue to account for at least 20 percent of total generation throughout the modeled period. As shown in Figure 3.2, in 2030, hydro, wind, and solar PV would account for 46, 16, and 9 percent of power generation, respectively. But most of the incremental electricity demand after 2030 would be met mainly by solar PV (reflecting the favorable economics of Montenegro's solar resources and the decrease in the cost of solar PV technologies), while hydropower capacity would remain flat, and wind would see a slight increase. As a result, by 2050, the share of solar generation would increase to 28 percent, while the share of wind would remain at 16 percent and hydro would decrease to 34 percent. In the RS, the lack of binding constraints on GHG emissions would allow coal generation to remain economically viable throughout the modeled period and still account for 23 percent of the total in 2050.

[104] High growth and optimistic growth re used interchangeably in this report.

Although it represents the least-cost development pathway under no external constraints, the RS is not a viable scenario for a sustainable development of Montenegro's energy sectors, as 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 overtime with its mostly fully depreciated generation fleet. However, significant negative financial and non-financial impacts that were not quantified in the model would arise from delaying the transition. First, prolonged reliance on coal would continue causing severe air pollution challenges and exacerbate the environmental and health impacts of coal mining and generation. Second, it would have energy security implications, especially in light of the recent episodes of coal supply disruptions and the increasing difficulty procuring financing for investments in coal mining and power plants. Third, it would hamper the competitiveness of the economy in terms of job creation and attractiveness for foreign direct investment and financing from international financial institutions. Lastly, the lack of progress on coal phase-out would be incompatible with EU integration and the commitments the country has made with the Sofia Declaration.

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



Source: World Bank analysis.

Note: 1 Includes sectors not covered by KYNESIS-WB6, that is, agriculture, waste, LULUCF (land use, land use change, and forestry), and IPPU (industrial processes and product use). Throughout the modeled period, total emissions from the "Other Sectors" are negative (a result of negative emissions from LULUCF) and are offset by positive emissions in energy-related sectors.

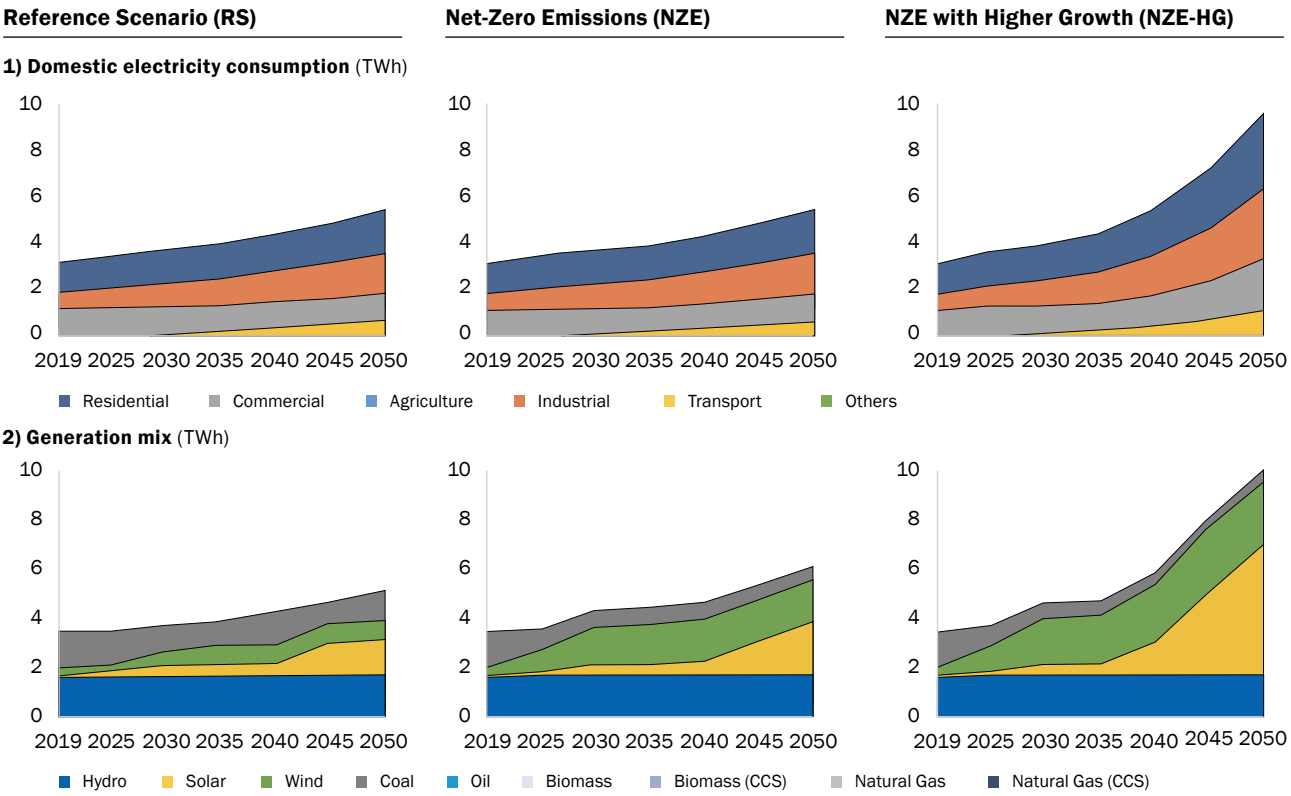
2 "Electricity" refers to the consumption of electricity in end-use sectors, while "renewables" refers to the direct use of RE in end-use sectors.

3 PJ = Petajoule

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

Because of Montenegro's large forestry carbon sinks, achieving economy-wide net zero GHG emissions by 2050 would require only a moderate expansion of investments in the near-complete decarbonization of the power sector. Since the LULUCF sector absorbs approximately 2.5 $MtCO_2eq$ a year, and the entire energy sector currently emits about 2.7 $MtCO_2eq$, the investments required for Montenegro to reach net zero are proportionally lower than for other WB6 countries. In the NZE, the decarbonization effort needed in the power sector would be only marginally higher than in the RS. Coal would be substantially reduced but could still account for 9 percent of total electricity generation by 2050,[105] while the deployment of wind and solar PV capacities would be accelerated compared to the RS. In the NZE, Montenegro would have to install about 600 MW of wind and 250 MW of solar by 2030 (versus 200 MW of wind and 200 MW of solar in the RS) and 650 MW of wind and 1.5 GW of solar by 2050 (versus 300 MW of wind and 1 GW of solar in the RS). The share of renewable energy in total electricity generation would increase from about 58 percent in 2019 (mostly hydro and wind) to more than 90 percent in 2050, compared to 77 percent in the RS for the same year (see row 2 of Figure 3.2). Hydro would balance intermittent wind and solar generation, limiting the need for battery storage. Power sector emissions would decrease from about 1.7 $MtCO_2eq$ n 2019 to 0.6 $MtCO_2eq$ in 2050. As a result of the accelerated deployment of solar PV and wind capacity, in the NZE, electricity generation and supply costs would be 10–15 percent higher than in the RS in the short and long term. Assuming that these costs are fully passed onto customers, the increase in retail tariffs would be of a similar magnitude. While these tariff increases could be mitigated by increased regional integration, the country 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 3.2: Power sector indicators across the RS, NZE, and NZE-HG scenarios for Montenegro



Source: World Bank analysis.

[105] It should be noted that such a low level of utilization of the country's single coal plant (Pljevljia) might not be viable from a financial point of view. If that was the case, careful power sector planning would be needed to identify alternatives that would ensure the reliability and adequacy of power supply after the decommissioning of the coal plant.

The least-cost pathway to achieving net zero by 2050 would require additional energy efficiency improvements and a larger-scale use of electricity in end-use sectors. As shown in row 3 of Figure 3.1 (final energy consumption mix), in 2050 final energy demand in the NZE would need to be about 5 percent lower than the demand in the RS. Achieving this would require ambitious policies to support energy efficiency improvements across all sectors. At the same time, in the NZE in 2050, about 60 percent of final energy demand would be met by electricity (especially in the transport and heating sectors), versus about 55 percent in the RS, while oil and oil products would account for about 20 percent of final energy demand, versus 30 percent in the RS.

In the NZE, GHG emissions from the transport sector could be abated by almost 50 percent by adopting a three-pronged Avoid-Shift-Improve strategy consisting of demand reductions (Avoid), a shift of demand to more sustainable modes (Shift), and the adoption of more energy-efficient vehicles running on cleaner fuels (Improve). The relatively limited reduction in GHG emissions in the transport sector in the NZE compared to other WB6 countries is explained by the fact that emissions from the transport sector have a higher average abatement cost than those from other sectors, and that Montenegro's large carbon sinks lower the overall decarbonization effort required to achieve net zero. Avoid strategies (for example, integrated land use planning to reduce travel distances, digital accessibility, and remote working when possible) could help reduce total passenger transport demand in 2050 by 5 percent in the NZE compared to the RS, with urban transport accounting for most of the reduction. Additional policies and incentives could support the shift of the residual demand for transport services from more polluting means of transport to less carbon-intensive ones. In 2050, private road transport would account for 70 percent of motorized passenger transport activity in the NZE, versus 84 percent in the RS,[106] while rail would account for 26 percent of freight transport activity (versus 14 percent in the RS).[107] But most of the GHG emissions reductions in the transport sector would have to come from 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 have to decrease substantially for both passenger and freight transport and could be 40–60 percent lower in 2050 than in 2019, depending on the transport segment. This would be achieved by both fuel-efficiency improvements in gasoline- and diesel-engine vehicles and, by 2050, an increase in the penetration of electricity in the transport fuel mix. In 2050, in the passenger transport segment, electricity would account for about 25 percent of total fuel energy demand, which corresponds to about 40 percent of the passenger car stock being EVs.[108] In the freight transport segment, in 2050 conventional fuels would still account for about 90 percent of total fuel energy consumption, followed by electricity (about 10 percent). In addition, a more efficient use of trucks by increasing their average payload—up to 15 percent more by 2050 in the NZE compared to the RS—would significantly reduce the specific energy consumption per km, by allowing for the use of high-capacity vehicles and leveraging the digitalization of logistics to achieve more efficient asset sharing and optimization of operations.

The decarbonization of the building and industrial sectors would require energy efficiency improvements, combined with higher levels of electrification of demand and a switch to cleaner energy sources. Similarly, to the transport sector, the incremental effort required in the building and industrial sectors to achieve net zero would be modest, owing to the emissions offset from the forestry sector. However, in the residential sector in the NZE, electricity would account for about 95 percent of final energy demand in

[106] Excluding the share of active mobility (walking and cycling), which is assumed to capture up to 4 percent of the passenger car demand by 2050 in the NZE.

[107] The RS assumes that the current rail modal shares is managed to be maintained (10 percent), despite the downward trends observed in past years, driven by ongoing efforts to improve the rail system. The outcomes from the Transport Community (TC) study "Technical Assistance to connectivity in the Western Balkans" (2023) suggest that Montenegro may have one of the largest potentials to increase the rail modal share for freight in the region. Thus, the NZE here assumes an ambitious scenario where rail manages to capture about 20 percent of road freight transport demand in the NZE compared to the RS, effectively increasing the modal share from the current 10 percent up to 26 percent. This assumed future rail modal share for Montenegro in the NZE remains below the future modal share estimated by the TC as per the report cited above, but is considered here to be a sufficiently ambitious challenge and would be above the current EU-27 average.

[108] The share of electric cars in the total stock is higher than the share of electricity in the fuel mix because of the significantly higher fuel efficiency of electric vehicles compared to gasoline- and diesel-engine vehicles.

2050, compared to about 45 percent today. In the industrial sector, in the NZE, oil products would have to be replaced by natural gas and electricity, but carbon capture and storage (CCS) solutions would not be economically viable (or needed to achieve net zero). An expansion of the existing carbon pricing mechanism could complement other decarbonization options for the industrial sector. The CPS modeling scenario in the CCDR—results are presented in the regional report—demonstrates how adequate carbon pricing levels can help speed up the decarbonization trajectories for WB6 economies, including a more rapid coal phase-out.

Significant decarbonization efforts in the non-energy sectors—for example, waste and agriculture (not included in the modeling exercise described above)—would be crucial to achieve economy-wide net zero GHG emissions cost-effectively. Stepping up GHG emissions reduction efforts in these sectors can lessen the need to resort to decarbonization solutions with a higher abatement cost in energy-related sectors. Montenegro should focus on reducing direct methane emissions from the waste and agriculture sectors and further improve the carbon sink potential of its forests. Methane is a potent GHG, with a global warming potential—that is, the capacity to absorb infrared thermal radiation and warm up the atmosphere—that is about 30 times that of CO2. It also contributes to the formation of ground-level ozone, a dangerous air pollutant.[109]

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

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

In an optimistic growth scenario, Montenegro would have to make additional efforts to achieve economy-wide net zero targets. In 2050, Montenegro's GDP is assumed to be about 95 percent higher in the NZE-HG than in the NZE and RS, which would correspond to a similar increase in the demand for services. But efforts to further improve energy efficiency could lead to an increase in final energy demand of only about 60 percent compared to the NZE. In addition, in the NZE-HG, meeting the decarbonization targets would require resorting to higher levels of the penetration of cleaner technologies across all sectors. For example, in the NZE-HG, Montenegro would have to install about 3.8 GW of solar capacity (versus 1.5 GW in the NZE). In 2050, electricity would account for almost 70 percent of the total final energy consumption (versus 60 percent in the NZE). In the NZE-HG, electricity generation and supply costs would be slightly higher than in the NZE in the medium term, but they would converge toward the NZE values in the long term.

3.3. Incremental investments needed for decarbonization.

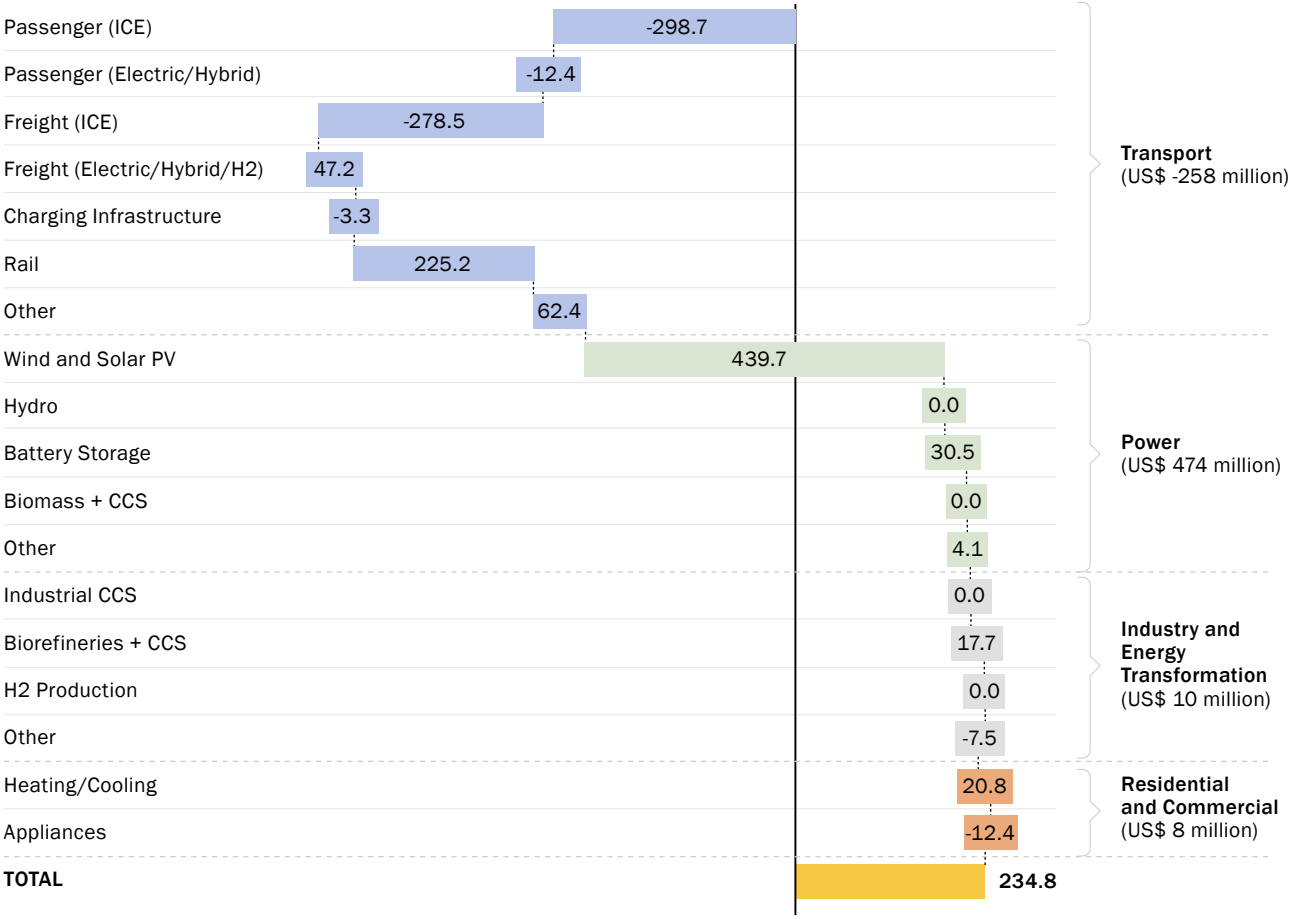
Overall, compared to the RS, in the NZE Montenegro would need to invest in the energy system an additional US$235 million until 2050 (expressed in present values and in 2020 dollars) to achieve economy-wide net zero. This investment is incremental to the discounted investments required in the RS,

[109] CCAC and UNEP, 2021. Global Methane Assessment. https://www.ccacoalition.org/resources/global-methane-assessment-full-report

which amount to US$21.3 billion until 2050. Approximately 72 percent of the investments could come from the private sector (including households). The incremental investment would be equivalent to 0.2 percent of GDP per year on average until 2050, but it would be distributed unevenly over time. Until 2030, the incremental investment would be around 0.1 percent of GDP on average, while from 2031 to 2040, this would increase to 0.4 percent on average.

The incremental investment would also be unevenly distributed across sectors, with most of it going to the power sector. The incremental investment by 2050 (US$235 million) would be composed of positive and negative contributions from the power sector (US$475 million), industry and energy transformation (US$10 million), transport (US$258 million), and the residential and commercial sectors (US$8 million) (all expressed in 2020 dollars). Figure 3.3 shows the breakdown by subsector. In the power sector, the incremental investment would be directed toward the scale-up of solar PV and wind capacities. On the other hand, in the NZE, investments in the transport sector would be lower than in the RS thanks to the implementation of Avoid strategies to reduce demand and Shift strategies to support the shift to collective modes of transport (for example, buses and trains), which would reduce the need for private ve*hicles*.

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



Source: World Bank analysis

In absolute terms, the energy transition would be costlier in the NZE-HG because a larger economy corresponds to higher levels of energy demand, and the required investments would be higher than in NZE in terms of share of GDP. In the NZE-HG, to achieve economy-wide net zero, Montenegro would need to invest US$25.3 billion in the energy system until 2050 (versus US$21.5 billion in the NZE), all expressed in present values and in 2020 dollars. In the NZE-HG, the incremental investments (calculated compared to a different reference scenario in which GDP growth is the same as in the NZE-HG) would correspond to about 0.6 percent of GDP on average until 2050, versus around 0.3 percent in the NZE.

