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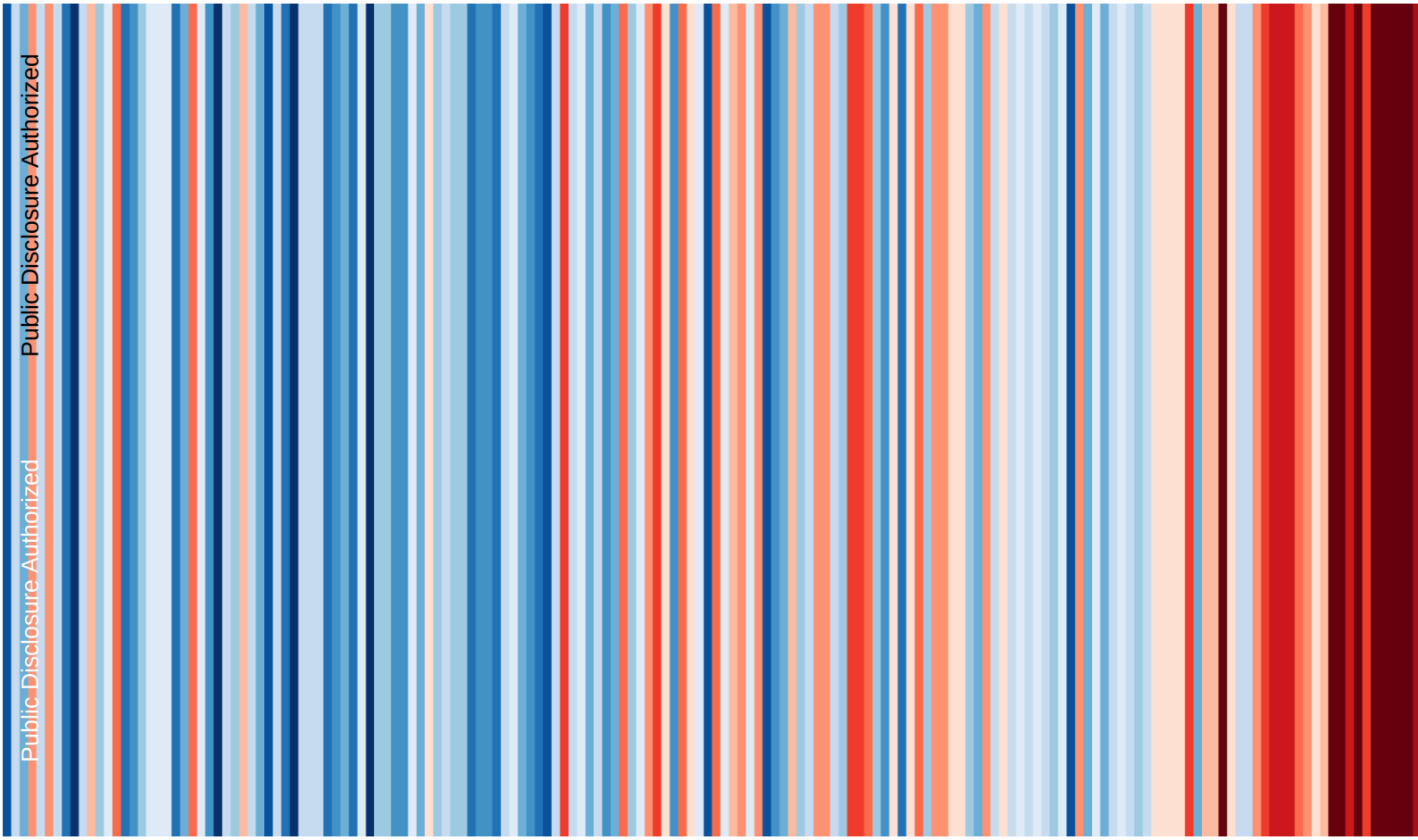

NORTH MACEDONIA CLIMATE PUBLIC FINANCE REVIEW

Integrating Climate Change Perspectives into Fiscal Policy

WORLD BANK GROUP

June 2024

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Abbreviations and Acronyms

BAU	Business as Usual
CBAM	Carbon Border Adjustment Mechanism
CBT	Climate Budget Tagging
CC-MFMod	World Bank's Climate Change Macroeconomic-Fiscal Model
CPAT	Climate Policy Assessment Tool
ENDC	Enhanced Nationally Determined Contribution on Climate Change
ETS	Emissions Trading System
GDP	Gross Domestic Product
GFDRR	The Global Facility for Disaster Reduction and Recovery
GHG	Greenhouse Gas
GPP	Green Public Procurement
IFMIS	Integrated Financial Management Information System
IPA	The EU Instrument for Pre-Accession Assistance
IPCC	The Intergovernmental Panel on Climate Change
KTOE	kiloton of oil equivalent
LPG	Liquefied Petroleum Gas
LTS	Long-Term Strategy on Climate Action
MFMod	The World Bank's Macroeconomic and Fiscal Model
MoF	North Macedonia's Ministry of Finance
MRVA	Monitoring, Reporting, Verification and Accreditation
NBRNM	The National Bank of the Republic of North Macedonia
NDC	Nationally Determined Contribution on Climate Change
PECI	Projects of Energy Community interest
PMI	Projects of Mutual Interests
PPPs	Public–Private Partnerships
RCP	Representative Concentration Pathways
SOEs	State-Owned Enterprises
TCP	Total Carbon Price
VAT	Value Added Taxes
WBIF	Western Balkans Investment Framework

Acknowledgments

This report was prepared by a World Bank team led by Joseph Dixon Callisto Pryor (Senior Climate Change Specialist) and Sanja Madzarevic Sujster (Senior Economist), and included Pavlina Zdraveva, Charl Jooste, Rafael Ravnik, Aleksandar Dedinec, Victor Mylonas, Mihaly Fazekas, and Joana Madjoska. Administrative support from Jasminka Sopova is gratefully acknowledged.

The work has been done with the financial support of the Austrian Government, through the Western Balkans Window of the Climate Support Facility.

The work was performed under the overall guidance of Xiaoqing Yu (Country Director); Massimiliano Paolucci (Country Manager); and Jasmin Chakeri (Practice Manager). The team received advice and support from Richard Record (Program Leader, World Bank). The team thanks peer reviewers Daniel James Besley (Senior Climate Change Specialist), Marissa Santikarn (Climate Change Specialist), and David Knight (Lead Country Economist) for their insightful comments.

The draft report was presented to the Ministry of Finance and the Ministry of Environment and Physical Planning in January 2024. The team is grateful for their comments and a fruitful discussion.

Cover page "warming stripes" graphic is a visual representation of the temperature change in North Macedonia over the past 100 years. The image was sourced from Ed Hawkins, National Centre for Atmospheric Science, University of Reading, National Centre for Atmospheric Science (https://showyourstripes.info/).

Executive Summary

North Macedonia's economy is expected to show moderate growth in the medium term, with public finances continuing to be stretched. Although the country anticipates positive medium-term economic prospects, economic headwinds like geopolitical tensions and conflicts, and energy supply and price uncertainties pose significant challenges. Increasing expenditures and slowing revenue growth has seen fiscal space tighten, with public debt reaching 62 percent of GDP, with further increases ahead.

The progressive impact of a changing climate brings new challenges and makes the achievement of North Macedonia's development goals much more difficult. This may complicate the country's ability to achieve its climate goals while preserving fiscal sustainability given climate change presents additional strains on public finances. This report aims to highlight the links between climate and government finances—identifying the relevant risks and opportunities, while explaining how fiscal policy can help achieve climate objectives while also delivering economic, fiscal, and social outcomes.

