



EUROPE AND  
CENTRAL ASIA

# EXECUTIVE SUMMARY NORTH MACEDONIA

World Bank Group

# COUNTRY CLIMATE AND DEVELOPMENT REPORT

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# Executive Summary

**North Macedonia is an upper-middle-income country that aspires to join the European Union (EU), but its sustained growth has been achieved at high environmental and health costs.** North Macedonia has been converging with the EU in terms of gross domestic product (GDP) per capita (from 34 percent of the EU-27 average at purchasing power parity (PPP) in 2009 to 41.5 percent in 2021) and poverty has decreased. However, the country's energy and carbon intensities remain higher than the EU-27 average; air pollution is a major issue, especially in the capital Skopje and other urban areas, including those in proximity to thermal power plants. North Macedonia is a hotspot for both slow-onset and sudden climate and natural hazards, including floods, heat-related stressors, and intensified wildfire risks.

**External drivers and international commitments shape North Macedonia's climate change policies, but further progress is needed to step up the country's climate ambition level, as well as implementation capacity.** The country is a party to the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement. Despite recent progress (for example, the draft Law on Climate Action), North Macedonia still lacks a comprehensive legislative framework for climate adaptation and resilience. As a contracting party to the Energy Community Treaty, North Macedonia has committed to harmonizing its energy and climate legislation with the EU *acquis*.<sup>1</sup> The country has expressed its intention to act to achieve a carbon-neutral continent together with the EU by 2050, but it has not set a net zero target yet. The World Bank's Climate Change Institutional Assessment (CCIA) highlights the fact that North Macedonia's institutional maturity for climate action is improving, but efforts are needed to strengthen institutional capacity and coordination mechanisms across the relevant ministries and agencies. Additionally, human capital in North Macedonia will be critical to enable climate action, such as by ensuring that the labor force is able to respond to the changing demand for skills brought about by the green transition. Human capital needs significant investments, given declining learning outcomes, as well as high rates of unemployment and persistent inequalities.

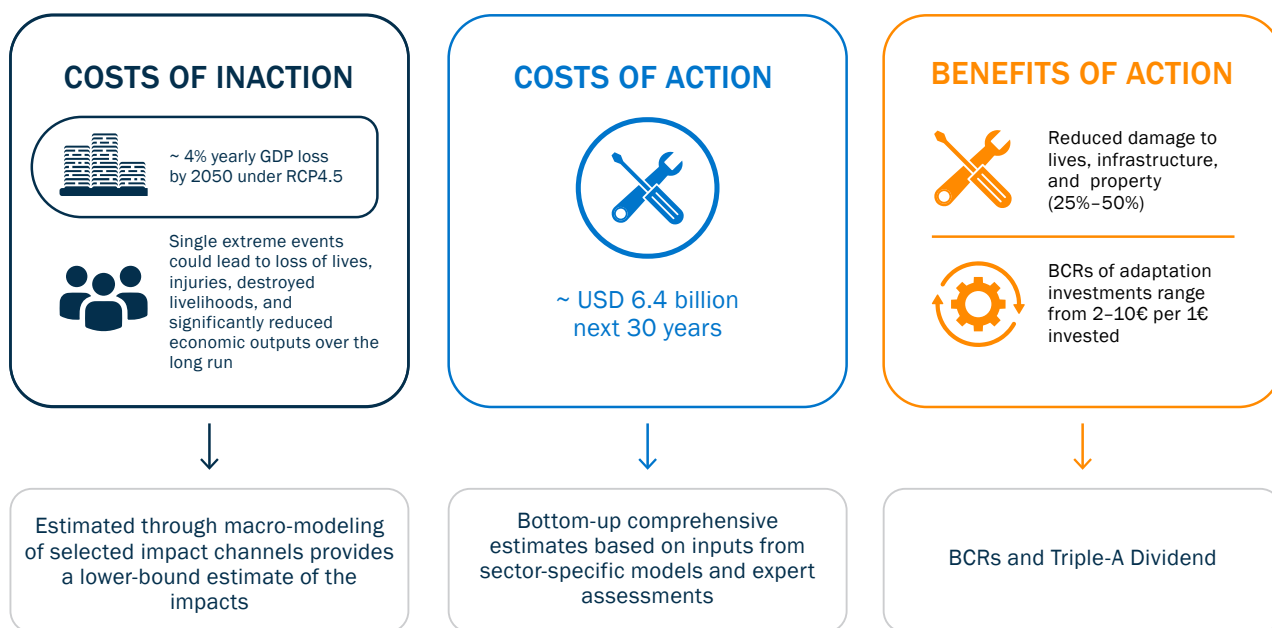
**North Macedonia is exposed to several natural and climate-related hazards, and the potential costs of inaction are high.** The country has a long history of devastating floods, and the future will bring more unpredictable, high-intensity extreme weather events (for example, in the form of torrential rains and heat waves). Recent decades have been characterized by a surge in heat-related stressors—heightened temperatures, droughts, and intensified wildfire risks—all of which threaten to undermine the nation's stability and productivity. Climate change also worsens access to fresh water, which, in turn, increases water-borne diseases. Extreme temperatures in North Macedonia increase morbidity and mortality. Losses from disasters and extreme climate events have totaled an estimated US\$667 million over the past 20 years. Moreover, the effects of natural hazards compound and cascade, increasing overall risk for already vulnerable sectors, especially agriculture. Small family farms dominate the sector and are especially vulnerable to droughts and hail because they are seldom covered by national irrigation systems or hail protection, do not use drip irrigation or ultraviolet nets, and lack agriculture insurance. Thus, extreme weather adversely affects yields and associated family incomes. The effects of climate-related shocks tend to be localized and worsen existing socioeconomic vulnerabilities, as rural, municipalities with declining populations and newly expanding urban areas are more exposed to floods and other climate risks. North Macedonia could suffer important economic damages from climate change under all the representative greenhouse gases concentration pathways (RCPs). In the absence of any investments to adapt to a changing climate, lower-bound estimates of the potential impact amount to close to 4 percent of GDP in 2050 under RCPs 2.6, 4.5, and 8.5. It should be emphasized that modeling the effects of natural hazards and climate change on GDP is not straightforward; reasoning in expected average impact can hide how dramatic certain events will be. For instance, the 2015 floods in North Macedonia caused 7 fatalities; affected more than 100,000 citizens; and resulted in economic losses of US\$107.4 million.