3.4. Human capital and labor market transformations

The green transition in Montenegro will require significant retraining that goes beyond Montenegro's high-polluting sectors. Transitioning to greener forms of production, distribution, and consumption can affect the labor market positively or negatively. The effects go beyond the most polluting industries (for example, coal mining) because significant transformations will be seen in other occupations (for example, mechanical engineering). This requires investment in retraining and upskilling to remain productive in a given occupation, or to move to another occupation with similar skill requirements. The extent of this reskilling depends on the gap between the current skills and the future skills required. Reskilling and upskilling can be considered short-term investments, but the evolving demand for labor will require longer-term investments to enhance the human capital needed for Montenegro to reach net zero by 2050. This means structural reforms will be necessary in the education system.

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

The skills impact on the Montenegro economy will go beyond just the brown industries, with a significant share of the workforce requiring upskilling or retraining in the medium run. In the Western Balkans, on average only 4.9 percent of jobs are in the brown industries, but the green transition will affect approximately one out of six workers in the entire labor force because of changes in technology or business models. Thousands of workers are especially at risk because they are employed in occupations for which a high percentage of jobs will need retraining and for which the skills gap is large.[110] Missing the required investments in retraining and upskilling will put individuals at risk of unemployment, and firms at risk of missing growth opportunities owing to a lack of an adequately trained workforce.

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

The skills most needed for the transition involve cognitive abilities and knowledge of STEM—science, technology, engineering, and mathematics. In contrast with physical or psychomotor abilities, developing cognitively based skills takes substantial time. Skills such as complex problem solving, critical thinking, and equipment maintenance are also needed, while social skills are of a second order of importance. To facilitate this skills development, Active Labor Market Policies (ALMPs) that support on-the-job training or upskilling for unemployed people will not be enough. They will need to be complemented with long-term education and training reforms. This also requires adjustments on the supply side of training provision beyond just the classical education system, including training for adult workers, with an increasing role for the private sector to play. Our estimates show that, in the WB6 countries, on average, the cost of retraining and reskilling the most at-risk workers varies between 0.4 percent of current GDP if they are retrained into safe occupations, and up to 1.4 percent of current GDP if they are retrained into green occupations. For Montenegro, this would mean from US$21 million to US$75 million per year to implement.

[110] These occupations across the Western Balkans are classified in the O*Net model and include 1. Wood Treaters, Cabinet-makers and Related Trades Workers; 2. Other Craft and Related Workers; 3. Metal Processing and Finishing Plant Operators; 3. Rubber, Plastic and Paper Products Machine Operators; 4. Food and Related Products Machine Operators; 5. Wood Processing and Papermaking Plant Operators; 6. Other Stationary Plant and Machine Operators; 7. Heavy Truck and Bus Drivers; 8. Manufacturing Labourers; and 9. Other Elementary Workers.

For climate change mitigation, green technologies must be absorbed, adapted, and developed to align with local needs and circumstances. Although catching-up economies rarely operate at the technology frontier, their rate of economic growth depends on their capacity to absorb institutional and technological advancements that bring them closer to the more developed economies (Lee at al. 2021).[111] Technology absorption refers to the acquisition, development, assimilation, and utilization of technological knowledge and capability by firms and other entities from external sources. It entails mastering specific technologies, adjusting them to local needs, and creating rich knowledge spillovers that can then lead to further innovations. Developing and deploying green technologies the absorption of technology in this way, and will requires that skills acquisition be complemented with other relevant resources and cross-sectoral partnerships. Enabling this to occur will require collaboration between the public and private sectors in research, development, and innovation, with an emphasis on cofinancing.

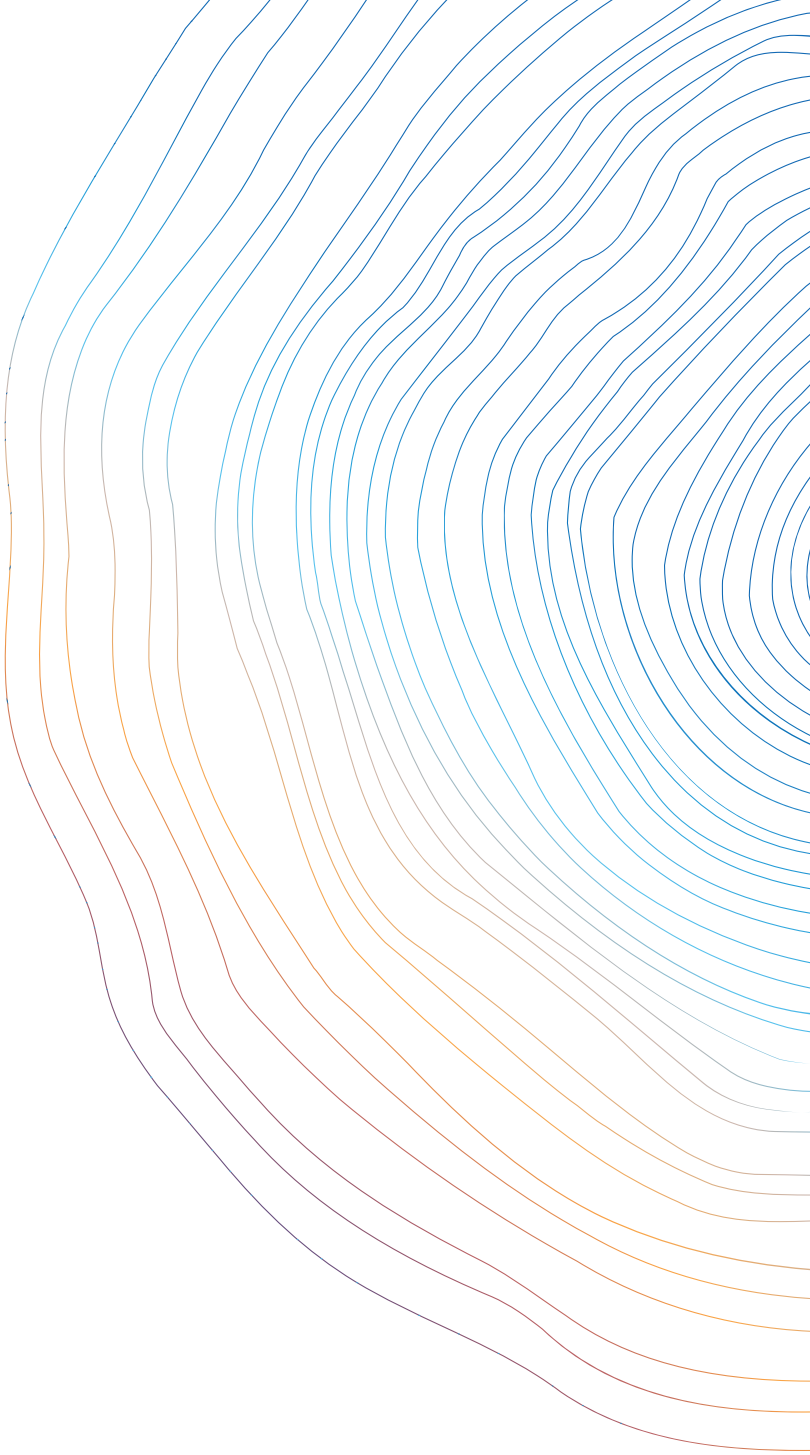
Health systems have a role in supporting the green transition and people who migrate because of climate change. Extreme weather conditions can affect occupational health through channels such as heat stress and outdoor workers' exposure to poor air quality.[112] The health system can therefore support occupational health through the training of health workers and public awareness campaigns that promote the recognition and management of climate-related occupational health issues. Additionally, in the medium to long term, with the change of jobs from brown to green, the type of job-related hazards and the type of occupational health support necessary will change, for which health systems will need to respond adequately. The health system can provide mental health and counselling services for workers who experience the direct effects of extreme weather events or are involved in disaster response efforts.[113] Similarly, as the green transition progresses, the need for mental health support will increase due to the psychological effect of climate change and it impacts. Lastly, because people who migrate in response to climate change may have limited access to health services and insurance,[114] the health system needs to be agile enough and ready to adapt to climate change and green transition-related migrations to provide adequate health care support when and where necessary. That would include enhancing the provision of health services in new settlement areas and optimizing service provision in old ones. In these processes, special attention will need to be given to the needs of the most vulnerable and at-risk populations to ensure equitable access to various health services,

[111] Lee, Jeong-Dong, Keun Lee, Dirk Meissner, Slavo Radosevic, and Nicholas S. Vonortas. 2021. "Technology Upgrading and Economic Catch-Up Context, Overview, and Conclusions". In: The Challenges of Technology and Economic Catch-up in Emerging Economies, edited by Jeong-Dong Lee, Keun Lee, Dirk Meissner, Slavo Radosevic, and Nicholas S. Vonortas. Oxford: Oxford University Press, pp. 1-34.

[112] CDC (2023). Occupation safety and health and climate. https://www.cdc.gov/niosh/climate/about/index.html.

[113] Schulte PA, Bhattacharya A, Butler CR, Chun HK, Jacklitsch B, Jacobs T, Kiefer M, Lincoln J, Pendergrass S, Shire J, Watson J, Wagner GR. Advancing the framework for considering the effects of climate change on worker safety and health. J Occup Environ Hyg. 2016 Nov;13(11):847-65. https://doi.org/10.1080/15459624.2016.1179388. PMID: 27115294; PMCID: PMC5017900.

[114] Lebano, A., Hamed, S., Bradby, H. et al. Migrants' and refugees' health status and healthcare in Europe: a scoping literature review. BMC Public Health 20, 1039 (2020). Link



Chapter 4

Economic impacts and growth opportunities

4.1. Macroeconomic impact

4.1.1. Introduction

Montenegro is a small state in the Western Balkans, set on achieving European Union membership by 2028. Economic impact analysis was carried out to assess the economic and distributional impacts of pathways presented in the earlier sections. The analysis assessed the economic impact of climate-intensified damage, and the economic and poverty impacts of decarbonization pathways, using the Macro-Structural Model with climate module (CC-MFMod) developed by the World Bank, together with the Carbon Price Assessment Tool (CPAT) developed jointly by the World Bank and the IMF. Based on this analysis, the chapter also identifies financing needs and structural and regulatory issues that need to be addressed to capitalize on the need for adaptation and mitigation, by investing in a greener and more productive economy. While increased and more diversified trade is an integral part of any strategy for growth and for resilience, especially for the Western Balkans, this section also points out opportunities in green value chains that could be further explored.

4.1.2. The impact of adaptation risks on the economy

Montenegro can be expected to have significant damages from climate change based on the analysis of three climate hazards, the largest impact coming from riverine flooding. The hazards modeled were: riverine floods, labor heat stress, and droughts (via their impact on maize and wheat yields only). The combined impact of the three hazards on output (GDP) by the year 2050 was a 7.9 percent drop under RCP 4.5 with trend growth. See Table 4.1, top panel (i.e. Without adaptation investments). Relative to RCP 4.5, damages were about 2 percentage points higher under RCP 2.6 and only marginally higher under RCP 8.5. This is because the largest driver of the damages is riverine flooding, with decreasing average risk as RCPs increase due to the overall drying of the region. For comparison, the average combined damages for the Western Balkans in 2050 under trend growth and RCP 4.5 are a 8.9 percent drop in output. Under optimistic growth, for Montenegro the combined damages under RCP 4.5 are 7.0 percent loss in output in 2050, while for the Western Balkans the comparable number is 8.9 percent. It is important to note that the modeling approach is based on average risk metrics and may lead to an underestimation of the impacts of certain hydrological extremes, in particular, flash floods).

TABLE 4.1: Projected damage and economic impact in the trend growth scenario

Real GDP % *deviation from baseline**	**RCP 2.6**			**RCP 4.5**			**RCP 8.5**		
Without adaptation investments									
	2030	**2040**	**2050**	**2030**	**2040**	**2050**	**2030**	**2040**	**2050**
Riverine floods	-3.9	-7.4	-9.6	-2.9	-5.6	-7.3	-2.8	-5.5	-7.2
Heat stress	-0.1	-0.3	-0.4	-0.2	-0.4	-0.6	-0.3	-0.6	-0.9
Droughts**	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Combined	*-4.1*	*-7.7*	*-10.0*	*-3.2*	*-6.0*	*-7.9*	*-3.2*	*-6.2*	*-8.1*
With adaptation investments									
	2030	**2040**	**2050**	**2030**	**2040**	**2050**	**2030**	**2040**	**2050**
Riverine floods	-2.8	-5.5	-7.2	-1.9	-3.7	-4.9	-1.9	-3.7	-4.8
Heat stress	-0.1	-0.2	-0.2	-0.1	-0.3	-0.4	-0.2	-0.4	-0.6
Droughts**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combined	*-2.9*	*-5.6*	*-7.4*	*-2.0*	*-4.0*	*-5.3*	*-2.1*	*-4.0*	*-5.4*

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

**Droughts via their impact on maize and wheat.

Sources: World Bank staff estimates using MFMOD with inputs from JBA, IIASA and CIMA.

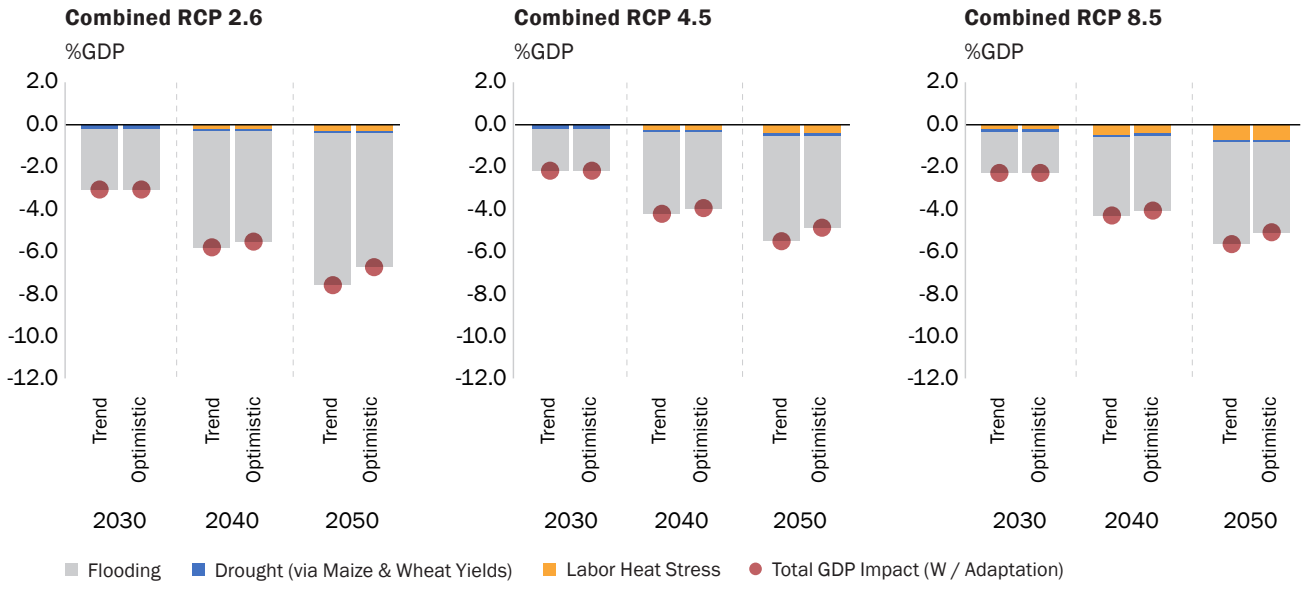
Montenegro is also vulnerable to damage from its exposure to earthquakes. Considering the country's risk of exposure, damage associated with earthquakes could reduce output by 5.5 percent under the trend scenario, and 4.8 percent under the optimistic growth scenario by 2050. This indicative metric offers an estimate of Montenegro's potential exposure to earthquake damage but does not capture the impact of extreme events to which the country could be exposed.

The effect of climate damages on fiscal aggregates is expected to be moderate: public debt is expected to increase, although less so in the high-growth scenario. Revenues are expected to experience a small decline as a share of GDP while expenditures are expected experience a small increase as a share of GDP, owing to the contraction of the economy. As a result, the fiscal deficit increases by almost one percent of GDP a year, which adds up to about 16 percentage points increase in public debt in 2050 with RCP 8.5 under trends growth and about 12 percentage points of GDP under optimistic growth for the same RCP.

The current account balance is expected to improve slightly. The current account's projected deviation from the baseline is an increase (improvement) of nearly 3 percentage points of GDP in 2050 under trend growth in all three RCPs (2.6, 4.5. 8.5) and nearly 2 percentage points of GDP under optimistic growth for all RCPs. The impact on current account balances can be attributed primarily to a reduction in domestic demand due to the negative GDP impact, and therefore to improved net exports.

Adaptation investments could reduce output losses; benefits to investments increase over time. Based on the modeling results of the three climate hazards, adaptation investments amounting on average to 0.6 percent of GDP a year through 2050 in all three RCPs (2.6, 4.5. 8.5) would result in combined GDP losses in 2050 of 5.3 percent under the trend scenario, compared to a 7.9 percent loss without adaptation investment under RCP 4.5. See Table 4.1, bottom panel (i.e. With adaptation investments) and Figure 4.1. As noted previously, the modeling results capture the lower-bound estimates of the benefits of adaptation investments for selected sectors; this estimate is dominated by simple investments that facilitate annual projections through 2050 and could be refined based on sector specific investments, with a view to yielding lower costs and higher benefits. Montenegro's benefits from investing in adaptation are expected to increase over time and be higher under more severe climate change scenarios.

FIGURE 4.1: GDP loss under RCP 2.6, RCP 4.5 and RCP 8.5 with adaptation under trend and optimistic growth (percentage deviation from the baseline)



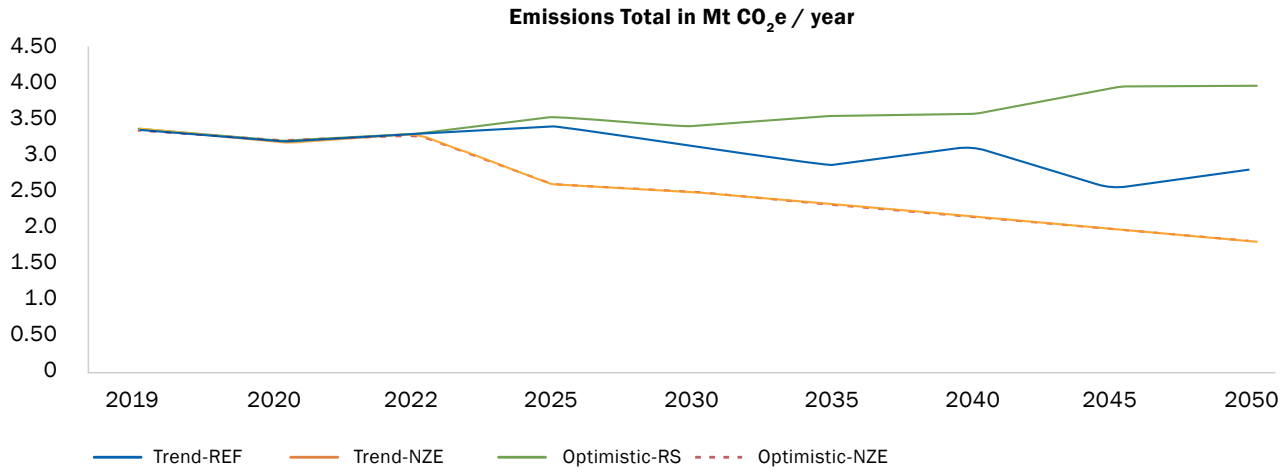
Sources: World Bank staff estimates using MFMOD with inputs from JBA, IIASA and CIMA.

The impact of adaptation investments on fiscal balances can be significant if the government carries the full share of the adaptation investment. In a hypothetical example of the public sector undertaking the total amount of adaptation investments for the three climate hazards modeled, the budget deficit would deteriorate

significantly. The deterioration would come from a contraction in revenues, contracting the economy and increasing public expenditure to cover adaptation investments. Under such a scenario, in 2050, public debt levels would worsen by about 34 percentage points of GDP under the trend growth scenario (this result is roughly consistent for the three RCPs), and about 22.5 percentage points of GDP under the optimistic growth scenario (this result is also roughly consistent for the three RCPs). In a scenario with adaptation investments, the current account improves but by less than the non-adaptation scenario.