Escalating physical and transition climate risks pose direct and indirect threats to macro-fiscal sustainability. Climate change physical hazards impact public finances through multiple channels, which can have complex interactions and can ultimately reduce fiscal space and compromise macro-fiscal sustainability. Physical risks, such as climate-related disasters, are increasing and have the potential to diminish the productivity of human, natural and social capital, thereby impeding economic growth. In the past three decades, North Macedonia experienced over USD 660 million in cumulative direct asset losses. Such events also cause economic, consumption, and well-being losses and introduce contingent liabilities that place pressure on public finances. The potential impacts of transition risks have been made more real with the introduction of the EU's Carbon Border Adjustment Mechanism (CBAM), with manufacturing sectors being particularly exposed due to their relatively high emissions intensity and trade exposure. Indicative estimates suggest the CBAM compliance costs could be around USD 120 million per year in North Macedonia with exported electricity and iron and steel products facing the largest compliance costs.

Domestic and global decarbonization efforts underline the need for strong policy and financing frameworks. North Macedonia has made a number of international commitments on climate action. The country's Paris Agreement pledge coupled with Sofia Declaration commitments require significant domestic climate action. At the same time, the world, and the EU in particular, are making efforts to decarbonize. As North Macedonia aims to join the EU, it will be required to fully align with the EU's net zero objectives. Combined, this highlights the need to prioritize climate mitigation in economic policy making.

Fiscal policy can play a crucial role in managing climate risks by reducing asset vulnerability, supporting resilient infrastructure, and steering the economy through the transition. Strategic fiscal planning is essential for climate risk management. Investing in climate-resilient infrastructure carries high returns, and incorporating climate into the budgeting process can reduce budget volatility and help reduce post-disaster recovery time. This can reduce economic costs and safeguard public finances. The modeling undertaken in this report shows that the overall impact of CBAM can be mitigated and be kept at a manageable level if coupled with effective carbon pricing policies and investments to support decarbonization.

Fiscal reforms are essential for financing the investment gap and promoting a green transition; but a consistent policy framework needs to be put in place. North Macedonia's ambitious climate mitigation goals require a significant level of investment—almost EUR 25 billion through 2030 and EUR 50 billion by 2050, cumulatively, as per the government estimates. However, the envelope will be higher if the current policy inconsistency remains in place: continued reliance on fossil fuel subsidies increases the cost of transition. While North Macedonia has embraced environmental fiscal reform, implementation lags, including on taxes on fuels and vehicles which remain below the EU average. Importantly, using fiscal policies to provide a price signal to businesses encourages clean investments

and eases the burden on public finances. Further, the integration of climate into public finance frameworks, such as through green public procurement and climate budget tagging, could be accelerated to systematically align public spending with climate objectives.

Addressing legal and political commitments to reduce carbon emissions, while preserving jobs, growth, and fiscal sustainability will require careful prioritization of policies and investments. This report explores climate impacts through a fiscal lens – complementing other World Bank efforts, such as those being progressed through the Country Climate and Development Report for the Western Balkans. In this regard, this report focuses on identifying fiscal policy priorities, based on three main objectives:

(i) Reducing exposure to, and impacts of, climate risks (physical and transition risks);

(ii) Improving fiscal policies, frameworks, and institutional arrangements to deliver on climate objectives, including Paris Agreement goals; and

(iii) Preparing North Macedonia for accession to the EU.

To achieve these objectives, action is required in three priority areas:

1. **Enhancing climate considerations within institutional and governance frameworks**. This includes requiring regular assessment of fiscal risks, including climate risks within budget frameworks, and establishing stronger disaster response mechanisms. It also includes strengthening budget planning and investment management frameworks and requiring private sector and banks to report and disclose climate risks.
2. **Improving fiscal policy frameworks and supporting policies.** Critically, this includes introducing carbon pricing to help manage transition risks. It also includes reforming vehicle taxes and removing fossil fuel subsidies to ensure a clear and consistent price signal. Combined with the effective use of carbon revenues, these reforms could help manage a just transition.
3. **Promoting innovative financing to help strengthen public finances and shift the burden to the private sector.** This includes funding renewable energy and green R&D.

Carbon pricing is central to fiscal reforms to provide appropriate investment signals, change production and consumption patterns, raise additional revenue, and prepare North Macedonia for EU accession. A carbon price is a crucial component of North Macedonia's new climate action law, but it is not yet adopted.[1] Early policy intervention can trigger transitions, so its introduction would accelerate the change, promote alignment with North Macedonia's commitments under the Energy Community Treaty, in addition to demonstrating progress towards EU accession requirements. Importantly, modelling suggests that carbon pricing could raise significant revenue—around 1.4 to 1.9 percent of GDP a year initially, as per the baseline and ambitious carbon pricing scenarios, almost doubling by 2035. The investment signal, combined with considerable revenue, highlights the importance of carbon pricing in decarbonizing Macedonian economy. If used strategically, carbon revenues can support affected households and businesses and therefore help deliver an equitable and just transition. At the same time carbon pricing offers a range of co-benefits such as improved air quality and associated health benefits. However, introducing a new tax instrument is not simple and may face opposition; making sure to explain the benefits of a new instrument (including how carbon revenue is used) is central to its effective implementation.

The links between fiscal policy and climate are clear and significant opportunities exist to help North Macedonia better manage climate risks while achieving positive economic, fiscal and climate outcomes. While some progress has been made, North Macedonia is currently not appropriately managing risks nor capitalizing on the opportunities presented by climate change. Through active

[1] The draft introduces carbon fee as an instrument. The report uses carbon tax, carbon fee and carbon pricing interchangeably, as all legal instruments would have the same climate policy objectives.

management and following through with past announcements and stated plans, North Macedonia is well placed to thrive in a carbon constrained world. The summary table below summarizes institutional, policy, and financing priorities in North Macedonia. However, the identified priorities focus solely on fiscal contributions to a more comprehensive strategy to address North Macedonia's climate change objectives.

Summary of policy recommendations

Policy priority	Description	Timeframe (Short or medium)	Targeting (Risk management, fiscal reform, EU accession)
	Institutions		
Promote climate risk reporting and disclosure of climate risks	• Develop the green taxonomy to avoid greenwashing • Require reporting and disclosure of climate risks by banks to help the private sector manage both physical and transition risks and shift the risk away from government • Introduce ESG reporting by corporate sector to disclose risks and raise awareness	ST MT MT	EU accession Risk management Risk management
Build fiscal risks assessment capacity	• Strengthen the modeling capacity in the MOF to understand and undertake macro-fiscal risk assessments stemming from climate change	MT	Risk management
Introduce budget and climate action monitoring	• Introduce and implement Climate Budget Tagging and align it with green taxonomy	ST	Fiscal reform
Establish planning and investment framework	• Include climate-related contingent liabilities (explicit and implicit) in budgets and fiscal projections to be better prepared when they materialize • Develop a disaster risk financing plan, which considers risk layering and regional pooling, to manage contingent liabilities and protect social spending • Promote climate system proofing to enhance resilience across all new capital infrastructure investments	MT ST MT	Fiscal reform Fiscal reform Risk management
Establish disaster response mechanisms	• Consider mechanisms that allow for quick financial response to disasters and access to social protection payments	ST	Risk management
	Policy		
Implement carbon pricing to help manage transition risks	• Establish a carbon price domestically to reduce liability under CBAM	ST	EU accession Risk management
Adopt the climate policy-critical legislation	• Adopt the REDII, the Energy Efficiency Directive, the MRVA package and ETS readiness, as well as the new TEN-E Regulation.	ST	EU accession Risk management
Progress vehicle tax reform	• Extend the motor vehicle tax to light commercial vehicles and increase the pollution tax component	ST	Fiscal reform
Reform fuel taxes	• Bring base excise rates of diesel closer to the rate for petrol before or when applying pollution pricing • Provide a rebate for fuel used as a feedstock	ST	Fiscal reform
Remove fossil fuel subsidies	• End subsidies to coal-fired electricity to prevent distortion or dilution of the price signal provided through the excise system (or other environmental policies)	ST	Fiscal reform