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

**The costs of action, that is, of investing in adaptation, are high—but then, the benefits of action can be even higher.** North Macedonia would need to invest in US\$6.4 billion (in 2020 dollars, undiscounted) over the next decade to protect people and property from the damaging and escalating impacts of climate change (Figure ES.1). This initial comprehensive adaptation investment package would cost equivalent to around 0.8–1.2 percent of GDP per year until 2050. Investments in adaptation will yield the “Triple-A Dividend,” which includes three types of benefits: (1) avoided losses, (2) accelerated economic potential, and (3) amplified social and environmental co-benefits. Implementing adaptation climate actions at the national level greatly reduces human and economic losses from disasters and climate events, and it facilitates 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.

**Adaptation investments can be a precursor to employment growth; skills improvement and increased trade opportunities often follow in the wake of these adaptation projects, further bolstering the case for a proactive approach to climate resilience.** For instance, a 14-fold benefit was found for the implementation of the national heat health action plan and associated heat-health adaptation measures.<sup>2</sup> Relatedly, while investments in education serve as economic drivers, they also inform pro-climate behaviors.<sup>3</sup> Enhancing climate resilience in urban and transportation sectors unlocks economic and trading opportunities and supports employment. Accordingly, the integration of risk information into the planning, design, and maintenance stages of all infrastructure investments should be encouraged. Moreover, investing in nature-based solutions (NBS) promotes adaptation while yielding substantial co-benefits for the ecosystem and local communities, especially those who are vulnerable and those in the mountainous and downstream areas. NBS for flood prevention can yield high net benefits, with benefit-cost ratios that are generally greater than 2 and that can be up to 12 for peatland restoration and up to 18 for floodplain restoration. Finally, investing in human capital helps systems to adapt through improved education and productive skills, earlier identification of health issues, and protection of vulnerable populations from impoverishment.

<sup>2</sup> Climate-Adapt. 2021. “Implementation of the Heat-Health Action Plan of North Macedonia.” [https://climate-adapt.eea.europa.eu/en/metadata/case-studies/implementation-of-the-heat-health-action-plan-of-the-former-yugoslav-republic-of-macedonia/#cost\\_benefit\\_anchor](https://climate-adapt.eea.europa.eu/en/metadata/case-studies/implementation-of-the-heat-health-action-plan-of-the-former-yugoslav-republic-of-macedonia/#cost_benefit_anchor).

<sup>3</sup> Angrist, N. W., K. Winseck, H. A. Patrinos, and J. S. Graff Zivin. 2023. “Human Capital and Climate Change.” NBER Working Paper Mo. 31000, National Bureau of Economic research, Cambridge, MA. <https://www.nber.org/papers/w31000>.