4.1.3. The impact of mitigation on the economy

FIGURE 4.2: Total emissions of the economy in the NZE and RS scenarios, under trend and optimistic growth (in $MtCO_2$ per year)[115]



Source: WDI and staff estimates based on TIMES model

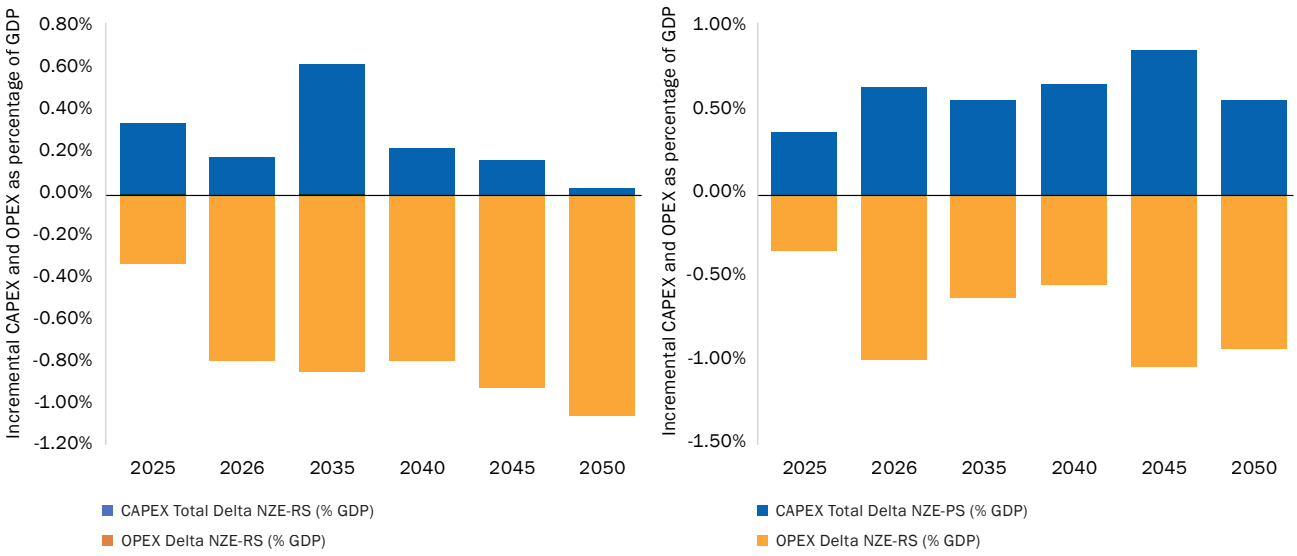
For Montenegro, the net zero transition demands moderately small amounts of incremental invest-ment relative to the reference scenario under trend growth, and slightly higher investment under optimistic growth. Figure 4.2 shows total emissions under trend and optimistic growth (without LULUCF) in the reference scenario and the net zero scenario. It shows that while Montenegro's emissions would be declining in the reference scenario under trend growth, they would need to decline even more to achieve net zero. Under optimistic growth, total emissions would rise in the reference scenario, and would have to be reduced almost by half in 2050 to achieve net zero.

Montenegro's incremental capital investment needs to achieve net zero are moderate to small (depending on the year). The estimated incremental capital investment in the NZE relative to the RS under the trend growth is projected to average about 0.2 percentage points of GDP annually during 2025-2050, with a surge around 2035 (Figure 4.2). The higher incremental investment under net zero reflects an increase in investments in power utilities necessary to expand capacity for solar and wind until around 2035, alongside a significant reduction in investment in hydro, which is nearly eliminated after 2040. The estimated incremental capital investment in the NZE relative to the RS under the optimistic growth is projected to average about 0.6 percentage points of GDP annually during 2025-2050 (Figure 4.2). The timing of the incremental investment between the NZE and RS scenarios under the two growth scenarios differs. Under trend growth, the highest incremental investment is 0.61 percent of GDP for 2031 and 2032, while under trend growth it is 0.94 in 2041. Both scenarios assume that the private sector (including households) will primarily fund the investment; the private contribution under trend growth is about 72 percent and under optimistic growth is about 77 percent.

[115] The modeling approach supports the investigation of incremental differences between energy scenarios, but it is not ideally suited for investigating the historical trends and connecting them to either the RS or the NZE scenarios.

The transition to NZE scenario has a negative but relatively small impact on GDP compared to the RS. The small adverse impact of the incremental investment on GDP under the NZE is largely driven by the need to replace existing power generation capacity with new capacity consistent with the decarbonization plan. In addition, increases in investment from the energy transition drive up resource costs in the economy (interest rates and wages) and prompt a slowdown growth. Figure 4.5 is illustrative. The incremental investment in power utilities needed to replace existing capacity (peaking at about half a percentage point of GDP in 2025) will have an adverse effect on the level of GDP, which would drop by approximately 2 percentage points in 2025 under both trend and optimistic growth scenarios. In subsequent years, the net impact of the NZE on GDP diminishes as productive investments pick up so that, by 2050, GDP will be lower by 0.7 percent relative to RS.

FIGURE 4.3: Incremental CAPEX and OPEX of the energy system under trend growth[116]



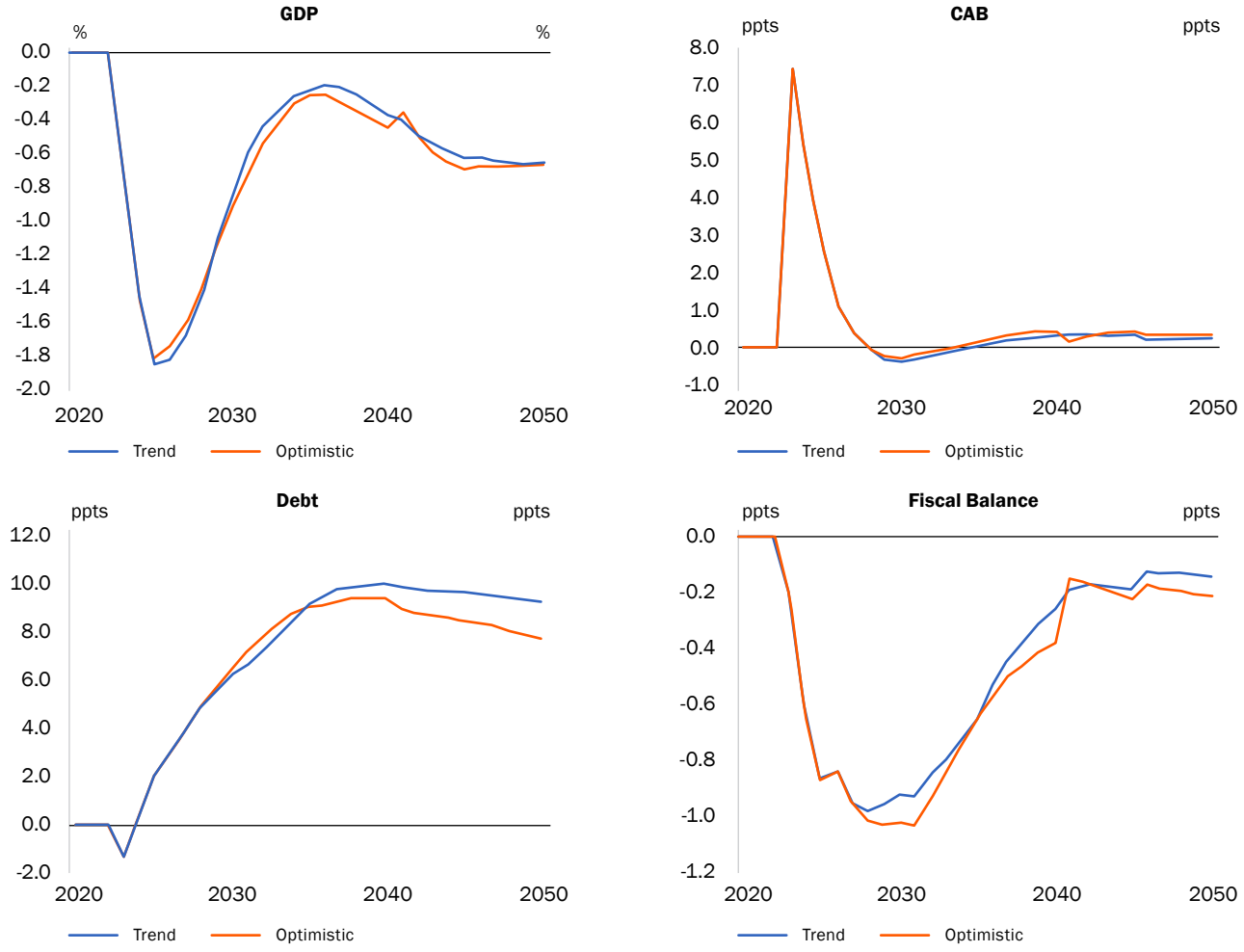
Source: WDI and staff estimates based on TIMES model, transport model, and the carbon price assessment tool (CPAT)

The incremental impact of the NZE on the external account, on the fiscal balance, and on public debt, is small but positive. The impact of the energy transition on the external account (Figure 4.5b) is driven by the reduction in fossil fuel imports, but it is affected by the need for energy trade. The spike in Figure 4.5b mirrors the temporary GDP drop shown by Figure 4.5a The impact of the energy transition on the fiscal balance is mostly negative but small, owing to the jump in public investment under the NZE scenario which peaks in 2035 (Figure 4.5c). The jump in the fiscal deficit from 2025 is also mirrored in higher levels of public debt (Figure 4.5d). In the optimistic growth scenario, the higher investment needs in 2040 and 2045 lead to reduced fiscal savings and a more gradual reduction of the public debt.

The transition the NZE is expected to yield a small amount of co-benefits to Montenegro, relative to its Western Balkans neighbors. Figure 4.6 shows the co-benefits from the NZE transition for the Western Balkans. For most countries the largest co-benefits come from the reduction in air pollution. Additional benefits come the transport sector, notably reduced mortality from road accidents and decreased costs associated with road maintenance. The net-zero transition 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 Business as Usual (BAU) scenario across the six countries. However, it's essential to note that in the cases of Kosovo and Montenegro, the net zero scenario would lead to an increase in air pollution mortality. This rise can be attributed mainly to higher biomass use in the residential sector, which, while carbon-neutral, does contribute to local pollution. Hence, it becomes imperative to enforce stringent emission standards to mitigate these negative health impacts effectively.

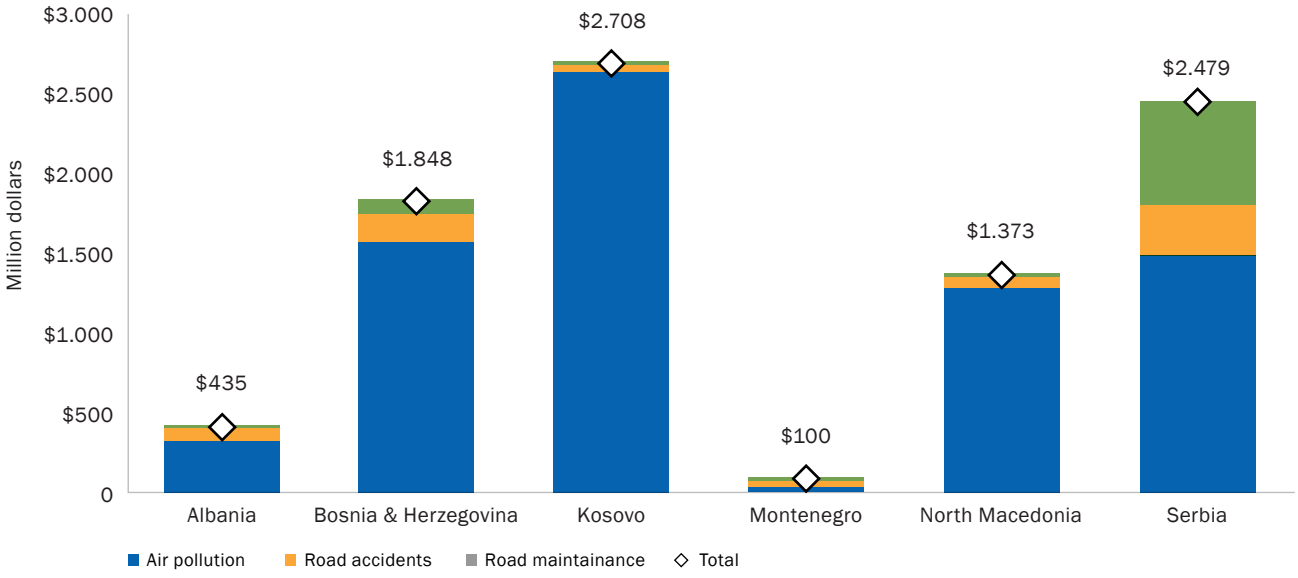
[116] The dynamics observed in the transport sector include a shift to greater use of public transport.

FIGURE 4.5: Incremental impact on macroeconomic aggregates of the NZE over the RS scenarios including co-benefits, under trend and optimistic growth



Source: WDI and staff estimates based on TIMES model, transport model, the macro-structural model with climate module (MFMOD), and CPAT

FIGURE 4.6: Present value of externalities in 2023 (flows until 2050, discount rate of 6%) in 2021, $US million



Source: World Bank staff calculations, based on TIMES model results, using the Climate Policy Assessment Tool (CPAT)

4.1.4. Poverty and distributional impact

Energy transition will involve adjustment in both direct and indirect prices, which will burden households with an expected loss of about 0.47 percent of total consumption per year over the period 2030–2050. Specifically, the NZE scenario would lead to average annual losses of 1.10, 1.02, and 0.73 percent of total household consumption in 2030, 2035, and 2050, respectively. The primary cost driver is the price of electricity, representing a "direct" incidence effect, while the "indirect" incidence effect encompasses increases in the consumption of fossil fuel-intensive, non-energy products.

In the NZE scenario, household consumption losses are equitably distributed between urban and rural households. Over time, the magnitude of these effects remains consistent within both subsamples. At the margin, urban households are expected to experience slightly higher losses; for 2050, approximately 0.8 percentage points consumption loss in urban compared to 0.7 percent consumption loss in rural.

Consumption inequality is expected to increase, reflecting the regressive nature of the NZE scenario. The rise in the consumption-based Gini coefficient is projected to be about 0.16 percent (average for 2025, 2030, 2035, 2050). This inequality results from the disproportionately large share of direct electricity consumption in the consumption baskets of households, coupled with relatively higher price increases for electricity. The "indirect" incidence appears minimal and does not significantly affect the overall redistribution under the NZE scenario. However, attention to households' electricity costs remains important.

Revenue recycling could significantly mitigate the initial household consumption losses associated with the NZE scenario. For instance, in 2030, redirecting revenues generated from policies within the NZE scenario toward targeted transfers for the bottom 40 percent of the consumption distribution could effectively offset approximately 93 percent of the average household consumption loss, with rural households experiencing the greatest gains. More importantly, the design of targeted cash transfers would inherently enhance overall progressivity under the NZE scenario by reducing consumption losses for households in the first four consumption deciles.

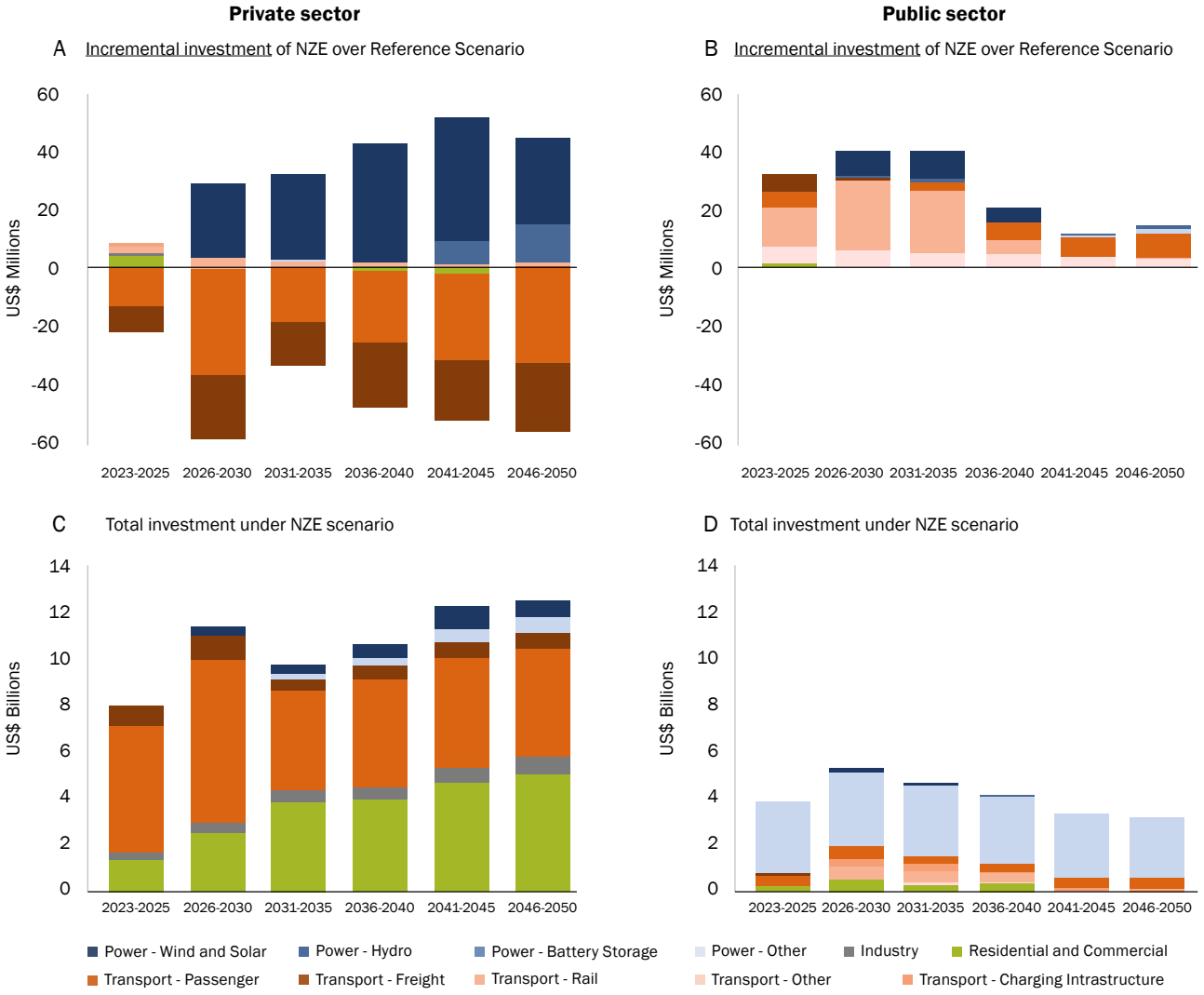
4.2. Financing of investments

4.2.1. Investment needs for adaptation and mitigation

Montenegro's incremental annual adaptation (from three hazards only) and mitigation investment needs come to 0.6 percent and 0.2 percentage points of GDP respectively for 2025-2050. The estimates come from the two separate modeling exercises reported in the preceding sections. They relied on the same GDP baseline and were run for trend growth and optimistic growth scenarios. The adaptation modeling exercise based on investments to mitigate the three hazards only (riverine floods, drought impact on maize and wheat, and labor heat stress) suggests average annual incremental investment rates of 0.9, 0.6, and 0.4 percentage points of GDP for 2025-30, 2031-40, and 2041-50 respectively. The mitigation exercise suggests average annual incremental investment rates of 0.2, 0.4, and 0.1 percentage points of GDP for 2025-30, 2031-40, and 2041-50 respectively. The incremental investment rates that emerge from the analysis in this report seem manageable for Montenegro, though they appear to be front loaded. Incremental adaptation investments will need to be front loaded while mitigation investments will need to be back loaded. Montenegro's incremental investment needs are lower than the Western Balkan's average, of 1.3 and 1.9 percentage points of GDP for 2025-50 for adaptation and mitigation respectively.[117]

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

FIGURE 4.7: Total (NZE scenario) and incremental (NZE vs. Reference scenarios) investments



Source: TIMES Model. Numbers represent undiscounted annual investment, averaged over the period.
Note: The numbers represent undiscounted annual investment, averaged over the period.