Shift responsibilities to the private sector, where possible	• Introduce policies to promote uptake of private sector insurance • Mandate minimum level of insurance to increase uptake of private insurance	ST MT	Risk management Risk management
Secure just transition	• Compensate low-income households for increased energy costs to be affordable • Invest in vocational education, enhanced non-formal education, early retirement options, and upskilling/reskilling packages for affected workers	MT MT	Risk management Risk management
	Financing		
Develop new instruments to fund the climate and resilience finance gap	• Develop the market for green bonds • Develop Green Equity Fund • Operationalize Energy Efficiency Fund to fund EE investments including for the residential sector • Develop budgetary instruments that account for climate related physical risks such as contingency funds, traditional insurance, and insurance in the form of catastrophe risk bonds and regional risk pools that help to transfer risk and enable fast recovery	ST MT ST MT	Fiscal reform Fiscal reform Fiscal reform Fiscal reform
Prioritize green R&D	• Reallocate state aid for green R&D from existing state aid programs	MT	Risk management
Promote renewable energy	• Retain an existing premium support scheme for renewable energy sources in the short to medium term to promote investment certainty but evaluate its role over time	MT	Fiscal reform
Strengthen public finance's role in boosting climate response	• Enhance and implement Green Public Procurement	ST	Fiscal reform

1. Introduction

Climate change presents challenges to North Macedonia's economic, social, environmental, and fiscal objectives. This report aims to highlight the interaction between climate change and fiscal policy— physical and transition climate risks place pressure on public finances while at the same time fiscal policies can help contribute to achieving North Macedonia's climate change objectives.

North Macedonia's current economic context may complicate its ability to achieve its climate goals while preserving fiscal sustainability. While the medium-term economic outlook for North Macedonia is positive, downside risks continue to loom on the horizon. Gross domestic product (GDP) growth forecasts have been revised downwards over the last three years[2] in response to the Russia's invasion of Ukraine, energy crisis, inflationary pressures, and uncertainty in the face of geopolitical tensions. Public debt, at 60 percent of GDP, is rising as investments in highways take pace, and as fiscal system responded to support households that are disproportionately exposed to cost-of-living pressures fueled by rising food and energy prices. The government has already allocated EUR 570 million (4.7 percent of GDP) and committed another EUR 170 (1.3 percent of GDP) in anti-crisis measures to avoid electricity and heating restrictions and mitigate the price shock to the economy, companies, and citizens. The fiscal deficit including the State Roads imbalance has remained high, reaching on average 6 percent of GDP since 2020, staying at above 5 percent of GDP in 2023.

Climate change presents an additional challenge for public finances. The country is highly exposed to extreme weather events.[3] Over the last 50 years, the country has experienced a 10-fold increase in the frequency of floods, a 6-fold increase in both extreme heat waves and fires, a 5-fold increase in tropical nights, and a doubling of heavy rainfalls.[4] In the past two decades alone it has seen, cumulatively, 12 climate-related national disasters that affected 1.3 million people.[5] Projections indicate climate change will reduce global economic output by up to 18 percent by 2050, and North Macedonia is among the countries that will face a negative output shock due to climate change.[6] Improving disaster preparedness and resilience is thus a high priority.

North Macedonia has legal and political commitments to reduce emissions. The Paris Agreement, which entered into force in 2016, sets out a framework to strengthen the global response to climate change. Under it, each country can define its national pledge and contribution to the global mitigation effort. As one of the Western Balkan Contracting Parties and signatory to the November 2020 *Sofia Declaration on the Green Agenda for the Western Balkans*, the country has committed to aligning with Europe's environmental policies, which are leading the world in the effort to reduce emissions. As part of the Sofia Declaration, and in line the Energy Community decarbonization roadmap, North Macedonia has committed to align with the EU Emissions Trading System (ETS) and work towards

[2] World Bank. 2023. Western Balkans Regular Economic Report: Spring 2023 and Fall 2023. https://www.worldbank.org/en/region/eca/publication/western-balkans-regular-economic-report

[3] World Bank. 2019. North Macedonia: Country Partnership Framework 2019-2023. https://www.worldbank.org/en/country/northmacedonia/publication/country-partnership-framework-cpf-2019-2022

[4] World Bank calculation based on the data from the North Macedonia Hydrometeorological Institute, provided for the North Macedonia's Fourth National Communication on Climate Change.

[5] Government of North Macedonia. 2023. 4th National Climate Change Communications. Ministry of Environment and Physical Planning. UNFCCC. https://unfccc.int/documents/627667

[6] Swiss Re. 2021. Press Release: World economy set to lose up to 18% GDP from climate change if no action taken, reveals Swiss Re Institute's stress-test analysis. April 22, 2021. https://www.swissre.com/media/press-release/nr-20210422-economics-of-climate-change-risks.html

implementing carbon pricing.[7] Energy Community members continue to make progress towards meeting the exemption conditions under the EU's carbon border adjustment mechanisms (CBAM) for electricity exported to the EU. Under legally binding and political commitments, they will integrate their electricity markets with the EU and support EU climate policies designed to make Europe the first carbon neutral continent by 2050. For North Macedonia, the 2030 targets are to reduce net GHG emissions by 82 percent and include a range of sectoral-specific targets, such as increasing the share of energy from renewable sources to 38 percent of gross final consumption of energy.[8] In addition, EU Accession requires clear action and progress on climate mitigation and ambition, which are part of the Energy Community's objectives. North Macedonia has made progress on some of these, but gaps remain (Table 1).

Table 1. Climate-related EU accession requirements and progress in North Macedonia

EU Accession Climate Requirement	Included in Energy Community	Established in North Macedonia
GHG Monitoring Mechanism Regulation	✓	No (Law on Climate Action, which includes this, is pending adoption)
EU Emission Trading System	✓	No
Effort Sharing Decision		No
Long-term Strategy on Climate Action and Action Plan (2021)	✓	✓
National Energy and Climate Plan	✓ (an update pending)	✓
Climate Change Communication Strategy and Action Plan		✓
NAP – project proposal submitted to GCF		No
Just Transition Strategy		✓

North Macedonia has increased the ambition, clarity, and comprehensiveness of its climate policies in recent years. In 2021, the country submitted its enhanced Nationally Determined Contribution on Climate Change (ENDC), which sets out a reduction target of 51 percent below 1990 levels by 2030 (82 percent in net emissions), the year of North Macedonia's anticipated accession to the EU. This is a big increase over previous targets. North Macedonia has also released its Long-Term Strategy, which outlines the country's contribution to the global effort towards green, low carbon, and climate resilient development, in the context of potential accession to the EU. North Macedonia is the first country to have adopted a Financing and De-Risking Strategies to gain traction for implementation of its 2030 climate targets.

Energy price pressures are jeopardizing national climate objectives. North Macedonia's production from fossil fuels increased by 44 percent y-o-y in 2022 to partly offset the global energy price pressure.[9] The national electricity company Elektrani na Severna Makedonija (ESM) has plans to use

[7] The EU ETS Directive and the MRVA package have been incorporated in the Energy Community by Ministerial Council Decision 2022/05/MC-EnC and the deadline for transposition expired on December 31, 2023. North Macedonia has not complied with the deadline.