**Accelerating the energy transition to achieve economy-wide net zero emissions in North Macedonia by 2050 is feasible, but it would require radical transformations and decisive action.** An energy system modeling analysis was conducted as part of the six Western Balkan countries (WB6) CCDR to assess sectoral decarbonization pathways for the countries. Until 2030, North Macedonia could meet the 2030 target (82 percent emissions reduction compared to the 1990 levels) for the scenario with additional measures (WAM) of its National Energy and Climate Plan (NECP) by decommissioning coal-fired generation and aggressively scaling up solar photovoltaic (PV) and wind capacities. Beyond 2030, all of the incremental electricity demand would be met by solar PV and wind; hydro and natural gas would balance the fluctuations of intermittent renewable generation. Achieving net zero by 2050 would also require significant energy efficiency improvements and the large-scale use of electricity and zero-carbon energy carriers (for example, biofuels, biomass) in end-use sectors, especially transport, heating, and industry. The aggregate employment impacts of the green transition may be manageable, but shifts are likely to occur among sectors, firms, occupations, and regions. Low-educated workers and men, on average, are expected to be disproportionately affected by the change associated with the green transition in North Macedonia. These expectations will entail implementing a Just Transition Plan in coal regions and workforce reskilling.

**In terms of macro-fiscal impact, the net zero target by 2050 can be achieved with a negligible impact on the current potential growth of the economy.** Overall, compared to a Reference Scenario (RS)<sup>4</sup>, North Macedonia would need to invest an additional US\$1.7 billion by 2030 and US\$5.6 billion by 2050 (expressed at present values and in 2020 US\$) in the energy system to achieve economy-wide net zero, equivalent to about 2.6 percent of GDP per year, on average. The lion's share of the incremental investment until 2050 would go to the power sector and would be mostly directed to the scale-up of renewable generation capacities. However, the higher investment required would be at least partially compensated by lower operating costs, estimated at -1.3 percent of GDP per year, on average. The impact of decarbonization investments on domestic output would be modest relative to the significant emissions reduction; GDP per capita would be only 0.3 percent lower in 2050, compared to the RS.

**More than 80 percent of additional capital investments needed to meet the decarbonization target could be undertaken by the private sector.** Raising capital to finance climate change-induced investments requires creating an enabling regulatory environment. Mobilizing financing for the green transition entails issuing green bonds, accessing public-private partnerships (PPPs), and tapping into EU pre-accession and guarantee funds.

**The green transition will have to be designed and implemented in a just manner.** In general, 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. At the same time, specific attention should be paid to the impact of the green transition on the two coal-dependent regions, Pelagonija and the Southwest region. The Just Transition roadmap calls for an integrated approach to green transition. Such integration regards the mitigation of impacts on people and communities as a core concern; plans for environmental remediation and land reclamation; and engages in strategic coordination across multiple actors, including stakeholders to be consulted (Three Pillars approach).<sup>5</sup> Strategic planning also entails supporting the economic diversification of those two regions to increase employment opportunities outside of the coal sector. The phaseout of coal provides an example of the importance of human capital investments, both prior to and during the transition, for the broader economic transition. Short-term investments include upskilling/reskilling packages with subsidizing schemes for the job transition of workers affected by the coal phaseout; longer-term investments include the improvement of vocational education and non-formal education—and both will be key. The green transition also requires

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<sup>4</sup> This modeling scenario represents an unconstrained least-cost evolution of the energy system. No specific assumptions are made on the introduction of new policies supporting decarbonization, and the evolution of the energy system is purely driven by economic considerations. This scenario is incompatible with the WB6 countries' aspirations of EU integration and their existing climate change commitments, but it provides a comparable baseline across the six countries for the other decarbonization scenarios.

<sup>5</sup> World Bank Group "Managing Coal Mine Closure: Achieving a Just Transition for All" (English). World Bank Group, Washington, DC.

stronger support for mental and other health conditions to the affected population. Overall, with the green transition, about 66,000 workers in North Macedonia will be at the highest risk of losing their jobs and will need to change their occupations. Therefore, the country will need to adapt the education system and social protection mechanisms to respond to these emerging demands, retrain people, and build up a health system to support the green transition, increase resilience to climate shocks, and adjust to changing disease patterns.

**The note concludes with a summary of detailed recommendations for policy reforms and investments, along with the associated complexities and timelines for 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 subsequent decades. The recommendations span four areas: (1) resilience and adaptation, (2) decarbonization and mitigation, (3) macroeconomy and financing, and (4) regulatory/institutional framework and education and labor.