For mitigation, the net zero scenario under trend growth requires total public and private investment between 2026 and 2050 of US$39.34 billion (in 2020 dollars, not discounted). Chapter 3 (Figure 3.3) showed the discounted investment gap, the difference between NZE and RS investments at the sectoral level through 2050 in discounted dollars. A breakdown of this figure shows two things. First, Figures 4.7A and B show a different time profile for the incremental investment between government and the private sector: the incremental government investment is frontloaded and largely on rail transport, while the incremental private investment is backloaded and largely on wind and solar. The incremental private investment in the transport sector is negative, which indicates that private investment in road transport is larger in the RS than in the NZE. In other words, the investment needed for electric vehicles in NZE is lower than the investment needed for internal combustion engine (i.e. gasoline and diesel-engine) vehicles in RS. The sectors for incremental investment can be viewed as sectors toward which the economy needs to pivot. Looking at total investment under the net zero scenario, Figures 4.7C and D show that the private sector is expected to undertake most of the investment (US$29.31 billion, 74.5 percent), with the public sector accounting for 25.5 percent (US$10.03 billion). The major investment categories, by sector, between 2026 and 2050 include transport (US$16.86, 42.9 percent of the total—88.8 percent private and 11.2 percent public), residential and commercial buildings (US$11.04 billion, 28.1 percent—94.2 percent private and 5.8 percent public) and power (US$9.95 billion, 25.3 percent—24.7 percent private, 75.3 percent public). Importantly, while passenger transport and residential

and commercial buildings are expected to be common interests, certain areas for investment are expected to differ between the public and private sectors. The private sector is expected to focus on freight transport, residential and commercial buildings, and wind and solar, while the public sector is expected to focus on transmission lines and rail transport.

There are opportunities for private sector investment in building sustainable transport, including rail and urban logistics. With the support of EU funds, Montenegro's national and subnational government entities could use PPPs to expand the rail infrastructure and improve service quality, increasing competitiveness for both passenger and freight transport. Montenegro has already received EU support for extending the country's rail network, which is part of the Orient/East-Med Corridor (WBIF 2024a). Core rail networks — for example, the rail connecting Montenegro with Albania and Serbia — need to comply with Trans-European Transport Network (TEN-T) standards by 2035, which would enable a gradual shift from private road transport to rail for both passenger and freight and improve coordination of international rail freight traffic. Private sector participation can also be expanded in urban logistics and emerging transport modes — for example, Mobility as a Service (MaaS). Yet state-owned transport enterprises need to be reformed to improve the market orientation of transport operators, enable access to finance, and increase service efficiency.

The private and financial sectors could support the development of a local EV market. Montenegro's EV market is still nascent.[118] While some vehicle dealers and distributors are offering different EV models, to date, demand is limited. The financial sector could play a crucial role in creating favorable conditions for the purchase of EVs and other low-carbon technologies. Montenegro's financial sector has well-established business models on lending for vehicle purchasing, but there is room to strengthen and promote "eco" credit lines. International and local financial institutions and local development banks could tap into EU and bilateral donor funds to create special credit lines for companies and individuals, offering tailored packages to support the purchase of EVs under favorable conditions. Leasing companies and microfinance organizations could also provide low-interest financing and specialized operational leasing offers to individuals, companies, and public institutions interested in buying EVs or electrifying highly utilized fleets such as commercial buses, ridesharing fleets, and taxicabs.

The private sector could participate in developing Montenegro's e-mobility sector. Montenegro's e-mobility sector is still underdeveloped, and only few charging stations exist, mainly in vehicle showrooms or service workshops.[119] With the help of EU funds, national and subnational government entities could leverage PPPs and traditional procurement tools to finance pilot projects to start developing EV-charging infrastructure along main corridors. Over time, as EV adoption increases, this could facilitate the roll-out of publicly available charging infrastructure, with decreasing public sector participation over time. Under a coherent policy framework, domestic providers of services linked to e-mobility could be involved, such as the Electric Power Industry of Montenegro for producing charging stations, telecommunication service operators, or petroleum product distributors. Some of these domestic service providers are planning to build charging stations throughout Montenegro, offering solutions for installing electrical chargers (up to 2x22 kW), for example, at existing gas stations, together with their commissioning, integration into central regional portals, user authorization, and billing.[120]

Montenegro can build on its competitive advantage in clean energy to attract private sector investment to boost wind-, solar- and hydro power. With solar and wind energy costs falling, there has been increased private sector participation in the provision of renewable energy without government support in Montenegro. The newly formed Ministry of Energy and Mining plans to build a stable energy system, leveraging Montenegro's significant hydropower potential, via hydropower plant projects in Cehotina and Krusevo.[121] Montenegro has recently approved the Law on the Use of Energy from Renewable Sources, in alignment with the EU's Renewable

[118] Energy Institute Hrvoje Požar. 2019. E-Mobility Market Analysis in Montenegro. https://www.undp.org/sites/g/files/zskgke326/files/migration/me/E-mobility-market-analyses.pdf.

[119] ibid.

[120] ibid.

[121] Balkan Green Energy News. 2023. Montenegro on track to add 4 GW of solar and wind, seeks EU support for green steel roll-out. https://balkangreenenergynews.com/montenegro-on-track-to-add-4-gw-of-solar-and-wind-seeks-eu-support-for-green-steel-roll-out/.

Energy Directive.[122] A key provision of the new law is the introduction of an auction system to support renewable energy projects, with the first auctions expected in 2025. The new legislation provides a solid framework to foster the adoption of renewable energy, offering investment incentives like streamlined permitting processes, guaranteed grid access for green energy producers, and financial backing to attract both local and international investors. Increasing the share of renewable energy is also crucial in relation to the EU's carbon border adjustment mechanism (CBAM) because access to clean energy would allow Montenegro's exporters of often highly energy-intensive products to reduce their CBAM Scope 2 emissions.[123] To unlock Montenegro's potential to export clean energy, the country needs to facilitate access to imported low-carbon technologies[124] and strengthen the energy links between the Western Balkans and the European Union. For Montenegro to exploit its geographical position and become a regional hub for clean energy exports, functioning submarine cables between Italy and Montenegro are crucial. Although the first energy link, the 600 MW capacity Italy–Montenegro interconnector, was successfully installed, the second strand of submarine cable — the Pljevlja–Bajina Basta transmission line — has experienced blockages because of unresolved property legal claims and issues to do with the planning documentation for its construction corridor.[125]

Montenegro's private banks and the Investment and Development Fund of Montenegro (IFD) could play a strategic role in leveraging sector-specific EU funds to introduce incentive measures that integrate economic, environmental, and social development goals, for example, via performance-based payment schemes. The IFD is a nonfinancial development institution of the state, established in 2009 through the adoption of the Law on the Investment and Development Fund of Montenegro.[126] The IFD could expand the range of credit support, for example, in the field of energy efficiency for the SME sector, thereby increasing green lending by building on existing programs. For instance, in November 2023, a €2 million loan was provided to NLB Banka Podgorica for on-lending to support residential homeowners through the WBIF, as part of the Regional Energy Efficiency Programme, supported by the EU and Austria.[127] The funds include technical assistance to identify and purchase energy-saving equipment (for example, insulation, heat pumps, and solar panels) and incentive payments of 20 percent of loan value upon successful installation. In expanding its role, the IFD could leverage this and other targeted EU and bilateral funds provided through the Green Economy Financing Facility (GEFF), earmarked for high-performance green technologies, materials for privately-owned residential buildings, and energy-efficient investments in residential buildings to cut costs and CO_2 emissions.[128]

Montenegro needs to improve its competition policy if it seeks to attract private investment for mitigation and adaptation at scale. Montenegro has progressed with harmonizing its competition policy legislation with that of the EU, but there is a need for institutional changes to improve its enforcement, which has been lagging. In many sectors of Montenegro's economy, SOEs, typically inefficient and uncompetitive, dominate the market, including network sectors, industry, social, and commercial sectors such as entertainment. Montenegro's Law on the Protection of Competition does not apply to certain economic activities, called "public interest activities," which has the effect of exempting many SOEs from needing to be competitive because those "public interest activities" are not clearly defined. As a result, many SOEs in practice are granted undue de facto (if not de jure) advantages over private firms,[129] disincentivizing private firms from entering certain sectors. Additionally, Montenegro's competition authority does not have the mandate to impose sanctions for antitrust infringements, which limits its ability to effectively enforce the rules of fair

[122] Government of Montenegro (2024). Press release from the 34th cabinet session. https://www.gov.me/en/article/press-release-from-the-34th-cabinet-session

[123] World Bank, Montenegro Country Economic Memorandum: Towards a Sustainable Growth Strategy, June 2022. Background paper Harnessing trade as an engine for economic transformation and green recovery.

[124] World Bank, Montenegro Country Economic Memorandum: Towards a Sustainable Growth Strategy, June 2022.

[125] Mirjačić, M. 2023. The second strand of the submarine cable between Italy and Montenegro is blocked. https://en.vijesti.me/news-b/economy-d/684342/the-second-line-of-the-submarine-cable-between-Italy-and-Montenegro-is-blocked

[126] Investment and Development Fund of Montenegro (2024). "About IDF". https://www.irfcg.me/en/article/about-idf

[127] Ahlemeyer, V. 2023. EBRD, EU and Austria boost green investments in Montenegro. https://www.ebrd.com/news/2023/ebrd-eu-and-austria-boost-green-investments-in-montenegro.html

[128] ibid

[129] World Bank, Montenegro Country Economic Memorandum: Towards a Sustainable Growth Strategy, June 2022.

competition. In the absence of an efficient control system and an appropriate sanction mechanism to limit the power of inefficient monopolies, the competition authority lacks the ability to detect cartels or collusion behaviors with its existing mechanisms. In many sectors of the economy, improving the efficiency of product and service delivery partly requires reducing the dominance of Montenegro's SOEs. This could be achieved by (i) improving corporate governance and narrowing the scope of SOE participation in the economy, and (ii) leveling the playing field by ensuring that SOEs and private companies be treated equally when it comes to dispensing state aid or investment incentives. See Annex E for an overview of the interplay between climate change and businesses of the state (BOS).

4.4.2. Green finance

More than 70 percent of additional capital investments needed to meet the decarbonization target could be undertaken by the private sector. As shown by Figure 4.7, private investment is expected to play a significant role in the decarbonization of Montenegro's transport, building, and power sectors. In addition, firms also need to invest in adapting to climate change. According to the latest available World Bank Enterprise Survey (2023), the percentage of firms experiencing electrical outages (55.4 percent) and damage of physical assets due to extreme weather (10.7 percent) is significantly higher in Montenegro than the average in ECA (27.5 and 6.1 percent, respectively). As the severity of these shocks increases with climate change, Montenegro can act in several fronts to help firms decarbonize while building climate resilience. First and foremost, having a regulatory environment that fosters competition and promotes low-carbon innovation is critical. As the entire region moves toward EU integration, the harmonization of legal and regulatory frameworks around energy and climate can facilitate the access to FDI. Public-private partnerships (PPPs) can play an important role in crowding-in private investment, especially in sectors that can generate long-term revenue streams, such as rail and road transport. Debt-based financing instruments, such as corporate green bonds and loans, are particularly suitable for solar and wind power investment, and green mortgages can support the decarbonization of the building sector. Capturing these opportunities will require for Montenegro to develop a green finance market.

Globally, green debt instruments play a crucial role in amplifying both public and private resources to address identified investment needs, but Montenegro is yet to take the first step of issuing guidance for thematic (green, social, and sustainability) bonds. Possessing a sufficiently developed financial system, Montenegro has issued Eurobonds in the past, setting the stage for thematic bonds in the foreseeable future. In March 2024, Montenegro issued its first dollar-denominated bond worth US$750 million on the international market, with a seven-year maturity and a 5.88 percent interest rate[130] But Montenegro's bond market still lacks depth. There is a need to increase awareness and build capacity among key entities in the financial sector regarding potential green financing options and debt instruments. To develop a green bond framework and market, the government needs to strengthen its governmental competencies in financial and operational management, on both local government level, while ensuring effective oversight. Developing an EU-aligned green taxonomy and adopting disclosure and reporting standards are crucial to enable the development of a green finance ecosystem. Montenegro can build on the country's existing legal framework to implement the EU taxonomy of sustainable activities since Montenegro has harmonized its system of classification of economic activities with the EU system via the Law on the Classification of Activities (2011).[131]

Montenegro can tap into EU pre-accession and guarantee funds to leverage additional financing. Montenegro has an adequate institutional framework for the implementation of the EU acquis chapter—a solid legislative framework, good institutional infrastructure on the Montenegro Stock Exchange, and close cooperation among institutions in the capital market.[132] Montenegro can thus access funding from the EU

[130] Pavlova, I. 2024. Montenegro sells maiden $750 mln bond amid strong demand." https://seenews.com/news/montenegro-sells-maiden-750-mln-bond-amid-strong-demand-1245300.

[131] Ibid.

[132] Ibid.

and from bilateral donors. In 2020, the European Commission adopted a comprehensive Economic and Investment Plan for the Western Balkans (2021–2027), which includes up to 9 billion EUR in targeted regional EU funds (for example, the European Fund for Southeast Europe and the Green for Growth Fund) for a range of sectors (such as transport, energy, and buildings) and issues (competitiveness, capacity development, youth employment). In 2023, the EC introduced the New Growth Plan for the Western Balkans to enhance the region's socioeconomic alignment with the EU and deepen economic ties with the EU's Single Market and within the Western Balkans via a common regional market. Implementation of the plan will occur via the recently established Reform and Growth Facility for the Western Balkans (€6 billion, 2024–2027), which includes the Western Balkans Investment Framework (WBIF) of at least €3 billion (€2 billion in grants, €1 billion in loans) to finance sustainable and climate-relevant investments, for example, on sustainable transport and clean energy. Montenegro can also make use of the EU Western Balkan Guarantee Facility, which provides guarantees to reduce the costs of financing for both public and private investments, and to reduce the risks for investors.

Guarantees (including political risk guarantees) can be a useful tool to de-risk investments and mobilize meaningful foreign private sector investments in support of Montenegro's green and resilience agenda. With the help of capital optimization instruments provided by international guarantee agencies (such as MIGA), international banks with subsidiaries in the country can reduce the regulatory risk-weighting applied to their mandatory and voluntary reserves at the consolidated level, freeing up capital for their subsidiaries. The freed-up capital can be used to finance climate mitigation and adaptation projects. Additionally, political risk guarantees covering War and Civil Disturbances, Breach of Contract, Transfer Restriction and Inconvertibility of local currency into hard currency, and Expropriation by governments can be used to de-risk investments and mobilize private capital in support of projects in strategic sectors, such as power, transport, green buildings, and contribute to the green and resilience agenda.

Montenegro has several options for adaptation investments, but virtually all of them require the government to strengthen its capacity to access EU and international donors, access the private sector, and build better public sector capacity to assess risks and access finance. Analysis suggests that national authorities lack the tools to assess their financial needs for adaptation and to access the resources required.[133] Montenegro will need to enhance its capacity to access international donors and private investment, with the public sector playing an important role in this. In particular:

- **At the international level, financial support from the EU and other international donors for climate actions could be further utilized to promote adaptation and sustainable economic development.** The Sofia Declaration on the Green Agenda for the Western Balkans, the new Growth Plan, and the EU Adaptation Strategy all aim to increase international climate finance for adaptation.[134] The Economic and Investment Plan (EIP) also provides a long-term investment package that will mobilize up to €9 billion to support green transition and climate actions, with the potential to attract an additional €20 billion investment in climate actions with the crowding in of private investors.[135] Other funds such as the Adaptation Fund, the Green Climate Fund, and the Special Climate Change Fund have also deployed billions of dollars in adaptation and could be leveraged further. Under the Adaptation Fund, an integrated, climate-resilient, transboundary, flood risk management project was launched in 2019 in the Drin River basin in the cross-border area of Montenegro.[136] With a total budget of US$9.9 million and involving 3

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

[134] European Commission. 2021. Communication From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions Empty - Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change. COM (2021) 82 final. https://www.researchgate.net/publication/307570598_Outlook_on_climate_change_adaptation_in_the_Western_Balkan_mountains.

[135] 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/

[136] 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

countries, the project is designed to improve the countries' capacity to manage flood risk at the regional, national, and local levels and to enhance the flood resilience of vulnerable communities in the river basin.

- **At the private sector level, commercial banks and firms have much to contribute.** Currently, Montenegro's private sector has low capacity to understand and respond to climate vulnerability and risk, especially the capacity to conduct climate risk and vulnerability assessments and integrate the findings into their business planning and/or investment decisions.[137] To promote private adaptation activities and climate finance, a higher level of collaboration between the public and private sectors is needed. The government could establish policies to help identify prioritized adaptation goals in the private sector and remove barriers that prevent companies from engaging in low-emission and climate-resilient development. In addition, adopting EU market guidelines and joining international platforms can help. For instance, one of its principles of the Coalition of Finance Ministers for Climate Action is "mobilizing climate finance" and it assists member countries to reach this goal by "mobilizing private sources of finance toward climate action in their capacity as Finance Ministers, and by complementing Central Banks and market regulators."[138] Research shows that, by 2028, the growing market for climate adaptation could be worth US$2 trillion a year.[139]
- **At the national level, public financing schemes and budgetary planning for adaptation need to be enhanced.** The government should allocate adequate financial sources to support adaptation, clearly outline the responsibilities of all the relevant institutions, and mainstream climate action into budgetary planning at the national and municipal levels. A good example to use would be Albania, which mainstreams climate change into national development planning and budgeting, together with fiscal policy options, through the implementation of the NAP.[140] Disaster risk financing also needs to be enhanced. According to the World Bank Ready2Respond (R2R) diagnostic,[141] the financial model in Montenegro is weak, and no financial risk management strategy or risk transfer instruments are in place for disaster prevention and response.[142] Improving DRF could therefore strengthen the country's financial resilience against climate disasters and yield substantial benefits, especially a reduction in the level of government liabilities.

4.3. Structural reforms and regulatory issues

Addressing climate change requires progress on structural reforms. To respond to the challenges posed by climate change, Montenegro will have to address structural and regulatory challenges that are also needed for achieving a more sustainable economic model. The Montenegro Country Economic Memorandum (CEM) identified four building blocks to help Montenegro achieve more sustainable and higher growth while preserving the country's natural resources. The building blocks are (1) strengthening competition and improving the business environment, (2) better leveraging foreign trade (3) improving the quality of human capital, and (4) strengthening public sector capacity.[143] These building blocks are important for the whole economy but also for the tourism sector, which merits special attention given its contribution to GDP and employment, and the sector's exposure to climate risks. Taken together the four building blocks aim to improve productivity and increase the availability of good jobs. In particular:

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[137] GCF, "Enhancing Montenegro's capacity.