[8] This translates into renewables amounting to 66 percent share in gross electricity production, 45 percent share in gross final energy consumption for heating and cooling, and 10 percent in final energy consumption in transport. Ministry of Environment and Physical Planning, 2021, enhanced NDC, ttps://api.klimatskipromeni.mk/data/rest/file/download/060cb9db7eeedc24bae3c127f2afb7139283bec07324b04956c364a7e9868f2b.pd. In accordance with Ministerial Council Decision 2022/02/MC-EnC the targets for RES, energy efficiency and GHG emission reduction for 2030 are legally binding. Those correspond to the targets in the NECP.

[9] Energy Community Secretariat. 2023. Energy Community CBAM-Readiness Tracker. https://www.energy-community.org/dam/jcr:d6e80d5e-9290-4e8b-ac7e-5170ec59808a/EnC%20Tracker%2006_2023_final.pdf

coal mines (Zivojno and Gushterica) to ensure energy security that may jeopardize the energy and climate change greenhouse gas (GHG) reduction targets and efforts to engage more renewables in the energy mix.[10] Coal is being imported to fuel the Oslomej and Bitola thermal powerplants and allow the latter to restart operating. While these measures are aimed at addressing short term constraints, continued reliance on fossil fuels not only undermines short term climate targets, but also prolongs the necessary transition and exposes North Macedonia to future energy price shocks.

Climate impacts and countries' asymmetrical responses expose North Macedonia to both physical and transition climate risks. ***Physical risks*** arise from climate-related hazards. This includes slow onset hazards (or chronic stresses), such as increased temperature and changes in annual rainfall. It also includes more sudden hazards (or acute shocks), such as those caused by extreme weather events[11] (e.g., floods, heatwaves, and fires). ***Transition risks*** stem from the global transition to a low carbon future (particularly caused by changes to social and economic policy), such as shifts in technology, fuel availability, and changes in trade dynamics (e.g. due to changes in consumer preferences or tariffs on emissions-intensive goods). This could mean some business or sectors become increasingly unprofitable and, as the Coalition of Finance Ministers for Climate Action has warned, can lead to "abrupt financial asset revaluation and stranded high-carbon assets with negative implications for the real economy and government budgets."[12] Abrupt and uncoordinated climate policies, technology disruptions, and altered consumption preferences during the transition towards a carbon-neutral economy exacerbate these risks.

This report aims to identify the multifaceted interactions between climate change and fiscal policy. In this context fiscal policy includes tax, subsidy, and expenditure choices that influence economic agents to achieve economic, social, and environmental outcomes. This report complements other ongoing analysis, such as the Country Climate and Development Report (CCDR) for the Western Balkans. The key messages in this report are aligned with those in the CCDR; for example, exposure to physical climate risks expose socio-economic vulnerabilities; investing in adaptation yields broad economic and risk mitigation benefits; significant effort is required to decarbonize the economy; and there is a need to incentivize private green investments. In this report focus is on climate impacts through a fiscal lens—how climate creates risks to macro-fiscal sustainability, but also how fiscal policies can help achieve climate objectives. Compared to the CCDR, this report also provides a more granular assessment of the climate transition risks and opportunities, including providing an assessment of the potential role of carbon pricing as a fiscal tool.

The report roadmap is as follows. The report begins with reviewing climate change risks to North Macedonia's economy and public finances. The long-term outlook is challenging, as climate events are likely to become more frequent and more extreme, resulting in asset and well-being losses and contingent liabilities placing pressure on government resources. Global decarbonization is also changing trade dynamics and increases the cost pressures and risking loss of markets. These conditions translate to risks to public finances, with impacts on value added, jobs, and revenue sources. The report then explores how fiscal policy can help manage climate risks and can influence

[10] Bytyci, F and Teofilovski. O. 2022. Balkans turns to coal as energy crisis trumps climate commitments. Reuters. April 19, 2022. https://www.reuters.com/business/energy/balkans-turns-coal-energy-crisis-trumps-climate-commitments-2022-04-19/

[11] In line with the Intergovernmental Panel on Climate Change (IPCC, 2012, 5), extreme events are weather or climate events that are above or below the range of naturally observed events. A disaster is a severe alteration in the normal functioning of a community, society or economy (e.g. requiring emergency responses) due to hazardous physical events, such as extreme weather or climate events. See https://www.ipcc.ch/site/assets/uploads/2018/03/SREX_Full_Report-1.pdf

[12] Dunz, N; Power, S. 2021. Climate-Related Risks for Ministries of Finance: An Overview. Coalition of Finance Ministers for Climate Action, Washington, DC. https://www.financeministersforclimate.org/sites/cape/files/inline-files/Climate-Related%20Risks%20for%20Ministries%20of%20Finance%20-%20An%20Overview%20%28CFMCA%29_1.pdf

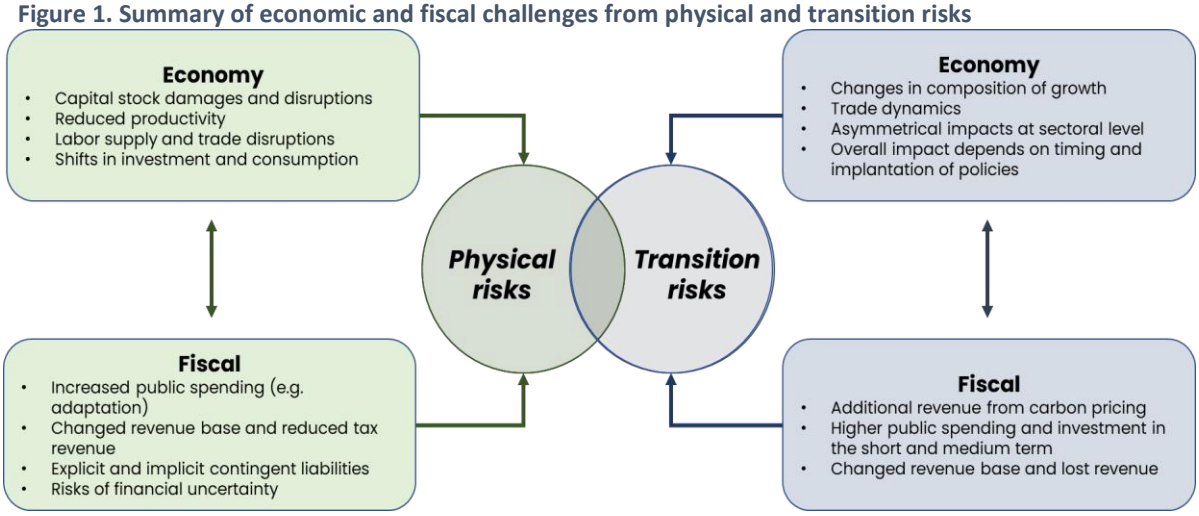
how North Macedonia achieves its climate objectives. For example, carbon pricing can incentivize the green transition, promote an efficient form of revenue raising, and help finance broader climate (and non-climate) objectives as well as unlock opportunities for the economy. However, this report is not intended to provide a comprehensive climate policy or risk assessment—fiscal policies alone cannot address all the barriers and challenges in achieving climate goals. Fiscal policies must be incorporated into a policy package aimed at addressing the full range of climate market failures and barriers. The report also presents an impact assessment, providing the economic and distributional impacts of fiscal reforms using the World Bank's Climate Change Macroeconomic-Fiscal Model (CC-MFMod), the MARKAL North Macedonia model developed by the Macedonian Academy of Arts and Science team, as well as the Climate Policy Assessment Tool (CPAT) jointly developed by the World Bank and the IMF.