[138] The Coalition of Finance Ministers for Climate Action. 2021. About the Coalition. https://www.financeministersforclimate.org/

[139] 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

[140] 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

[141] To support disaster risk management in Western Balkan countries, an assessment was undertaken by the World Bank and Prepared International (PPI) in 2020 to examine the countries' emergency preparedness and response (EP&R) current capacities. The assessment uses the Ready2Respond (R2R) diagnostic methodology, designed by the World Bank and executed by PPI. The methodology covers five core components of EP&R (legal and institutional frameworks, information, facilities, equipment, and personnel), which are further divided into 18 criteria, 72 indicators, and 360 attributes that represent necessary elements for fully developed EP&R system.

[142] World Bank and GFDRR, Montenegro—Ready 2 Respond Diagnostic Report.

[143] World Bank, Montenegro Country Economic Memorandum: Towards a Sustainable Growth Strategy, June 2022.

- ***Removing barriers to competition in services and increasing innovation and investment in green technology***. The significant private sector financing needs emerging from the adaptation and mitigation analysis suggest that climate change will present an opportunity to modernize the economy. Montenegro needs a business environment (broadly defined here to include the regulatory and competition environment) that will make modernization efficient and attractive for investors. Box 4.1 highlights the importance of incentives (price/carbon and diffusion and research) and market contestability, especially in the energy sector, as policy anchors to support the modernization of the economy and to help the country attain the high income status. The CEM found that while Montenegro may have the right polices, there are gaps in the implementation and enforcement of policies. For example, SOEs enjoy preferential treatment in public procurement, bankruptcy rules, and access to finance, land, and state aid. Barriers to trade and competition in transport, electricity, and professional services are among the most restrictive in the region. In road freight and coach transport, for example, exclusive license requirements and restrictions on foreign firms to offer services limit market contestability. Stronger competition in electricity generation would facilitate investments in renewable energies. There is also a large variety of local parafiscal charges among competing firms, investment incentives and state aid are available only to selected firms, and there are differences in effective real estate and CIT tax rates for the same type of assets and firms. Antitrust enforcement is also weak—the competition authority, for example, cannot impose sanctions limiting market efficiency.

- ***Improving the quality of human capital***. Sections 2.3 and 3.4 of this report underscore the importance of investing in people to overcome adaptation and mitigation challenges. New skills are important for the labor respond to the new opportunities provide by the green economy and to enable a Just Transition. The CEM notes that Montenegro has significant income inequality, which affects the quality of its human capital, undermines upward mobility and limits Montenegro's labor productivity growth potential. Differences in circumstances at birth account for at least 36 percent of labor income inequality in Montenegro; gender is accounts for 40 percent of income inequality. Excluding a large share of Montenegro's new generation from access to quality education and health services for factors beyond their control—such as their birthplace, gender, or the socioeconomic status of the parents—shrinks the pool of tomorrow's skilled workers and entrepreneurs. Policies ensuring equal access to quality education and health services across geographic areas and income groups, targeted social protection, and promoting gender equality help address Montenegro's inequality of opportunity and can unlock its full human capital potential.

- ***Montenegro needs to strengthen and empower public institutions to enforce the legal frameworks that are being aligned with the EU acquis***. At present, there is room for strengthening and ensuring consistent enforcement of legal frameworks. There is a need for anti-corruption mechanisms to unleash competitive market forces that reallocate resources to the most productive firms and allow firms to reap more benefits from innovating. In addition, stronger public financial management would help uphold medium term planning and orient public spending to close the gaps in access to quality education, health services and other public services. Montenegro can also empower public agencies that enforce the new, best-practice environmental protection laws, spatial planning, and waste management to preserve Montenegro's natural assets and pristine landscape which would sustain and promote the growth engine of the economy — tourism. These are critical especially to adaptation efforts.

Montenegro will also need to improve its innovation framework. The CEM and the WDR (Box 4.1) underscore the importance of innovation in raising productivity and enabling the structural shifts in the economy that are needed to address climate challenges. Montenegro ranks 75th among the 132 economies featured in the Global Innovation Index (GII) 2023 and 36th among the 39 economies in Europe. The GII finds that Montenegro exhibits strengths in several key areas that are crucial for fostering innovation and economic growth. Its robust institutional quality and regulatory environment, characterized by operational stability and effective governance, provide a solid foundation for businesses to thrive. The country also boasts advanced infrastructure, particularly in information and communication technologies (ICTs), with widespread access and efficient government online services, indicating readiness for digital transformation. However, the GII finds that Montenegro faces challenges in its business environment and market sophistication. Policies for doing

business and fostering entrepreneurship culture need further development to stimulate innovation and attract investment. Despite these weaknesses, Montenegro's strengths in institutional quality and infrastructure present opportunities for improvement and lay the groundwork for advancing its innovation ecosystem and global competitiveness. Continued efforts to address these weaknesses while leveraging existing strengths will be essential for Montenegro's long-term economic success.

Like other Western Balkan countries, Montenegro will need to create fiscal space and improve efficiency of public spending. While Montenegro's public debt reached 60 percent of GDP in 2023, the country has a history of fiscal volatility owing to policy choices and to exposure to external shocks due to the small size of the economy. Based on the analysis of the previous section, the impact of climate hazards on public debt can be high (if no action is taken from households and firms) while the mitigation impact seems manageable. Both adaptation and mitigation needs will however motivate a change in the mix of public investment (more of one and less of the other, or different way of designing programs or projects) and potentially require additional investment, should fiscal space permit. The public sector's response needs to be three-fold. First, adopt policies that mitigate the economic and social impact of climate change by incentivizing private and household action (i.e. zoning, mandatory insurance, developing financing instruments, carbon pricing, incentives for research and innovation, etc.). Second, review and strengthen efficiency of existing programs (i.e. social assistance, education, pharmaceutical spending, etc.). Third, increase fiscal space by bolstering domestic revenue mobilization through, inter alia, taxation of environmentally- and health harmful products and activities, while reducing tax expenditures and increasing the tax base by reducing the informal economy. These would allow Montenegro to actively monitor and manage fiscal risks from climate change.

BOX 4.1: Can the net zero transition be a path to high-income status for the WB6?

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

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

To capitalize on the energy transition, the WB6 will need to increase their productivity. Middle-income countries are able to transition to high-income countries by improving their productivity. The World Development Report (WDR 2024) looks at the transition from upper middle income to high income status and makes several important points. First, while in early stages of development, when countries are far from the technological frontier, investments contribute significantly to economic growth, while in the middle stages of development, infusion of technologies (adoption and diffusion of technologies created elsewhere) makes an increasingly large contribution to growth alongside investment, and in the later stages of development, homegrown innovation plays the largest role in improving productivity. An economy's technological frontier can be pushed forward by infusion and innovation brought by new entrants into the market, as well as by incumbents

(including SOEs). Second, a combination of carbon pricing and support programs would encourage the adoption of lower carbon technologies and spur competition through infusion and innovation, as long as markets are competitive. Energy efficiency gains will lower costs for households and businesses. Third, incumbents, which often seek to preserve their dominant status in a market, can be disciplined through competition policies. SOEs, as incumbents, can be encouraged to innovate through shareholder action, governance or regulatory actions. Existing market leaders can only maintain their market share if they adapt to current incentives, such as finding more efficient ways to use and produce energy in the power and transportation sectors. Entrants and incumbents can be incentivized, as necessary, with subsidies for infusion and innovation. The implication for the energy transition of the WB6, where SOEs play a significant role in each economy, is that energy markets need to be contestable, using programs and policies to incentivize this competition. Furthermore, the ECA Companion Report to the WDR (2024, forthcoming) notes that the transition to net zero needs to be based on (i) continued economic transformation, (ii) integration into global markets and value chains to bring in more energy efficient technology, regulations on energy efficiency, and the introduction of renewables. Implementation of a strong reform agenda is needed to meet these objectives. For an overview of the interplay between climate change and SOEs in Montenegro, see Annex E.

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

EU climate action strides offer opportunities for deeper trade integration in GVCs through access to markets, finance, and technologies. Increasing environmental opportunity costs of production as a result of the EU Green Deal and EU CBAM can significantly affect operations of firms that do not have access to green technologies and clean energy resources. The green transformation of Montenegro's economy calls for accelerated access to environmental goods and services, green foreign direct investment, and increased renewable energy exports.[144] In this context, the EU offers not only a large market for goods and services[145], but also access to investment, technology, and know-how, which is critical for greening the product and export mix of Montenegro's economy. Alignment with EU regulations and standards can also improve the quality of goods and services produced and exported from Montenegro, allowing the country to further reap the benefits of the EU accession agenda.

4.4. Growth opportunities with export development and EU accession

Leveraging trade opportunities is critical for higher growth of Montenegro's small and open economy. By relying strongly on services, the country's trade openness to GDP reached 126 percent in 2022.[146] While travel and tourism drive the country's exports, merchandise exports of around 10 percent of GDP are among the lowest in the world, still dominated by products with low degree of exportability.[147] With global efforts to step up on the green transition underway, focus on greening the trade mix can allow Montenegro to explore better export diversification avenues and to target higher growth prospects. In this context, addressing weaknesses such as insufficient access to foreign technology, lack of export diversification, low export capacity, and low benefits from participation in global value chains (GVCs)[148] will be important to unleash all of the benefits of trade integration for growth in the coming period.

[144] Montenegro Country Economic Memorandum: Towards a sustainable growth strategy. Background note: Harnessing trade as an engine for economic transformation and green recovery.

[145] More than 500 million consumers. World Bank, 2023. The Economic Effects of Market Integration in the Western Balkans.

[146] Section 4.2 discussed some of the export opportunities for Montenegro. This section gives a brief analysis of competitive strengths and opportunities in three value chains.

[147] Montenegro Country Economic Memorandum: Towards a sustainable growth strategy. Background note: Harnessing trade as an engine for economic transformation and green recovery.

[148] Montenegro Country Economic Memorandum: Towards a sustainable growth strategy.

Montenegro can advance on its green transition and promote green growth at the same time. The country's ranking on the Green Complexity Index (GCI)[149] has picked up dramatically since 2006 and positioned it on the 73rd place in 2022 across 231 countries and territories included in the assessment. Moreover, the country's potential to diversify into green and complex products in the future based on existing competitive strengths has increased during the same time period. Montenegro's green competitiveness potential can unlock untapped trade diversification opportunities which can also boost prospects for greener growth. In addition, relative to the rest of the countries in the region, Montenegro is considered to have the lowest transition risk given the current export share of low-complexity brown products in the export basket.[150]

Montenegro has several comparative advantages and trade opportunities. In the past decade, export of environmental goods was on average only 0.2 percent of total merchandise exports, while the import average stood at 1.2 percent, below the trade averages observed for the rest of the countries in the region[151]. Looking into the future, as more countries move towards the net-zero target by 2050 and the deployment of renewables accelerates, Montenegro can further expand and exploit trade advantages within green value chains beyond the growing export of clean energy from hydro, solar and wind. This is in particular the case for the wind value chain where Montenegro can capitalize more on ferro-nickel and refined copper products, for which there is growing global demand and export values are already on the rise. Export opportunities are also identified within the solar value chain, in particular for some ores and concentrates, for which Montenegro has a competitive advantage (Figure 4.8), but also for machines and mechanical appliances, where Montenegro has a potential opportunity (Figure 4.9).

FIGURE 4.8: Competitive strengths

Products with export competitiveness (RCA≥1)

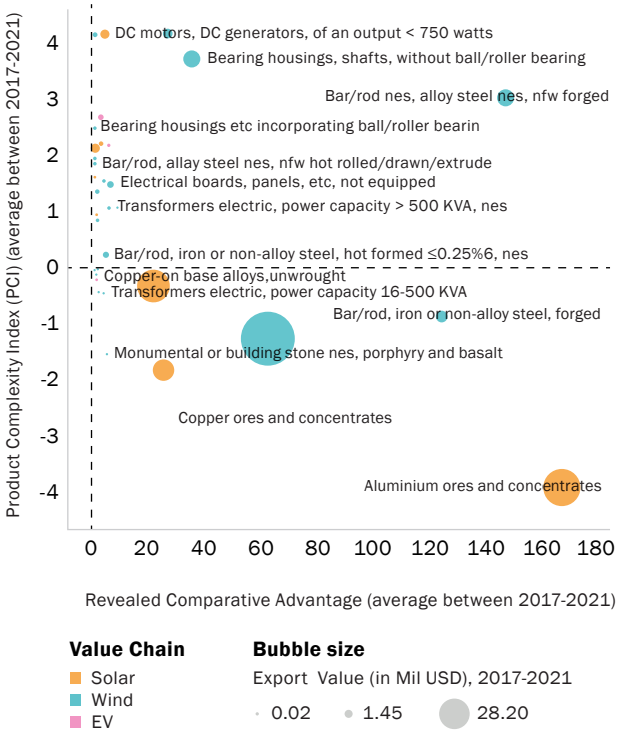
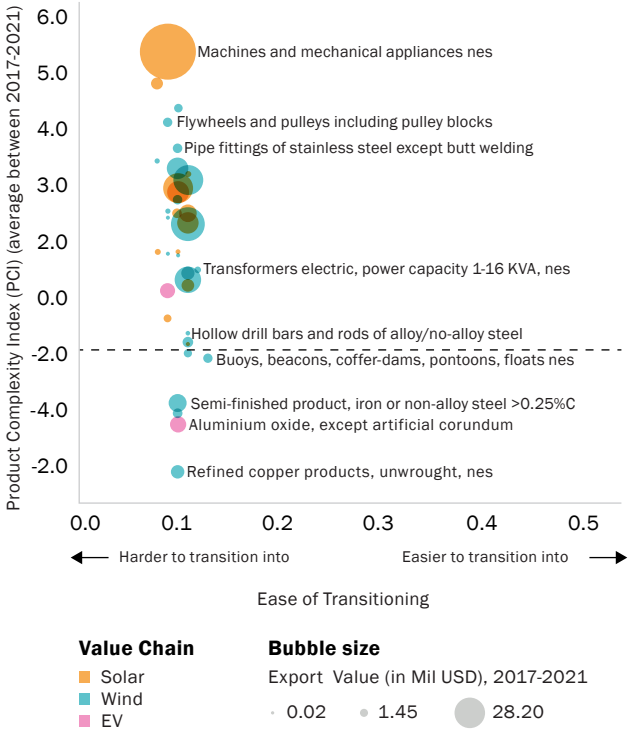


FIGURE 4.9: Potential opportunities

Products without export competitiveness (0.1<RCA<1)



Source: WITS mirror data.

[149] The index measures countries' green competitiveness based on the number and complexity of green products they are competitive in.

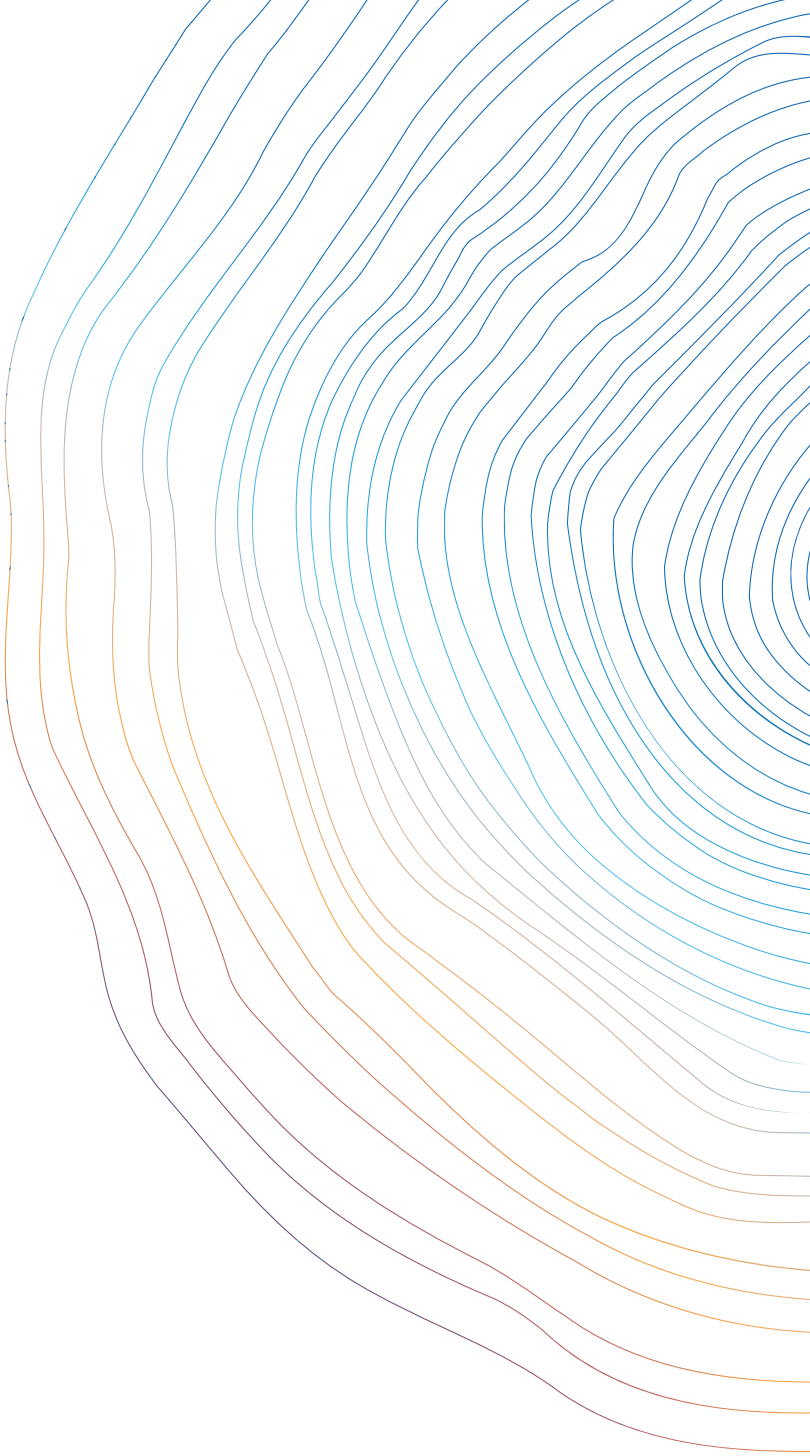
[150] Based on the ranking of the Brown lock-in index (BLI) that measures a country's transition risk through the share of low-complexity brown products in its export basket.

[151] Albania, Bosnia and Herzegovina, North Macedonia, Serbia and Montenegro included in the analysis.

EU climate action strides offer opportunities for deeper trade integration in GVCs through access to markets, finance, and technologies. Increasing environmental opportunity costs of production as a result of the EU Green Deal and EU CBAM can significantly affect operations of firms that do not have access to green technologies and clean energy resources. The green transformation of Montenegro's economy calls for accelerated access to environmental goods and services, green foreign direct investment, and increased renewable energy exports.[152] In this context, the EU offers not only a large market for goods and services,[153] but also access to investment, technology, and know-how, which is critical for greening the product and export mix of Montenegro's economy. Alignment with EU regulations and standards can also improve the quality of goods and services produced and exported from Montenegro, allowing the country to further reap the benefits of the EU accession agenda.

[152] Montenegro Country Economic Memorandum: Towards a sustainable growth strategy. Background note: Harnessing trade as an engine for economic transformation and green recovery.

[153] More than 500 million consumers. World Bank, 2023. The Economic Effects of Market Integration in the Western Balkans.



Chapter 5

Conclusions and recommendations

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

Policy Actions	Investments	Prioritization
Policy Area: Resilience and adaptation		
RA1: Disaster risk management[154]		
▪ Improve the institutional and legislative framework for climate change adaptation and DRM, including i) finalizing and implementing the coordination framework for adaptation planning and actions, ii) developing and implementing adaptation strategies at sectoral levels (priority sectors being water, agriculture, tourism, biodiversity, and human health), iii) clearly defining the roles and responsibilities of different institutions and agencies responsible for climate change adaptation and DRM, and iv) investing in the technical capacity building and staffing of institutions working on adaptation. EU ▪ Enhance adaptation financing by i) identifying major adaptation financing gaps (comparing the costs of necessary adaptation measures to the available resources through national and external sources), ii) developing a dedicated adaptation finance strategy or expanding the details on financing in the National Adaptation Strategy and the NAP (both for investments and proposing appropriate financial and fiscal mechanisms), and iii) budget planning for the implementation of local adaptation and DRM strategies and action plans. EU	▪ Upgrade current early-warning and information management systems, including ensuring that the monitoring stations and equipment are functional and adapted to the requirements, automatization and digitalization for effective information sharing, and integration of local information systems with national early-warning systems and information management systems. EU ▪ Enhance preparedness capacity by i) establishing a national training center and training programs for improved preparedness and response to earthquakes and other prioritized hazards, ii) investing in up-to-date equipment for more effective emergency response based on identified prioritized needs, and iii) establishing clear emergency procurement mechanisms, e.g., enough budgetary flexibility to allocate funds and procure vital equipment and other resources in an emergency in a timely manner. EU	Urgency ●●○ Ease of implementation ●●○
	▪ Develop and implement an investment package with prioritized (critical) infrastructure assets (including public buildings and transport networks) to be upgraded considering i) disaster and climate resilience, ii) energy efficiency improvements, and iii) heat adaptations such as shading and air-circulation systems EU	Urgency ●○○ Ease of implementation ●○○
RA2: Urban		
▪ Improve local adaptation planning and monitoring, recording and evaluation (MRE) systems to track implementation progress of local adaptation plans. EU		Urgency ●●○ Ease of implementation ●●○

[154] 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
	▪ Invest in climate-resilient and green urban planning, especially in densely populated areas near or in river valleys that are highly prone to flood risks. Measures should include nature-based solutions such as more public urban green areas like city parks, gardens, and green corridors. EU	Urgency ●○○ Ease of implementation ●●○
RA3: Water		
▪ Reform the national legal framework for water management toward compliance with the EU acquis and improve the technical and institutional capacities in the water management sector. EU ▪ Enhance assessment processes and the management of flood risk toward alignment with the EU Floods Directive 2007/60/EC, including flood hazard and risk mapping and the development of comprehensive flood risk management actions. EU	▪ Invest in monitoring, data collection, and management systems to improve the overall information system for the country's water sector ▪ Invest in the renewal, operation, and maintenance of water supply infrastructure to reduce the high levels of non-revenue water in the supply network and increase resilience against extreme climate events ▪ Invest in sustainable sediment management practices to ensure the water balance of adjacent groundwater bodies and the water supply of the coastal area	Urgency ●●● Ease of implementation ●●○
RA4: Forestry and biodiversity		
▪ Promote reforestation with native and fast-growing species, with climate resilience and biodiversity considered ▪ Increase the coverage of protected areas and establish national parks to support ecosystem protection and recovery ▪ Consider climate change scenarios in strategic forestry-related documents	▪ Enhance the protection and rehabilitation of forest ecosystems and afforestation to help conserve natural habitats	Urgency ●●○ Ease of implementation ●●○
RA5: Agriculture and Food Systems		
▪ Develop strategic action plans to establish the Agricultural Knowledge and Information System ▪ Support and monitor in particular the implementation of IPARD III, measure 4 (agri - environmental - climate measures and organic production measures) ▪ Develop a national strategic plan to gradually transition into self-sufficiency in funding and implementing adaptation measures ▪ Consider climate change scenarios in strategic documents for the agriculture and food sectors	▪ Invest in an Agricultural Knowledge and Information System (AKIS) since there is currently no such system in the country. AKIS combines agricultural education, extension, and advisory services ▪ Increase spending on pillar 2 (rural development) and measure 4 activities ▪ Develop a transitional investment scheme to facilitate the transition to decoupled support or "green direct payment" support (also called "greening" support) for farmers who adopt or maintain farming practices that contribute to EU environmental and climate goals. EU	Urgency ●●● Ease of implementation ●●○
▪ Continue to develop, update, feed, and deploy for decision making the national road asset management system and road sector database, with climate hazard functionality, along with enhanced coverage and granularity of climate data captured in the system over time ▪ Test institutional incentives to scale up the deployment of resilient transport infrastructure, such as updated resilience engineering standards, construction standards, and public procurement processes ▪ Adopt budgetary procedures that specifically and more transparently allocate funding to enhance the climate resilience of transport infrastructure	▪ Rehabilitate and climate-proof the most exposed, most vulnerable portions of the main national road network as a priority, and then expand this to rural access roads over time ▪ Develop resilient green transport infrastructure, including railways, charging stations, public transit, and non-motorized transport, to address future transport demand and a transition to a resilient and lower-carbon pathway for the transport sector	Urgency ●●● Ease of implementation ●●○

Policy Actions	Investments	Prioritization
RA7: Education, skills, and labor markets		
▪ Reform education and training systems to prepare the flow and the stock of workers with the skills needed for new jobs, by increasing the links between the education and training system and the labor market, including through greater involvement of the private sector ▪ Develop national plans for fostering green values, attitudes, and behaviors in children at an early age and throughout the education and training system ▪ Decarbonize education delivery, adapt school infrastructure to climate change, and create modern learning environments ▪ Promote science and R&D to adapt to climate change ▪ Reform the financing and design of upskilling and reskilling programs to expand opportunities for lifelong learning, including on-the-job learning ▪ Assess how well the current labor regulations and tax and benefit systems balance the need to be flexible to allow firms to adapt to economic changes, and the need to protect workers	▪ Invest in the conditions needed for more labor-market-responsive and larger-scale training: curricula, instructors, infrastructure, equipment ▪ Invest in green school infrastructure—energy-efficient buildings, space-efficient structures—embed learning about energy-efficient technology in the curriculum to foster climate education [as part of DRM and Urban Policies] ▪ Invest in R&D and innovation to facilitate adaptation to the green economy ▪ Establish mechanisms (e.g., skills development funds) co-led by the private sector to support reskilling and upskilling on a larger scale ▪ Develop tools for a labor market observatory to regularly identify changes in the demand for skills associated with the greening of the labor market ▪ Invest in labor mobility schemes to support the geographical reallocation of jobs and workers	Urgency ●●● Ease of implementation ●○○
RA8: Social protection systems		
▪ Modify legislation to (i) allow social protection programs to expand coverage to additional people in response to disasters and climate impacts; and (ii) establish mechanisms to respond to localized shocks rapidly and transparently through the social protection system ▪ Align social protection, DRM, and climate change legislation to (i) recognize the role of social protection in supporting adaptation, (ii) strengthen the use of early-warning systems to inform a scaling up of social protection programs, and (iii) enable disaster risk financing or pre-positioned resources to be channeled through these programs to reach affected people directly ▪ Develop labor income protection systems, including for informal workers, to respond to a likely increase in job-related shocks	▪ Support dedicated outreach by the social protection systems to poor and vulnerable communities to ensure their understanding of the benefits that are available to support their climate adaptation ▪ Invest in social protection delivery systems to enable the quick identification of people in need of support and their enrollment and payment history, supported by a robust complaints and grievance mechanism. This includes (a) investing in the interoperability of social protection information systems with other government databases to allow for rapid identification of eligibility; and (b) establishing standard operating procedures to ensure optimal system capacity during disasters, supported by capacity building and staff training[155] ▪ Invest in efforts to better understand the individual- and household-level impacts of disasters and climate events, including through the tracking of damage and losses	Urgency ●●● Ease of implementation ●●○
RA9: Health system		
▪ Improve data sharing with other sectors on surveillance and monitoring of emerging new diseases and climate-related health emergencies ▪ Create plans for health system response to health emergencies (including climate-related ones) ▪ Continue structural reforms in health sector (organizational, financial, HR) to respond to climate-related health emergencies and changes in burden of disease with support to just transition in view	▪ Establish technical prerogatives for robust connections with other sectors for surveillance and monitoring ▪ Make strategic investments for strengthening response 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 investments in health facilities to respond to changed disease burden and to support just transition and related migrations	Urgency ●●● Ease of implementation ●●○

[155] These investments should be accompanied by the establishment and financing of a contingency budget that will fund the immediate and rapid expansion of social protection systems when shocks occur. For the purposes of budgeting, the maximum amount would be allocated each year on the assumption that the amount could be triggered by events in any given year. In practice, however, the actual disbursements can be needs-based.

Policy Actions	Investments	Prioritization
Policy Area: Decarbonization and mitigation		
DM1: Energy pricing		
▪ Enhance competition and strengthen regulatory institutions. (EU) ▪ Ensure that electricity tariffs and supply prices to end customers are cost-reflective to strengthen the long-term financial viability of the power sector. (EU) ▪ Increase fuel levies and other environmental taxes to EU levels. (EU) ▪ Strengthen targeted social protection measures for vulnerable and energy poor customers in parallel with price reforms. (EU) ▪ Scale up carbon pricing, with revenue recycling to help vulnerable and low-income groups. (EU)		Urgency ●●● Ease of implementation ●●○
DM2: Power sector		
▪ Develop spatial plans for identifying priority zones for RE development. (EU) ▪ Prepare a pipeline of RE projects with clear timelines and support schemes. (EU) ▪ Strengthen planning capacity for the grid integration of RE, both at the (EU) transmission and the distribution levels ▪ Develop the legal and regulatory framework for battery storage. (EU)	▪ Develop and implement national transmission grid modernization programs to enable the grid to integrate renewable electricity. (EU) ▪ Pilot investments in battery storage. An accelerated RE deployment should be accompanied by investments in battery storage and the strengthening of the power transmission network. These investments should be carefully assessed and planned, e.g., through periodic updates of the ten-year network development plan ▪ Support investments led by the private sector based on competitive selection processes (e.g., renewable energy auctions) in solar and wind capacities	Urgency ●●● Ease of implementation ●●○
DM3: Transition away from coal		
▪ Develop a framework for repurposing the abandoned pits of the Pljevljia coal mine, including labor and social mitigation measures and land rehabilitation, and taking into account local communities indirectly affected by the closure ▪ Adopt a Just Transition strategy for coal mine closures, including labor and social mitigation measures and land rehabilitation, and taking into account local communities indirectly affected by the closure	▪ Provide support to projects for the rehabilitation of closed mines and the reskilling of workers ▪ Launch pilot projects to support job creation in select coal communities, ahead of the closure of other coal mines ▪ Strengthen public employment services, expand upskilling/retraining programs for occupations that are in demand, and invest in ALMPs in coal-affected areas	Urgency ●●○ Ease of implementation ●○○
DM4: Transport sector		
▪ Transition to concession-based models for public transport where providers are paid based on indicators of service delivered (performance-based contracts), aiming at improving service and accelerating the transition to e-buses. Increase the bankability of bus concessions through standardization at national and regional levels ▪ Improve the coordination of international rail freight traffic at the corridor level. (EU) ▪ On rail transport, ensure a fully open market for passenger and freight services ▪ 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 ▪ Improve the governance and enforcement of emission testing in roadworthiness inspections. (EU)	▪ Finance pilot projects to start developing EV-charging infrastructure along main corridors. National and subnational government entities can leverage PPPs and traditional procurement tools to finance the pilots. ▪ Support low-interest finance for the early e-mobility transition of highly utilized fleets. Work with international and local financial institutions, tapping into EU and bilateral donor funds, to create special credit lines for companies and individuals, offering tailored packages to support financing. (EU) ▪ Introduce dedicated infrastructure for the exclusive circulation of public transport vehicles along key urban corridors ▪ Invest in continuous, integrated, and safe non-motorized transport infrastructure (for example, bicycling)	Urgency ●●● Ease of implementation ●●○

Policy Actions	Investments	Prioritization
▪ Introduce regulatory requirements for early electrification of highly-utilized fleets (buses, taxis, ride-sharing, and public fleets) ▪ Establish a clear policy framework for the deployment of charging infrastructure in a way that incentivizes and facilitates private sector participation ▪ Prioritize collective and active mobility (bussing, biking, walking) over private motorized transport in urban and metropolitan areas		
▪ Introduce minimum regulatory requirements for the rollout of publicly accessible EV charging points, gradually converging with those of the EU alternative fuels infrastructure regulation (AFIR) for both light- and heavy-duty vehicles. EU ▪ Introduce low-emission zones with gradual and growing levels of restriction over time ▪ Introduce 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 PPPs ▪ Improve the market orientation of transport operators and encourage private participation ▪ Reform state-owned transport enterprises, enable their access to finance, appoint professional boards of directors, and divest state-owned enterprises of noncore business activities. EU	▪ Invest in improved public transport and pedestrian and cycling accessibility ▪ Support, with decreasing participation over time, the roll-out 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 WB6 and EU neighbors. EU	Urgency ●●○ Ease of implementation ●●○
▪ Gradually phase out gasoline- and diesel-engine vehicles among new registrations	▪ Revitalize and expand rail infrastructure through investment, improving service quality and competitiveness for both passenger and freight transport. If core rail network were to be compliant with Trans-European Transport Network standards by 2035 as per the Western Balkans Sustainable and Smart Mobility Strategy (e.g., the railway connecting Montenegro with Albania and Serbia), it would enable a gradual shift from private road transport to rail for both passengers and freight.	Urgency ●●○ Ease of implementation ●○○
DM5: Residential and commercial sector		
▪ Enhance EE standards for buildings and reinforce compliance. EU ▪ Develop a roadmap for sustainable heating	▪ Set up national programs to improve the energy efficiency of public buildings ▪ Provide incentives for EE and distributed RE in private buildings, including the electrification of heating through heat pumps, and installation of rooftop solar PV systems	Urgency ●●● Ease of implementation ●●●
DM6: Industry		
▪ Enhance EE standards for industry and enforce compliance. EU		Urgency ●●○ Ease of implementation ●●●

Policy Actions	Investments	Prioritization
DM7: Education, skills and labor markets		
▪ Retrain current workers to adapt to the transition ▪ Support mitigation studies and research activities, including scientific research on decarbonization, absorption (forestry, nature preservation, and so on) ▪ Implement the measures listed in RA7 above: many of them will facilitate not only adaptation but also mitigation and decarbonization	▪ Invest in upskilling and reskilling to improve the employability of the labor force and mitigate climate change in key economic sectors, and retrain workers in the most vulnerable occupations toward safe or green occupations ▪ Invest in research and development in the area of mitigation ▪ Implement the investments listed in RA7 above: many of them will facilitate not only adaptation but also mitigation and decarbonization	
Policy Area: Macroeconomy and financing		
MF1: Macroeconomic Stability		
▪ Maintain fiscal policies to deliver sustainable debt levels. ▪ Create fiscal buffers to better manage uncertainty while balancing support to priority policies and investments. ▪ Manage fiscal risks to contain impact on public debt.	▪ Strengthen the institutional capacity to implement and monitor fiscal rules. EU ▪ Strengthen economic modeling and climate modeling capacities. ▪ Enhance the quality and accuracy of the medium-term macroeconomic framework, including better integration of climate considerations. EU ▪ 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.	Urgency ●●● Ease of implementation ●●●
MF2: Fiscal reforms		
▪ Reduce tax expenditures and ensure broad-based revenue mobilization to create fiscal space for adaptation and mitigation needs (support programs, investments). ▪ 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. ▪ Invest in public infrastructure to support the integration of new technologies in electricity grids, public transport, broadband, recycling, planning of cities, etc. ▪ Expand 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. ▪ Redesign social safety nets to ensure comprehensive support for vulnerable populations during economic transitions and climate-related changes, using part of carbon tax revenues to fund social and economic programs or incentivize adaptive changes through revenue recycling.	▪ 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.	Urgency ●●○ Ease of implementation ●●○
MF3: Public finance		
▪ Improve implementation of the emissions trading system, including further harmonization with the EU acquis and other polluter-pay principles to ensure sustainable funds for climate change, both mitigation and adaptation ▪ Introduce climate proofing for the planning of all capital investments ▪ Introduce green public procurement standards for the public sector.		Urgency ●●● Ease of implementation ●●○

Policy Actions	Investments	Prioritization
MF4: SOEs		
▪ Strengthen the competition framework and ensure competitive neutrality, levelling the playing field between SOEs and private companies. ▪ Improve corporate governance of SOEs, foster collaborations between SOEs and private firms and incentivize climate actions within SOEs' operations.		Urgency ●●● Ease of implementation ●●○
MF5: Green finance		
▪ Develop an EU-aligned green taxonomy and green/blue/sustainable bond framework. EU ▪ Adopt financial disclosure and reporting standards, in alignment with the EU Sustainable Finance framework. EU ▪ 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	▪ 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.	Urgency ●●○ Ease of implementation ●●●
MF6: Resilient and sustainable growth		
▪ Provide policy certainty for investors in climate responsive sectors, by regularly updating them on adaptation and mitigation policies and plans. ▪ 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.	▪ Develop an open data system to track adaptation and mitigation challenges, making it valuable for consumers, entrepreneurs, and investors. ▪ 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. ▪ Promote R&D and support the commercialization and transfer of technologies specifically aimed at climate change solutions.	Urgency ●●○ Ease of implementation ●●●
Policy Area: Regulatory / Institutional Framework		
IR1: Planning		
▪ Enact a Low-Carbon Emissions Development Strategy and set a 2050 net zero target. EU ▪ Enact the NECP aligned with the Energy Community targets. EU ▪ Enact the NAP ▪ Include climate change considerations into the National Spatial Plan to 2040 ▪ Introduce mechanisms for the mandatory alignment of local strategic and spatial plans with national climate policy ▪ Introduce mechanisms to encourage local self-governments to develop Just Transition action plans in cooperation with the energy industry ▪ Set-up a robust MRVA system compliant with EU requirements. EU ▪ Make it mandatory for LSGs to set GHG emissions reduction targets and prepare inventories		Urgency ●●● Ease of implementation ●●○

Policy Actions	Investments	Prioritization
IR2: Institutional framework		
▪ Ensure that relevant governmental bodies have a clear mandate for climate change, and that their organizational structures reflect these mandates ▪ Ensure that the National Council for Sustainable Development and its working group on Climate Change continue to support horizontal and vertical coordination and improve their climate change mitigation and adaptation capacities	▪ Allocate adequate financing to ensure that the line ministries, subnational governments, and other relevant institutions have enough staff to manage climate change and continue bolstering their technical capacities. EU ▪ Set up a capacity building/training plan and introduce climate change training modules for the public administration	Urgency ●●● Ease of implementation ●●○
IR2: Accountability and citizen engagement		
▪ Set up a committee for climate change in the Parliament ▪ Introduce a clear mandate for the state auditor regarding climate policy ▪ Further improve public consultation processes, and facilitate citizen engagement and participation in the development of climate-related policy and legislation	▪ Enhance platforms and mechanisms to enable public access to reliable information on climate change	Urgency ●●○ Ease of implementation ●●●