2. Climate risks to the economy and public finances

Physical and transition climate risks have direct and indirect impacts on the economy and on macro-fiscal sustainability, and the impacts are expected to intensify. Climate-related disasters can reduce revenue by eroding the tax base, increase public expenditures, including from post-disaster responses, and can reduce well-being, particularly of low-income households. Ambitious climate change policies in other countries, particularly trading partners, can increase costs or decrease market access for North Macedonia's emission-intensive trade exposed industries. However, measures, including fiscal policies, can help manage and diversify these risks, improve macro-fiscal sustainability, and improve competitiveness and market access.

North Macedonia is exposed to climate risks that have direct and indirect impacts on the economy and on macro-fiscal sustainability. Physical risks (such as climate-related disasters) threaten to reduce productivity of human, physical, natural, and social capital as well as, consequently, economic growth.[13,14] The specific impacts of transition risks on economic growth are less clear. However, they may include the need for financing for mitigation and adaptation projects, increased pressure on trade-exposed sectors, and an overall increase in uncertainty. Such changes can result in deterioration of government balance sheets, reduction in asset value, and structural changes to the economy (Figure 1).[15]

Figure 1. Summary of economic and fiscal challenges from physical and transition risks



Source: Adapted from Gagliardi et al. (2022)[16]

2.1. North Macedonia's exposure to climate physical risks is increasing

Like in most countries, North Macedonia's climate is changing, which poses risks to its economy and macro-fiscal sustainability. North Macedonia's Fourth National Communication on Climate Change indicates that the country will face a hotter and drier climate.[17] Slow onset (gradual) hazards like

[13] Feyen, Erik; Utz, Robert; Zuccardi Huertas, Igor; Bogdan, Olena; Moon, Jisung. 2020 Macro-Financial Aspects of Climate Change. Policy Research Working Paper No. 9109. World Bank, Washington, DC. https://openknowledge.worldbank.org/entities/publication/6721ca7f-f426-5756-ac00-0bec2d25f892.

[14] Hallegatte, Stephane; Vogt-Schilb, Adrien; Bangalore, Mook; Rozenberg, Julie. (2017) *Unbreakable: Building the Resilience of the Poor in the Face of Natural Disasters*. Climate Change and Development; Washington, DC: World Bank. https://openknowledge.worldbank.org/entities/publication/25ab6845-b9d1-56dc-9ee9-95ee78ea5d40

[15] Feyen, Erik; Utz, Robert; Zuccardi Huertas, Igor; Bogdan, Olena; Moon, Jisung. 2020.

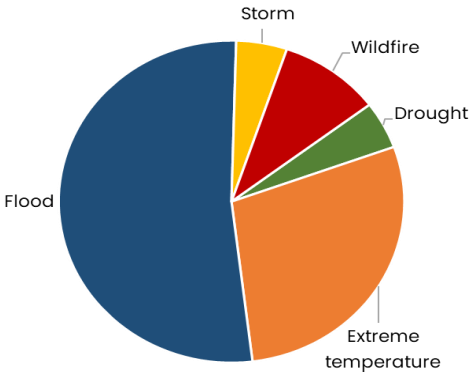
[16] Gagliardi, Nicola; Arevalo, Pedro; Pamies, Stéphanie. 2022. The Fiscal Impact of Extreme Weather and Climate Events: Evidence for EU Countries, Discussion Paper 168, July 2022, European Economy Discussion Papers. https://economy-finance.ec.europa.eu/publications/fiscal-impact-extreme-weather-and-climate-events-evidence-eu-countries_en

[17] Government of North Macedonia. 2023.

temperature and precipitation changes will have macro-fiscal impacts through reduced labor productivity, particularly in agriculture, and thus secondary impacts on public revenues. However, these impacts are hard to measure. This chapter therefore focuses on sudden events, such as the increasing severe and frequent floods, drought, and forest fires due to changes in precipitation and temperature.[18] ThinkHazard classifies flooding, landslides, and wildfire hazards in North Macedonia as "high," meaning that there is higher than average potential for these events to cause severe damage and significant disruption to activities. This risk level will likely continue to increase due to climate change.[19]

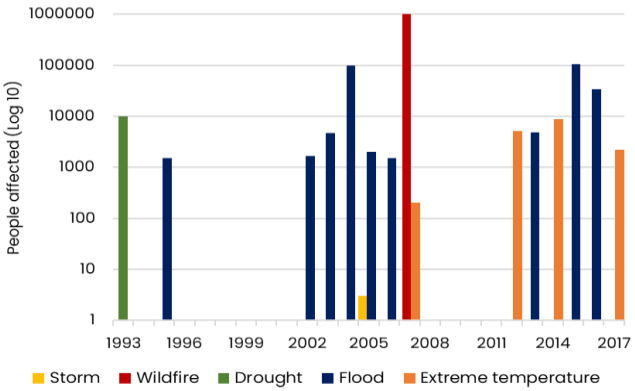
Disaster events have already far exceeded government's capacity to respond. Because North Macedonia's geography lends itself to flash flooding, flooding constitutes around a half of disasters recorded in the country between 1990 and 2021. Floods account for around 20 percent of average annual monetary losses over the same period (Figure 2)[20] and they affect people more than any other type of disaster that is related to climate impacts (Figure 3). The government of North Macedonia's capacity to respond to damage has long been inadequate. For example, in 1994 floods caused damage that represented around 77 times the recovery budget allocated by the government.[21]

Figure 2. Average Annual Natural Hazard Occurrence 1980-2020[22]



Source: World Bank (2021) Climate Change Knowledge Portal.

Figure 3. Key Natural Hazard Statistics 1993-2017 (number of people affected)



Source: World Bank (2021) Climate Change Knowledge Portal.

Wildfires have also been prevalent, and will be more so due to climate change, and present mitigation challenges in addition to physical risks. The first recorded forest fire was prior to 2000, and in the last two decades, the frequency of forest fires has increased—the time between severe fire events has decreased from seven to two years since.[23] A hotter and drier climate will cause further increases in the frequency and severity of wildfires. In addition, wildfires turn forests from GHG sinks

[18] Djurdjevic, Vladimir. 2020. Report on climate change projections and changes in climate extremes for the Republic of North Macedonia. Prepared within the project "Macedonia's Fourth National Communication and Third Biennial Update Report on Climate Change under the UNFCCC". Ref. number IC 44/2019. https://api.klimatskipromeni.mk/data/rest/file/download/f40bd7dbcd0a9485bdb4eeead826efbd631b59c2e44af1a37ef8d90bbed367aa.pdf

[19] GFDRR. 2020. ThinkHazard: FYR of Macedonia. World Bank. https://thinkhazard.org/en/report/241-fyr-of-macedonia

[20] World Bank. 2021. North Macedonia Country Summary. Climate Change Knowledge Portal. World Bank Accessed February 13, 2023. https://climateknowledgeportal.worldbank.org/country/north-macedonia