Annex A. Climate Change Institutional Assessment: Main findings

BOX A.1: Climate Change Institutional Assessment (CCIA) Methodology

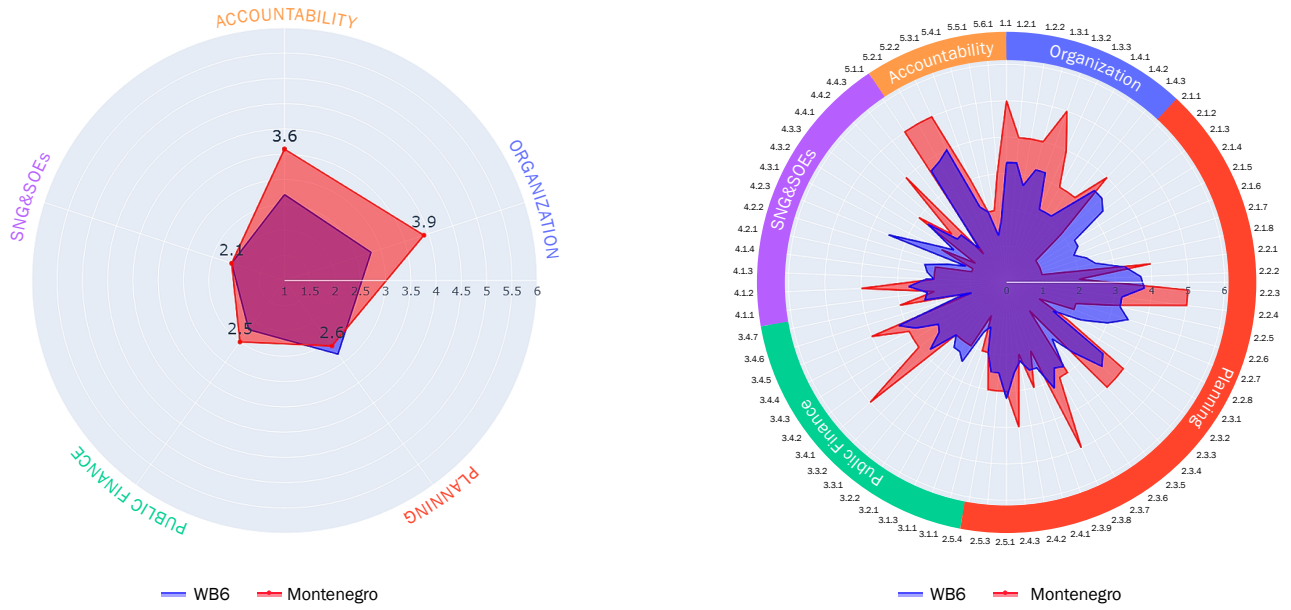
Country institutional capabilities are critical for reaching medium- and long-term climate action results. A Climate Change Institutional Assessment (CCIA) helps prioritize and sequence measures to enable countries to meet their climate change mitigation/de-carbonization and Adaptation and Resilience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

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

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

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

FIGURE A.1: Summary of CCIA Montenegro benchmarking by pillar, indicators



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

TABLE A.1: CCIA pillars: highlights and gaps

	Achievements	Gaps
Organization	▪ Regulatory basis for climate action available: Law on Protection from the Negative Impacts of Climate Change ▪ High-level coordination and advisory role provided by the National Council for Sustainable Development (NCSD), supported by the Secretariat at the Prime Minister's Office and the Working Groups for Climate Change	▪ Organizational structures for climate change in ministries are only partially established and have insufficient capacities
Planning	▪ The National Climate Change Strategy until 2030 and Implementation reports ▪ Revision of NDC for alignment with Energy Commission targets ongoing	▪ NECP not yet prepared ▪ Adaptation planning framework currently missing[156] ▪ Net zero target missing ▪ Climate change scenarios not considered in sector strategies
Public finance	▪ National carbon pricing system (the first and only one in the WB6 region) established ▪ National climate finance mechanism established and operational: Eko Fund budgeted from environmental taxes and carbon pricing	▪ Climate change not integrated into public finance management ▪ No green public procurement ▪ National ETS has faced significant challenges and is being reconsidered
SNG / SOEs	▪ Vertical coordination in place ▪ SOE providing electricity subject to national carbon pricing system	▪ Subnational strategic plans for climate action are not obligatory ▪ The subnational level lacks mechanisms for sustainable climate action financing
Accountability	▪ Access to climate information ▪ Mechanisms for stakeholder consultations in place and operational	▪ Role of independent expert advice is not regulated in the law. ▪ No Parliament oversight ▪ State Audit Institution not reviewing climate action

[156] According to the Montenegrin Division for Climate Chance, the national adaptation plan will be adopted by the end of 2024.

Annex B. Assessment of adaptation needs

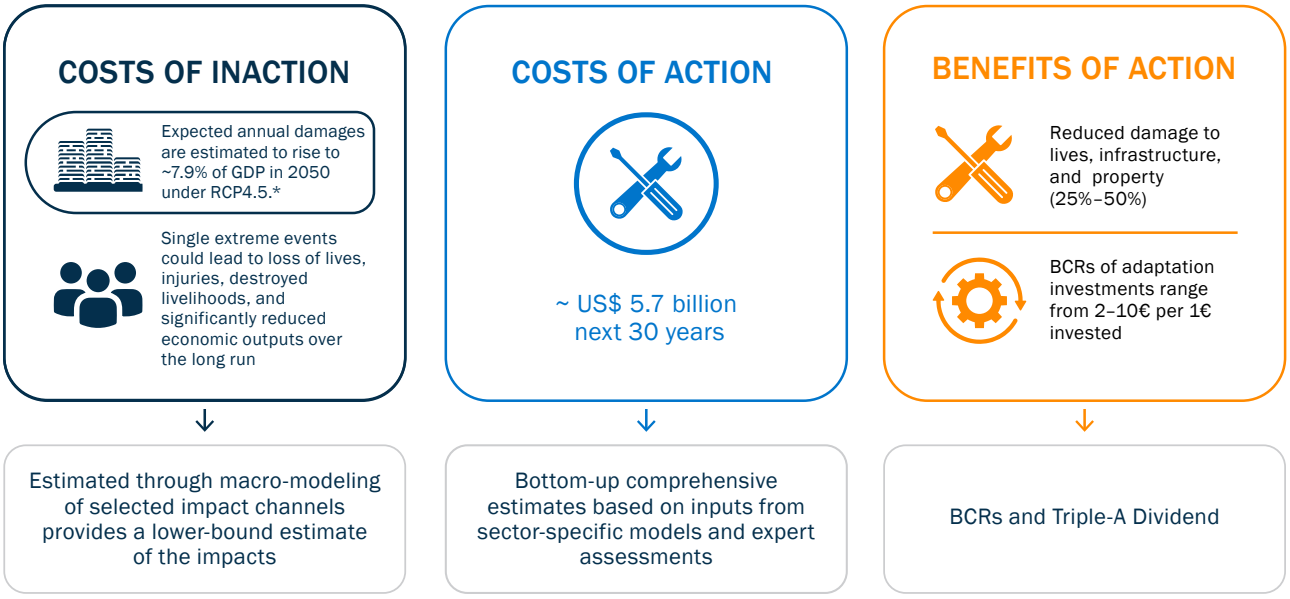
Table B.1 provides undiscounted costing details of the measures prioritized in the policy table (refer to section 8). It includes the narrative to justify the cost estimates by sector; both the policy and investment measures are denoted with an alphanumeric code corresponding to each measure in the policy table. This estimate is more comprehensive than the adaptation estimate done by the hazard exercise that was part of the macro modeling (in Section 4.1 on macroeconomic impacts), due to the limitations of that modeling exercise. The table describes some of the challenges, methodological issues, and choices made in the endeavor to develop a coherent narrative on adaptation based on quantitative estimates.

TABLE B.1: Estimate of adaptation needs

Policy Area	Total cost (2020 US$)	Total Cost (€)	Estimate
RA1: DRM	2.963 billion	2.787 billion	RA1.1 ~ €5.9 million
			RA1.2 ~ €2 million
			RA1.3 From the costs of building retrofitting and heat climate change adaptation in the Western Balkan countries conducted for this CCDR, €2.67 billion
			RA1.4 Based on cost estimate for the DRM investment plan proposed in the World Bank Ready 2 Respond report for Serbia, €16.6 million
			RA1.5: Montenegro—Ready 2 Respond: emergency preparedness and response, €92.3 million
RA2: Urban	333.3 million	313.5 million	RA2.1 Inspiration from "Participatory Local Climate Adaptation Strategies developed" costs in Montenegro; Adaptation to Climate Change and Resilience in the Montenegrin mountain areas—Gora Adaptation Fund Project Proposal pg. 35) US$340,159 ~ €313,090
			RA2.2 Cost will be ~€313.15 million, extrapolation from Urban Regeneration Program Albania 2013-2017
RA3: Water	548.2 million	515.6 million	RA3.2 Cost inspiration from Bosnia and Herzegovina National Adaptation Plan pg. 60; "Alignment of the BiH flood protection system with the EU Directive 2007/60/EC on the Assessment and Management of Flood Risks (Update flood hazard maps and flood risk maps; Develop and Adopt Flood Risk Management Plans)—1,000,000 BAM," ~ €5.6 million
			RA3.4 From Water Gobal Practice assessments: Investment needs of €500 million to reduce non-revenue water (NRW) levels from current 67 percent to EU average of 25 percent. Montenegro is reported around 67 percent. Investment needs to reduce losses in Montenegro to around 25 percent (EU average) are estimated around €500 million. This estimate is deducted from a detailed technical assistance project on NRW which was recently finalized for Croatia (population of 3.9 million, NRW values of 49 percent, investment needs of €1.7 billion to reach EU average NRW values of 25 percent).
			RA3.5 €10 million
RA4: Forestry and diversity	371.7 million	349 million	RA4.1 Based on Bosnia and Herzegovina National Adaptation Strategy cost estimates, €5.9 million
			RA4.2 Based on cost estimates from Serbia-drafted National Adaptation Plan, €300 million
			RA4.3 Based on cost estimate from National Adaptation Plan, €43.7 million
RA5: Agriculture	58.3 million	54.8 million	RA5.2 Inspiration from "Development of Agriculture and Rural Areas in Montenegro under IPARD II (2014-2020)" in Montenegro; Adaptation to Climate Change and Resilience in the Montenegrin mountain areas–Gora Adaptation Fund Project Proposal pg. 76 ~ €51.8 million
			RA5.6 Inspiration from "Enhanced resilience of smallholders' livelihoods to climate change": Output 1.1. Multi-stakeholder clusters were established and facilitated for selected commodities (US$1,126,749) + Output 1.2. Adaptive capacity of farming systems strengthened, and local businesses developed (US$552,559) + Output 1.3. Financial support to adaptive activities provided (US$1,583,652) = US$3,262,960 (~ €3 million) in Montenegro; Adaptation to Climate Change and Resilience in the Montenegrin mountain areas—Gora Adaptation Fund Project Proposal pg. 35
RA6: Transport	1.35 billion	1.27 billion	€345 million to enhance resilience of existing road network + €922 million over 2024–30 to develop new resilient green transport infrastructure. Total combined costs of ~2.2 percent of 2024–30 GDP

Policy Area	Total cost (2020 US$)	Total Cost (€)	Estimate
RA7: Education, skills and labor market	21.4 million	20.1 million	RA7.7 [€750,000 to €2.2 million] range provided by other Global Practice colleagues, ~ €2.2 million
			RA7.9 [€560,000 to €1.1 million] range provided by other Global Practice colleagues, ~ €1.1 million
			RA7.10 [€1.4 million to €8.9 million] range provided by other Global Practice colleagues, ~ €8.9 million
			RA7.11 [€2.5 million to €5 million] range provided by other Global Practice colleagues, ~ €5 million
			RA7.4 [€560,000 to €2.9 million] range provided by other Global Practice colleagues, ~ €2.9 million
RA8: Social protection systems	25.3 million	23.8 million	RA8.4 Estimated by Social Protection Global Practice colleagues, ~ €500,000
			RA8.5 Estimated by Social Protection Global Practice colleagues, ~ €2 million
			RA8.6 Estimated by Social Protection Global Practice colleagues, ~ €20.8 million
			RA8.7 Estimated by Social Protection Global Practice colleagues, ~ €500,000
RA9: Health system	19.08 million	17.943 million	RA.9.1 Estimated by Health, Nutrition, and Population Global Practice colleagues, US$100,000 ~ €89, 270
			RA9.2 Estimated by Health, Nutrition, and Population Global Practice colleagues, US$200,000 ~ €178,540
			RA9.3 Estimated by Health, Nutrition, and Population Global Practice colleagues, US$1 million ~ €892,270
			RA9.4 Estimated by Health, Nutrition, and Population Global Practice colleagues, US$1.5 million ~ €1.339 million
			RA.9.5 Estimated by Health, Nutrition, and Population Global Practice colleagues, US$10.3 million ~ €9.195 million
			RA9.6 Estimated by Health, Nutrition, and Population Global Practice colleagues, US$7 million ~ €6.249 million

FIGURE B.1: Summary of adaptation investment narrative



Source: World Bank analysis.
Note: GDP = gross domestic product, RCP = representative concentration pathway, BCR = benefit-cost ratio.
* The macroeconomic model yields annual estimates for damages based on the expected annual loss from each climate hazard. The expected damages are projected to grow over time, reflecting increasingly unpredictable and volatile climate conditions. Combined damages from the drought impact on maize and wheat, heat stress on labor productivity, and riverine floods, are estimated to be 7.9 percent of GDP under RCP 4.5 in 2050 for Montenegro.

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

This estimate is based on a comprehensive, bottom-up approach, with a clear (and verifiable) methodology, that brings immense value to clients grappling with similar issues. Note that a large part of these investments is in hard infrastructure, and this cost could be reduced by developing more detailed feasibility studies, combining investments (EE and seismic), and improving building codes to higher standards to avoid retrofitting, which is generally more costly. Additionally, some of these investments—water systems efficiency, irrigation schemes, social protection schemes, and so on—are development investments that are in any case essential for the expansion of sectors, the economy, and society. The benefits of these investments, grounded in reality, are only very partially captured by the macro-modeling, which was estimated by hazard rather than by sector and is partial because of the modeling framework's current limitations. Besides, the positive impacts of investments on growth and employment and co-benefits are not fully captured by the macro-modeling exercise. In this report, we therefore have a lower-bound estimate of the costs of inaction, the positive impact of adaptation action on GDP from the macro-modeling, and a more comprehensive cost-of-action estimate.

Benefits of action–The Triple Dividend

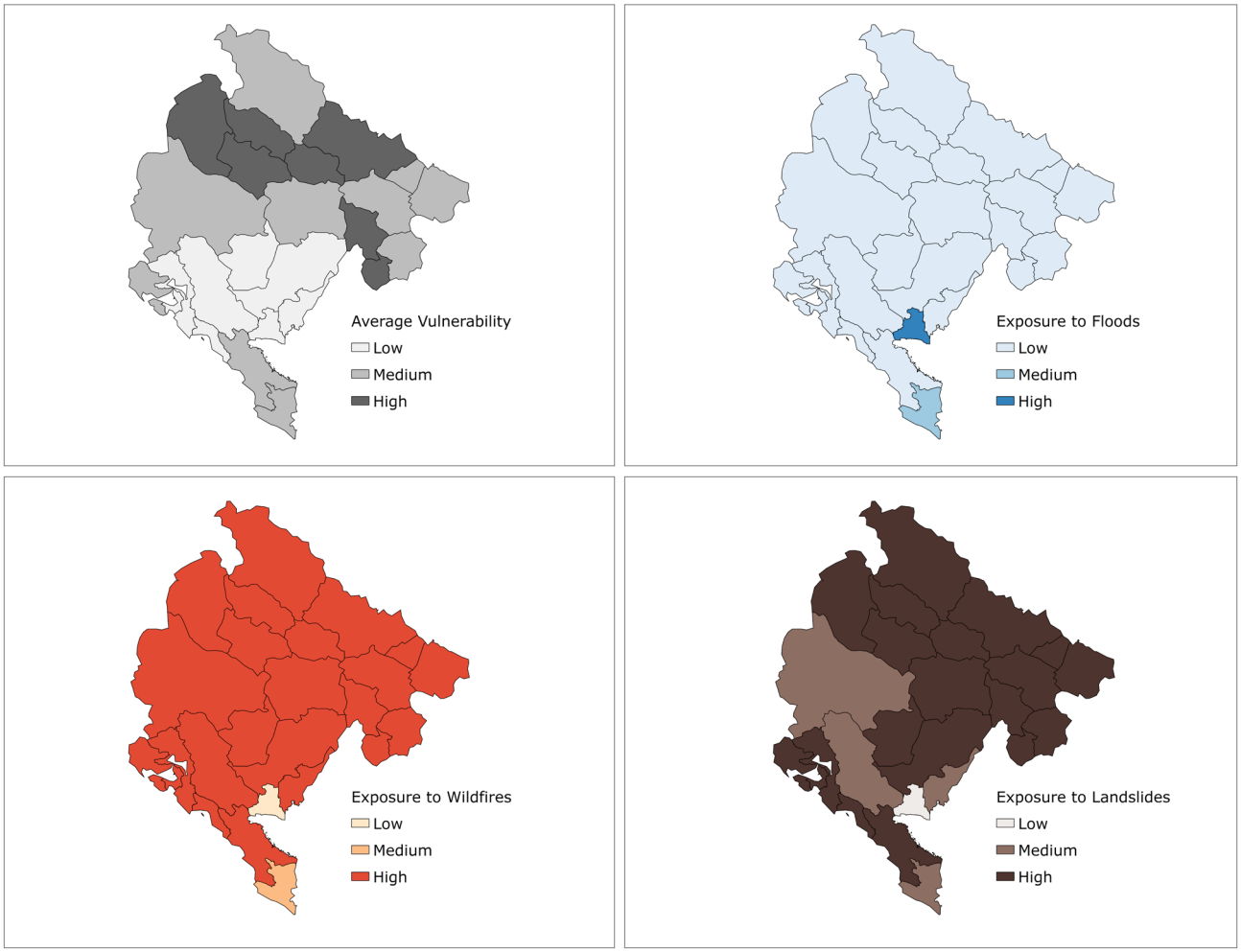
Investing in adaptation can yield substantial social, economic, and environmental benefits. Such benefits could be expressed through the Triple-A Dividend. The Triple-A Dividend framework reconciles perspectives from the humanitarian, environmental, and economic fields (Figure B-1). It identifies three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

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

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

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

FIGURE C.1: Overlapping vulnerabilities in Serbian municipalities



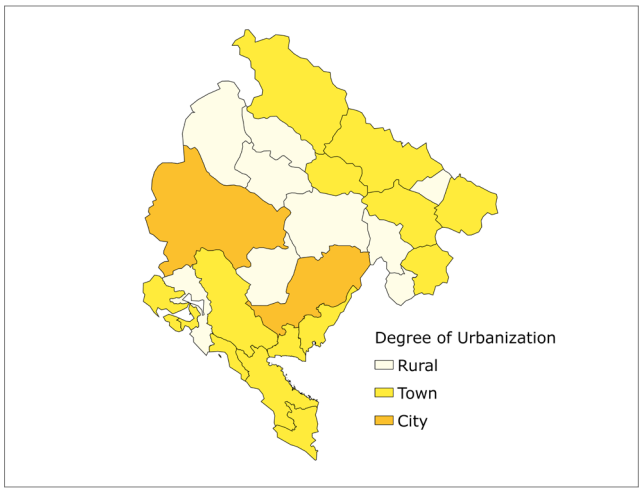
Sources: World Bank, MONSTAT, GHS-POP R2023A, OpenStreetMap, JBA, CIMA, ELSUS v2.
Note: Average vulnerability is measured as the arithmetic mean of 1-4 scores assigned to each municipality based on the quartiles of the distributions of: 1. population growth/decline from 2000 to 2020, 2. access to markets, 3. average net earnings. High flood exposure indicates a municipality's average raw depth of half a meter or higher for a flood event (fluvial or pluvial), with a 1 percent yearly probability of occurrence. Low flood exposure indicates a depth of less than 20 cm for a similar event. High wildfire risk represents an average municipality score of 3 or higher based on CIMA's wildfire hazard grid assigning to each 100x100 m cell a score from 1 (very low) to 6 (very high). High landslide risk is similarly defined as an average municipality score of 3 or higher based on the ELSUS v2 landslide hazard grid, which assigns to each 200x200 m cell a score from 1 (very low) to 5 (very high). For both wildfires and landslides, low risk is defined as an average below 2.

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

Vulnerability	Bijelo Polje, Andrijevica, Šavnik, Gusinje, Mojkovac, Plužine, Žabljak
Floods	Zeta, Ulcinj, Mojkovac, Berane, Bijelo Polje, Old Royal Capital Cetinje, Pljevlja, Nikšić, Danilovgrad, Tuzi
Wildfires	Nikšić, Old Royal Capital Cetinje, Žabljak, Plužine, Rožaje, Danilovgrad, Plav, Kolašin, Podgorica Capital City, Pljevlja
Landslides	Plav, Gusinje, Kolašin, Andrijevica, Budva, Berane, Kotor, Herceg Novi, Rožaje, Bar

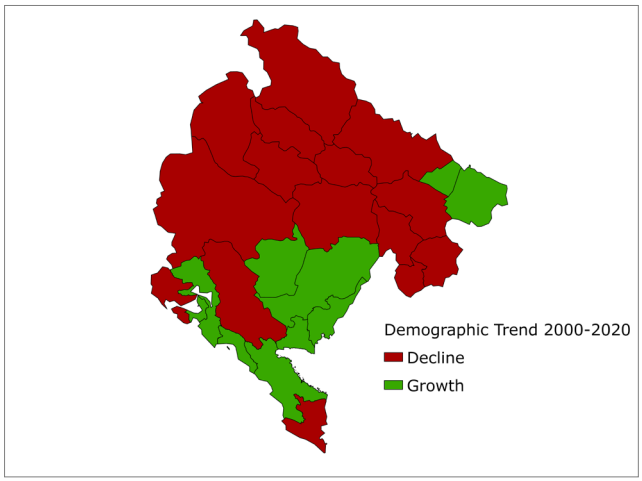
Sources: World Bank, MONSTAT, GHS-POP R2023A, OpenStreetMap, JBA, CIMA, ELSUS v2.
Note: Includes socioeconomic vulnerability.

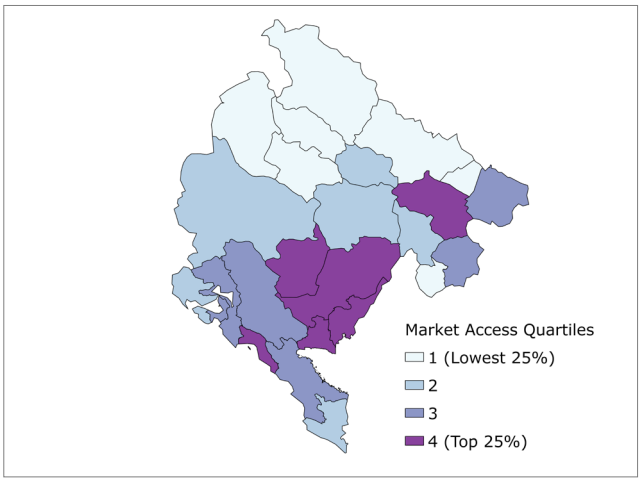
FIGURE C.2: Degree of urbanization of Serbian municipalities

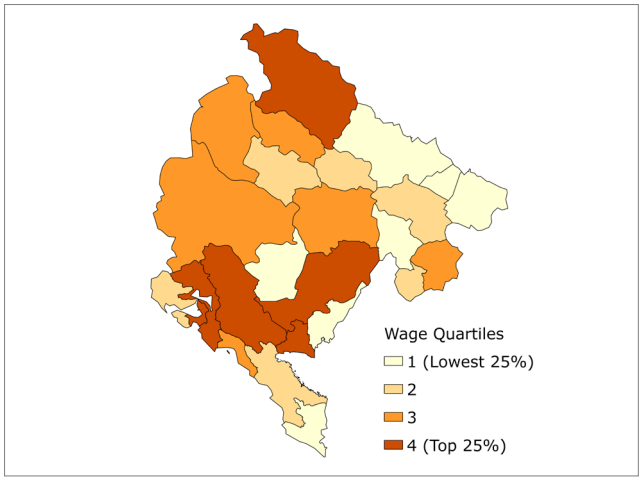


Sources: World Bank, GHS-POP R2023A
Note: The classification is based on the European Commission's Degree of Urbanization methodology, applied to the GHS (Global Human Settlement) 1 km² population grid. Cities are areas where more than 50 percent of the population live in an urban center (defined as a contiguous area with a minimum density of 1500 inhabitants per km² and a minimum population of 50,000 inhabitants). Towns are areas that do not meet the City classification threshold but where more than 50 percent of the population live in urban clusters (defined as contiguous areas with a minimum density of 300 inhabitants per km² and a minimum population of 5000 inhabitants).

FIGURE C.3: The determinants of socioeconomic vulnerability







Sources: World Bank, MONSTAT, GHS-POP R2023A, OpenStreetMap
Note: The figure shows the distribution of individual determinants of the average vulnerability measure in Table C.1. Market access is measured as the population potential using the routing distance in km from the centroid of the municipality to all urban areas (identified using the European Commission's definition of urban clusters) in 2020, restricted to only markets in the same country. Wage refers to 2023 yearly average net earnings in € from the Monthly Statistical Review 1/2024 on Employments and Earnings.

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

A structural macroeconomic model (MFMOD) was used to model the impact of climate change on GDP and to assess 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.

T**rend 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 D.1 shows assumptions for the trend and optimistic growth scenarios.

TABLE D.1: AVERAGE ANNUAL GDP GROWTH RATES, 2025–50

	Albania	Bosnia and Herzegovina	Kosovo	Montenegro	North	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 analysis.

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

For the macroeconomic impact of mitigation, the reference scenario (RS) was used as a baseline. For each growth scenario, a reference scenario (RS) level of energy demand was assessed, with commensurate levels of energy system investments. In addition, for the same level of energy demand, the net zero (NZE) scenario was developed, with commensurate levels of energy system investments, as output from the energy sector model. For each growth scenario, the incremental cost of the NZE scenario relative to the RS was assessed. Investment needs from the energy model were input into the macro model. The benefit of this approach is that it provides a comparison of the macroeconomic impact of the net zero transition for the same level of GDP (and energy demand) as the RS. The drawback of the approach is that it does not quantify higher

order effects of a net zero transition, such as the development of new sectors or of additional exports, given the availability of the greener economy. Such higher order effects can be significant if they are accompanied by reforms that alleviate structural bottlenecks.

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

TABLE D.2: Real GDP per capita: differences between nze and rs scenarios 2030, 2040, and 2050

Differences in growth rates (percentage points)						
	Trend growth			**Optimistic growth**		
	2030	**2040**	**2050**	**2030**	**2040**	**2050**
Montenegro	0.291	-0.068	0.004	0.254	-0.056	0.011
WB6 Avg.	-0.013	-0.057	-0.170	-0.011	-0.125	-0.176
Differences in GDP levels (percent difference between NZE and RS)*						
	Trend growth			**Optimistic growth**		
	2030	**2040**	**2050**	**2030**	**2040**	**2050**
Montenegro	-0.842	-0.378	-0.662	-0.908	-0.448	-0.668
WB6 Avg.	-0.189	-0.360	-0.535	-0.352	-0.583	-0.603

Source: World Bank analysis based on TIMES model inputs.

* The changes in the level of GDP per capita are equivalent to changes in the level of 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 E. Businesses of State and Climate Action

In Montenegro, Businesses of State (BOS)[157] play a significant role in sectors that are vulnerable to the negative effects of climate change. There are 207 BOSs in Montenegro, which play a crucial economic role, contributing significantly to revenues and formal employment, amounting to one of the largest state footprints in the region. Total domestic revenue of BOSs corresponds to 21% of Montenegro's GDP, mostly from centrally-owned BOSs. Of all 207 BOS in Montenegro, 51% operate in climate-vulnerable sectors, compared to a global average of 56% (Figure E.1). The sectors most at risks through BOS' exposure to climate change-induced extreme weather events include energy, transportation, water and waste management, and hospitality, where most revenues are generated by BOSs. Climate change effects could, for example, threaten waste management, a key service provided by every city and municipality. Flooding can impact disposal sites and damage processing facilities, heavy rains can cause dangerous leaching and run-off into the groundwater, requiring these companies to invest in costly, resilient waste management systems. The operation of state-owned hotels could be threatened by storms, heat waves, infrastructure outages, or water scarcity. Climate hazards can also bring down power lines, leading to outages, or impair transports connections, all of which impact private sector operations and households.

Many BOS in climate-vulnerable sectors are loss-making which poses challenges to financing necessary adaptation investments. Adaptation investments are likely to require public funding because many of the concerned BOS are unlikely to have the cash flow to fund adaptation investments themselves, nor are they likely to have access to capital markets due to their poor financial performance, as 35% of them are loss-making. In extreme cases, damage from climate hazards to the assets of BOSs may require further government spending, which in turn can have negative effects on the fiscal space of the country. Such a potential fiscal drain can jeopardize the ongoing fiscal consolidation of Montenegro. Despite a decline in public debt to 60.3 percent of GDP in 2023, the World Bank 2023 Macro Poverty Outlook underscores that debt nevertheless presents a vulnerability because it is subject to significant financing and rollover risk. Considering large Eurobond repayments in 2025 and 2027 and high borrowing costs, Montenegro must demonstrate fiscal prudence by consolidating its public finance to narrow the fiscal deficit and further reduce public debt.[158] A pathway of fiscal prudency therefore must factor in climate change risks and its potential fiscal fallout from BOSs.

In several sectors that are responsible for high levels of GHG emissions (carbon-intensive sectors), the state plays a vital role, including in energy and transport. While overall, only 10% of BOSs in Montenegro operate in carbon-intensive sectors, compared to a global average of 18%, they play a pivotal role in some sectors. Beyond energy, where 43% of BOS in carbon-intensive sectors operate, transportation (air transport, freight water and rail transport etc.) and agriculture see a high share of BOSs, with 33% and 24%, respectively. Almost two-thirds of these (57%) were not generating profits.[159] It is unlikely, therefore, that these BOS will have the cashflows for the required mitigation investments. A large share of BOS in carbon-intensive sectors (38%) operate in competitive markets where their economic rationale is weak and where the private sector is more suited to deliver services.

BOSs play a prominent role in the state-dominated energy sectors. The energy sector has a significant state presence with 18 BOSs operating in the various segments of the energy sector, ranging from network development to power generation, transmission, wholesale and trade, and retail distribution.[160] In key segments of the energy sector, power generation, transmission, wholesale and trade, BOSs/SOEs are the largest firms with more than 50% market share (Figure E.2), occupying a prominent market position. The

[157] This section uses Businesses of the State (BOS) to refer to all businesses owned by the state with a holding >10%, both directly or indirectly owned through subsidiary holdings. This differentiates BOS from State-owned Enterprises (SOEs) which are often companies where the state has a controlling stake either through majority holdings or special voting rights.

[158] World Bank. 2023. Europe and Central Asia - Macro Poverty Outlook Country-by-Country Analysis and Projections for the Developing World: Annual Meetings 2023. Washington, D.C.: World Bank Group. https://documentsinternal.worldbank.org/search/34175581.

[159] The BOD Database covers a single year, usually 2019 (as is the case for Montenengro).

[160] Note that not all sectors where BOSs/SOEs operate are considered carbon-intensive, however, in order to understand impediments to private sector market entry or risk to market distortion, a holistic picture of the entire state footprint is given.

relatively prominent role of SOEs has historic reasons and may also be explained by the relatively small market size of the Montenegrin energy sector which may deter private market entry.

Given the strong state-presence in the energy sector, there is a need for more pro-competition regulations to facilitate the transition to a more carbon-neutral economy. According to OECD-WB PMR data (2021),[161] the electricity sector is more restrictive in Montenegro compared to its peers: These indicators reveal that Montenegro with a score of 3.52 has a more restrictive regulatory environment compared to its aspirational and structural peers, with a score of 2.02 and 1.90, respectively (Figure E.3). Under the assumption that the private sector will play a leading role in the generation of renewable energy as well as in the overall efficient management of the sector, various reforms are required to entice a high level of private sector participation:

- The lack of rules on developing market-based support schemes for renewables may be hindering emergence of privately-owned energy producers and favor existing incumbent SOE. While renewables and particularly hydro power is significant in power generation in Montenegro, private participation in electricity generation is still limited. The laws on renewables which would facilitate auction process for renewable tariffs are not yet implemented.[162]
- A lack of unbundling may hinder new suppliers from accessing markets. While the Montenegrin Energy Law requires the separation of ownership of operators active across segments of the energy sector value chain, in practice the separation is not fully implemented, posing a heightened risk to private sector involvement in the sector.
- Implementation of non-discriminatory network access regulations needs to be expedited and improved in order to attract private market entrants.
- Last, the regulator's independence and effectiveness may be undermined by budget constraints, impacting its ability to fulfill its duties.

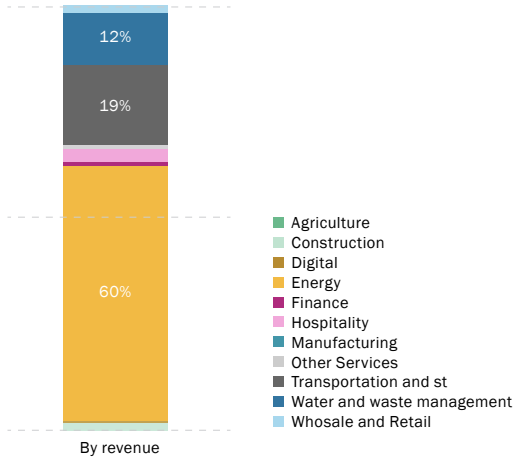
For a successful adaptation and mitigation strategy, the government of Montenegro will need to ensure that BOSs in climate-vulnerable and carbon-intensive sectors can respond to the emerging investment needs by adopting necessary reforms. Reform efforts should continue to focus on streamlining (or "right-sizing") the state presence across the economy, in particular in competitive markets where private operators are better suited to deliver services, thus avoiding that the country spends public funds on climate action where, in fact, the private sector should step in. For BOS in climate-vulnerable sectors, like water and waste management, energy, and transportation, reforms should aim at enhancing the performance of these BOSs so they can raise the required funds for adaptation investments. In addition, the government could adopt rules mandating SOEs to monitor and reduce fiscal risks by strengthening their resilience to climate-related physical risks. These rules should include the preparation of long-term corporate plans that assess the financial exposure of BOSs to climate risks. For BOS in carbon-intensive sectors, the government could mandate BOSs to embed climate objectives in their decision processes for major investment, in particular to (i) avoid carbon-lock-in (i.e., long-term investment in carbon-intensive technologies); and (ii) promote the application of carbon-efficient technologies and processes. Given the strong state-presence in the energy sector, there is a need for more pro-competition regulations to facilitate the transition to a more carbon-neutral economy, as outlined above. Most BOS across carbon-intensive (76%) and climate-vulnerable sectors (87%) are directly owned by government entities,[163] either by the central government, or subnational entities. This should make mandating of climate mitigation and adaptation objectives easier, provided the country has effective governance structures and mechanisms to coordinate climate action at central and subnational/ municipal level.

[161] OECD PMR database and OECD-World Bank Group PMR database, 2021. PMR sub-indicator for Energy (electricity) in Montenegro and selected peers. Scale is 0–6, from least to most restrictive, 2021 data.

[162] Under the current regime feed-in tariffs (FiT) are applicable for projects smaller than 1 MW and are set by a regulation rendered by the Government. The new renewable regime is yet to be put in place which would introduce an auctions model for setting the FiT but the law is yet to be adopted and the auctions could be expected only after 2025. Feed-in tariffs (FiT) have been successful in attracting investment, market-oriented mechanisms to set the FiT such as auctions or a premium over market prices should be explored to open the sector.

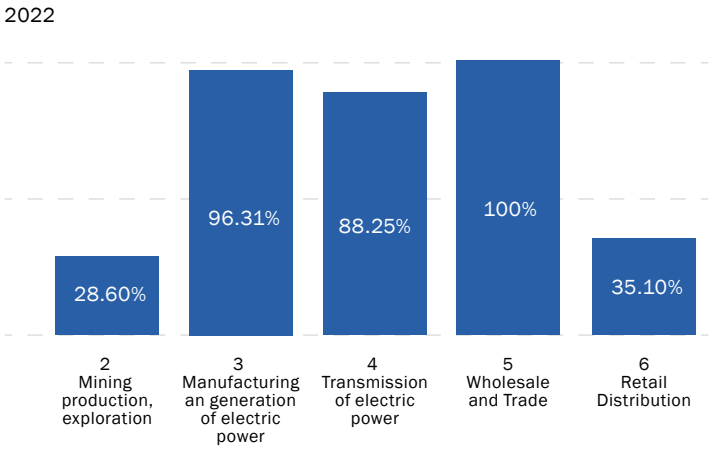
[163] By contrast, an indirectly-owned BOS would be a firm that the government owns through another firm, typically another BOS or a holding company.

FIGURE E.1: Distribution of BOS in climate-vulnerable sectors in Montenegro, based on revenues of enterprises



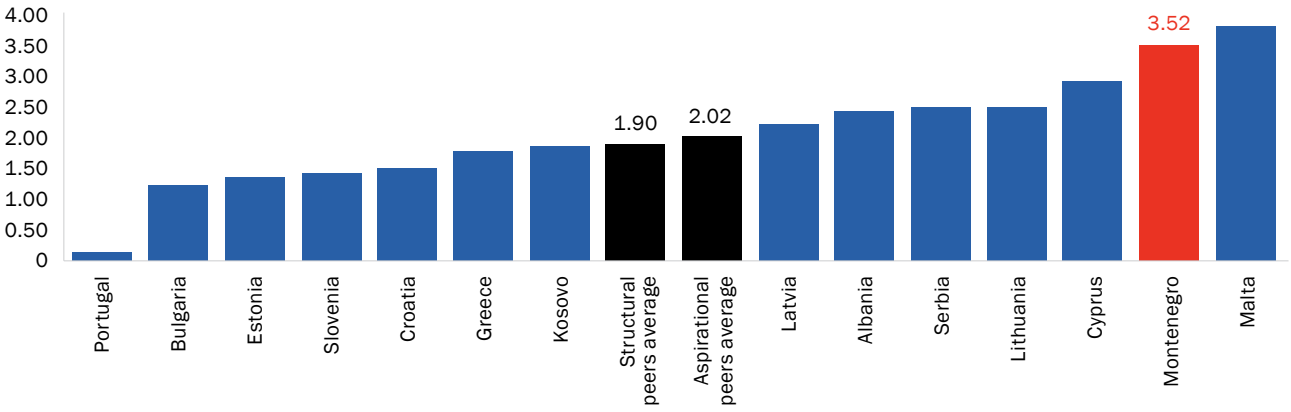
Source: WB Global BOS database.

FIGURE E.2: Market Shares of BOSs/SOEs across subsectors of the energy sector (% in 2022)



Source: Authors' calculations using sector data from the ORBIS database, Government of Montenegro's Ministry of Finance SOE data, Institut Alternativa, and desk research based on the WB BOS database.

FIGURE E.3: OECD-World Bank Product Market Regulation (PMR) data for Montenegro's energy sector (2021)



Source: OECD PMR database and OECD-World Bank Group PMR database
Note: PMR sub-indicator for Energy (electricity) in Montenegro and selected peers.
Scale is 0–6, from least to most restrictive, 2021 data. Structural peers average represents Croatia, Kosovo, Albania, Bulgaria, and Serbia.
Aspirational peers average represents Lithuania, Latvia, Estonia, Slovenia, Portugal, Malta, Greece, and Cyprus.
The figure refers only to the electricity score of the energy sub-indicator because a gas sector does not exist in Montenegro.