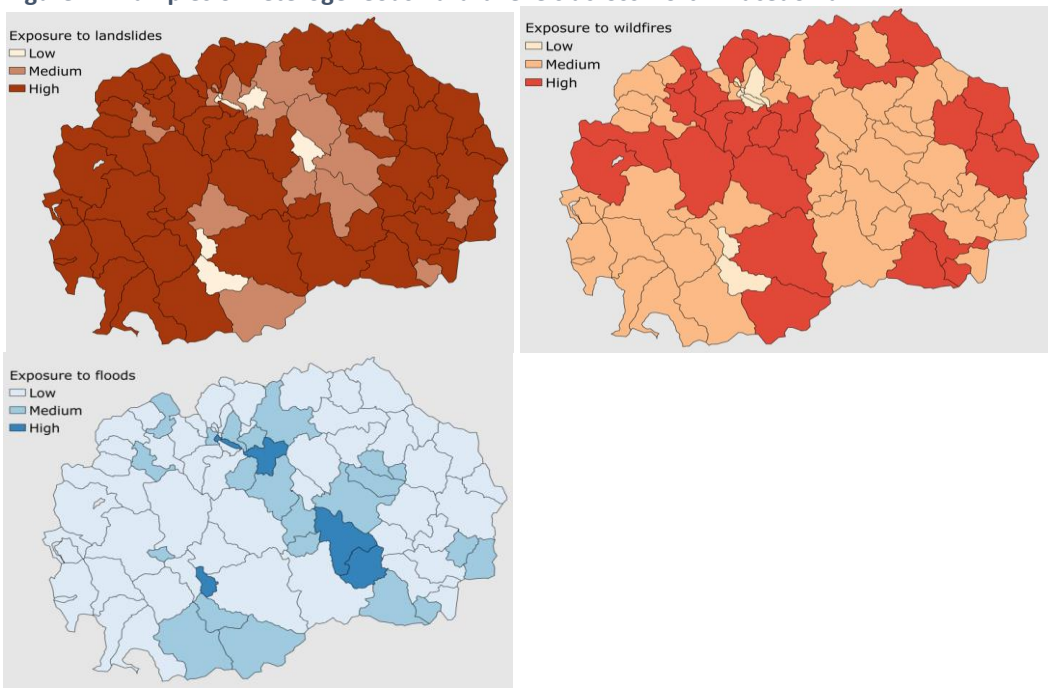
[21] World Bank. 2021. SEE Catastrophe Risk Insurance Facility TA SECO (P156455), Implementation Completion and Results Report. March 15 2021. https://documents1.worldbank.org/curated/en/164351616972613977/pdf/Western-Balkans-SEE-Catastrophe-Risk-Insurance-Facility-TA-SECO-Project.pdf

[22] Earthquakes and epidemics have been excluded, noting that they are not historically related to climate impacts.

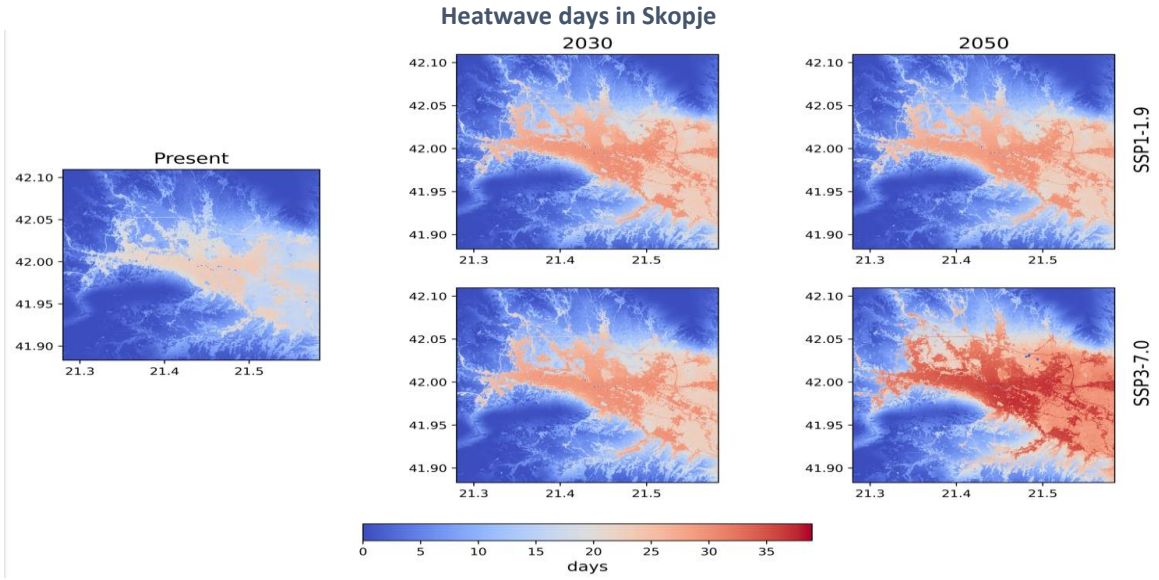
[23] Government of the Republic of North Macedonia. 2023.

to significant GHG emitters, jeopardizing the country's ability to meet its climate mitigation targets. Both the ENDC and the Long-term Strategy on Climate Action (LTS) evidence an understanding of this, as both include forest-focused climate actions: to reduce average annual burned area by 63 percent (to approximately 6,000 hectares) and to expand forested area by an additional 5,000 hectares.

Figure 4. Examples of heterogeneous hazard levels across North Macedonia



Source: World Bank CCDR and JBA Risk Management. *Note:* hazard classification is based on the spatial distribution of hazard intensity at a given frequency or "return period"— where high levels of damage can be expected to occur within a project or human lifetime to "Very Low," where potentially damaging effects are unlikely to occur, on average, in a project or human lifetime.



Source: World Bank CCDR and VITO

Note: A heatwave is defined as a minimum of three days in which both the daytime and nighttime temperature exceed the 90th percentile threshold of a base period (taken as the period 2001-2020).

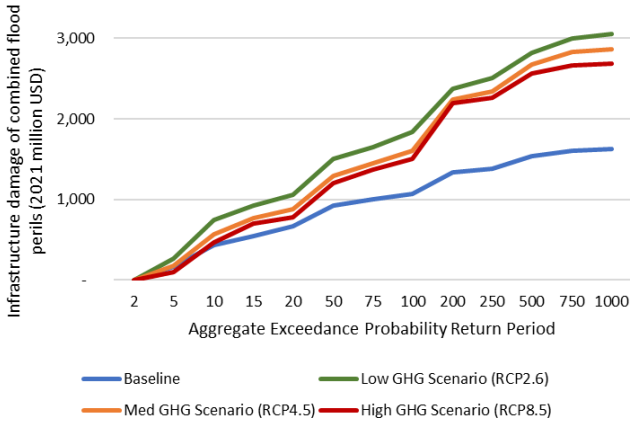
Changes to the climate and the associated impacts are not evenly distributed, geographically or economically. Projections of change under future climate scenarios predict significant geospatial differences across the country[24] and therefore heterogeneous hazard impacts (Figure 4). This can be

[24] Djurdjevic, Vladimir. 2020.

particularly problematic if the regions subject to localized changes (e.g., temperature or precipitation extremes) include vulnerable communities or economically significant industries or infrastructure. Climate change impacts are also imperfectly shared across the population, with poor households and communities generally being disproportionately affected.[25] These factors highlight the limitations of macroeconomic modelling, which tend to provide aggregate results at the economy level (see Chapter 3).

North Macedonia's exposure to climate-related disasters (i.e. physical risks) is expected to get worse, but adaptation investments can reduce output losses. Partial modelling shows that the negative impacts of climate change increase over time, although the average impact increases do not coincide with higher GHG emission scenarios. This is due to overall drying of the region, which decreases the average flooding risk under higher emission scenarios (i.e., higher RCPs). Figure 5 shows that under current climate conditions, a once in 50-year flood can lead up to US$0.9 billion of losses. This increases to up to US$1.5 billion under future climate scenarios. While the economic damages from floods diminish under the more adverse climate scenario (RCP 8.5), damages from labor heat stress increase and almost offset the lower damages from floods. Figure 6 summarizes the GDP impacts under different climate scenarios, resulting from heat, droughts, and floods. Without adaptation, climate change is expected to reduce GDP by more than 4 percent just accounting for the heat, droughts, and floods channels. However, MFMod modelling suggests that investing around USD 90 million annually in adaptation to address heat, drought, and flood impacts (such as tree plantings, infrastructure protection, early warning systems, and shifting work hours) can improve the GDP impacts across all climate change scenarios—bringing GDP reductions in 2050 closer to 2.5 percent. Financing these investments (particularly a more comprehensive investment program covering non-climate resilience investments for earthquakes) will be costly[26], including in terms of the burden carried by public finances. However, they will more than offset the corresponding economic losses. Indeed, the numbers presented here are conservative in terms of the benefits of investments: they consist in a lower bound for impacts of climate change and natural hazards without adaptation on GDP, a comprehensive investment program that is still less costly than these impacts, and a lower bound in terms of benefits (as the positive impacts of investments on the growth and associated co-benefits are not modelled).

Figure 5. Infrastructure damage of combined flood perils

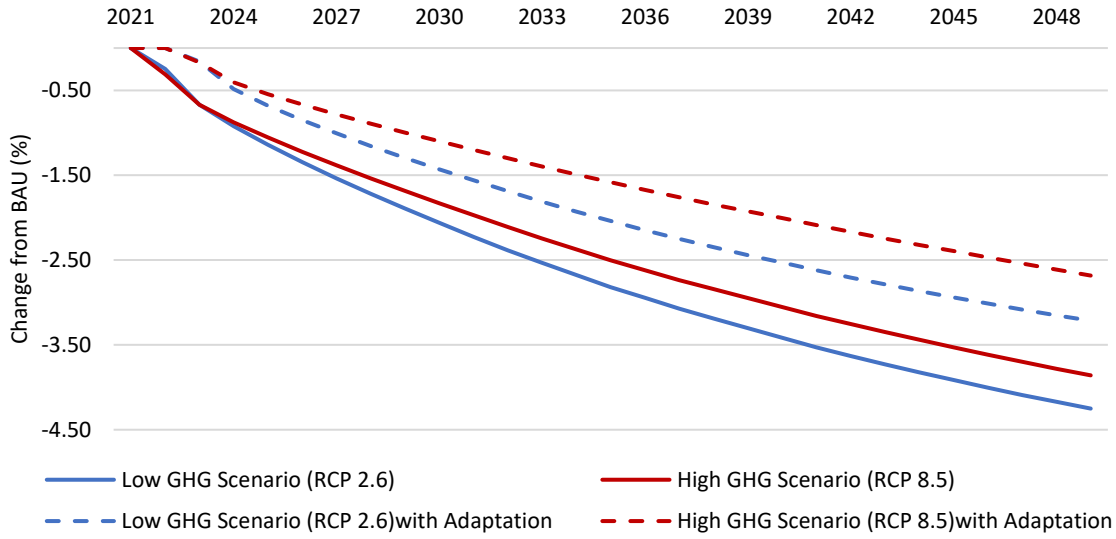


Source: JBA Risk Management.

[25] Hallegatte, Stephane; Vogt-Schilb, Adrien; Bangalore, Mook; Rozenberg, Julie. 2017.

[26] A more comprehensive investment program, this time covering most sectors and hazards estimate the total in the order of USD 6.5 billion or around 0.8-1.2 percent of GDP in the period to 2050.

Figure 6. GDP impacts (compared to BAU) under different climate scenarios - with and without adaptation investments (2020-2050).



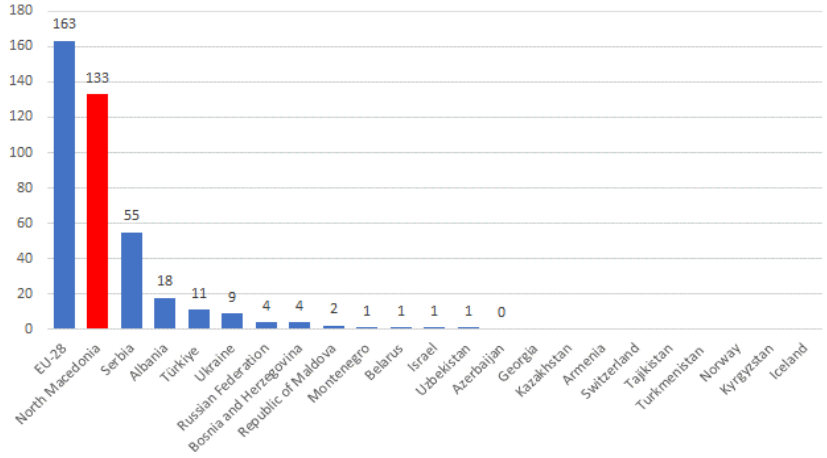
Source: World Bank analysis using MFMod.

Economic costs of climate are broader than direct asset losses, which places additional pressure on macro-fiscal sustainability. Understanding the broader potential impacts of climate on North Macedonia's economy and fiscal system requires looking beyond asset losses, which are only one component of broader economic costs. In addition to both public and private asset losses, climate change also affects consumption, income, and well-being. Loss of life, degraded health, and degradation of cultural heritage, biodiversity, and ecosystem services are difficult to quantify but are serious.[27] Estimates of well-being losses indicate that North Macedonia's expected annual well-being losses from floods alone will be around 0.9 percent of GDP, fourfold the average annual risk to assets alone.[28] Well-being losses include the resulting loss of consumption that would have otherwise occurred but is diverted to rebuilding (as well as the loss in income and assets itself). This loss in consumption is calculated based on pre-disaster consumption, and it provides a useful estimation of secondary effects and the relative impact across income groups. Much like other impacts, well-being impacts are not evenly distributed. For example, an equivalent loss in assets in terms of denar amount will have a greater impact on the consumption ability of households with fewer resources.

Air quality concerns alone represent a significant well-being risk. Modelling for North Macedonia's Fourth National Communications suggests that existing policies and measures will prevent mortality because of reduced air pollutant emissions compared with doing nothing. Estimates predict 133 fewer deaths in 2030, representing 33 percent of the total avoidable deaths in the region, due to policies in place (Figure 7). The benefit of reduced air pollution in terms of years of life lost will result in 1,468 years gained in 2050 at national level, or 36 percent of the total life-years gained in the region. Improved air quality will result in fewer cases of illnesses and improved health of the labor force, with 6,528 averted work lost days in adult employed population, 170,692 restricted activity days avoided and 105 fewer cases of hospital admissions. All these also provide economic benefits in terms of reduced healthcare costs and improved productivity.

[27] Popovski, Vasko. 2022. Disaster Risk Reduction Report: Fourth National Communication on Climate Change.
[28] World Bank, North Macedonia: Country Climate and Development Report, forthcoming.

Figure 7. Avoided premature deaths in 2050 due to the emissions reductions achieved with the planned climate action

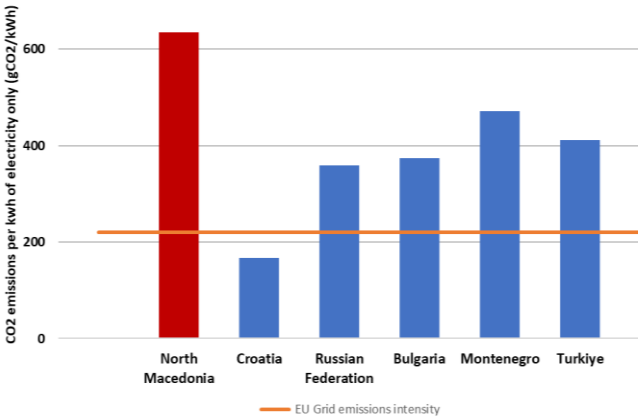


Source: Climate Change Mitigation report for the Fourth National Communication on Climate Change, 2021

2.2.North Macedonia's exposure to climate transition risks is also increasing

North Macedonia has a relatively energy-intensive economy, and the energy mix is dominated by fossil-fuels, which largely drives transition risks in the country. Over three quarters of primary energy supply is from coal for electricity and oil products for transportation. The main power producer is a state-owned company Elektrani na Severna Makedonija (ESM), owning and operating the majority of total installed capacity. Transport fuels and natural gas are completely imported, while coal is almost solely domestically soured.

Figure 8. Electricity grid emissions intensity in North Macedonia, EU, and select countries



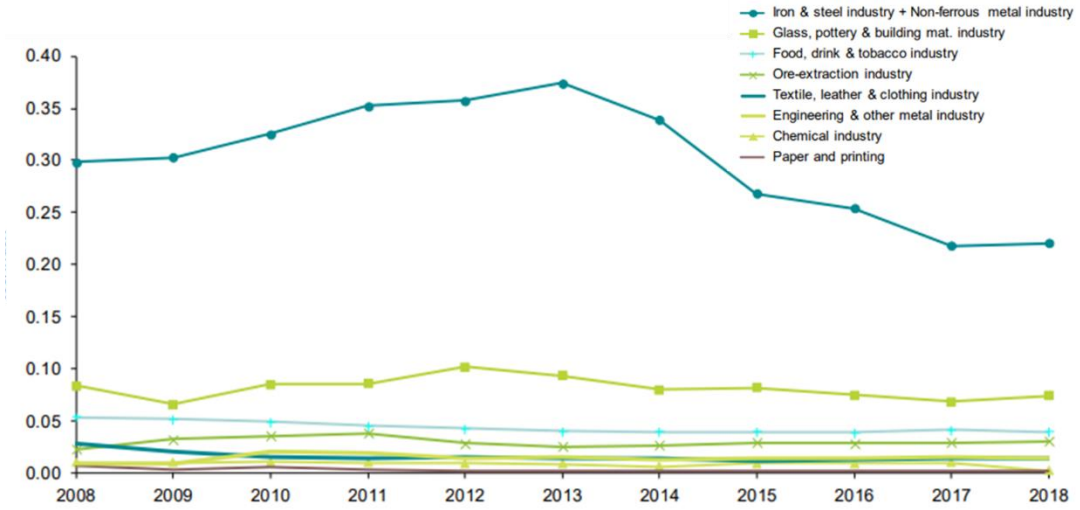
Source: World Bank analysis, based data from the European Environment Agency and International Energy Agency.

North Macedonia faces transition risks from a variety of sources. Because the carbon intensity of production of North Macedonia industry is relatively high, carbon border taxes applied by the EU are among the most immediate risks to Macedonian exports. Reduced demand for emission-intensive products and/or substitution for lower-emissions alternatives (e.g. due to shifting consumer, or government preferences), reduced demand for high-emitting fuels (e.g. coal), shifts in global demand for traditional technology (e.g. shifts to electric vehicles away from internal combustion vehicles[29]), and an increased potential for stranded assets also raise concern.[30] One area where North Macedonia is particularly exposed is on electricity production, due to a high reliance on lignite coal (Figure 8). Domestically, iron and steel are the most energy intensive industries (Figure 9).

[29] Electric vehicles are expected to represent 18 percent of the global car market in 2023. IEA. 2023. Global EV Outlook 2023. https://www.iea.org/reports/global-ev-outlook-2023.

[30] For example, in 2020 Japanese conglomerate Sumitomo wrote off its Bluewaters power station in Australia due to an inability to access finance because of concerns around future coal supply and the long-term viability of fossil fuels.

Figure 9. Energy intensity (consumption/industrial production growth index) in North Macedonia.



Source: Research Center for Energy and Sustainable Development – Macedonian Academy of Science and Arts (2019)[31]

However, steel production in North Macedonia may have advantage over other, more intensive producers. Steel production in North Macedonia uses electric arc furnace technology[32], which is far more efficient that blast furnace steel (e.g., less than half the emissions compared to blast furnace technology).[33] For example, Makstil produced over 300 million tonnes of steel in 2022 using recycled scrap metal with electric arc furnace (EAF) technology, which produces around a third of the emissions of blast furnace technology per ton of steel. This is important because the blast furnace technology route is responsible for around 70 percent of global steel production. Makstil's North Macedonia facility produces steel with an average direct[34] emissions intensity of around 0.11 tCO_2 per ton steel.[35] While this is slightly higher than global scrap EAF averages (0.04 CO_2/ton steel), it remains an order of magnitude below global averages for blast furnace steel (~1.2 tCO_2 per ton steel).[36] This suggests North Macedonia steel may be relatively lower emitting compared to others steel from other countries and may have a competitive advantage under the CBAM.

The EU's CBAM presents a tangible example of a climate transition risk for North Macedonia. The CBAM puts a carbon price on imports of certain emissions-intensive goods to the EU from 2026, reflective of their emissions intensity and the extent to which the goods faced a carbon price in the country of production (Box 1).[37] For example, the introduction of the EU's CBAM will increase the cost and therefore reduce the competitiveness of imported goods that are more emissions intensive and have not already paid a carbon price. The extent to which the CBAM applies to North Macedonia is

[31] Research Center for Energy and Sustainable Development - Macedonian Academy of Science and Arts. 2019. Study on Industry Analysis of Policies and Measures. https://api.klimatskipromeni.mk/data/rest/file/download/490f1f51642940a74f1e167eb73d7b883498ea63d882ca5fa6209870ba8d7e00.pdf

[32] Global Energy Monitor, *2023 Pedal to the Metal*. https://globalenergymonitor.org/wp-content/uploads/2023/07/GEM_SteelPlants2023.pdf

[33] World Steel 2023. *Sustainability Indicators 2023 report*. https://worldsteel.org/steel-topics/sustainability/sustainability-indicators-2023-report/

[34] This emissions intensity value only includes direct (scope 1) emissions. It does not include indirect (scope 2) emissions associated with electricity consumption, which is aligned with current coverage of the EU CBAM for steel products. Fact Sheet. https://ieefa.org/sites/default/files/2022-06/steel-fact-sheet.pdf

[35] Based on data provided directly by Makstil.

[36] The Institute for Energy Economics and Financial Analysis (IEEFA). 2022. The facts about steelmaking Steelmakers seeking green steel.

[37] Regulation (EU) 2023/956 OF the European Parliament and of the Council of 10 May 2023 establishing a carbon border adjustment mechanism. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32023R0956

determined by the level of electricity market integration,[38] the presence of domestic carbon pricing, and EU accession requirements more broadly. The Government of North Macedonia does not need to implement additional policy or legislation to comply with the EU CBAM—compliance obligations rest with importers. Requirements on North Macedonia exporters, including costs and/or reporting, will be determined through the exporter-importer commercial arrangements. While there are no exemptions to the CBAM for non-electricity products, there are opportunities for exemption of electricity exported to the EU, where electricity markets are integrated (Box 1). Importantly, electricity market coupling is a precondition to apply for such an exemption, which requires transposition and implementation of the EU's Electricity Market Integration Package. This has been delayed in North Macedonia, which makes such an exemption unlikely in the short term. However, North Macedonia can reduce the CBAM compliance costs imposed on its exporters (including electricity) by adopting a domestic carbon price (such as a carbon tax or ETS), as discussed in section 3.3.[39]

Box 1. Overview of the EU's CBAM

The EU CBAM is a policy instrument that imposes a carbon price on certain products imported into the EU. It will replace the existing approach to manage the risk of carbon leakage (i.e., free allocation of EU ETS allowances).[40] Its intent is to level the playing field by imposing a carbon price on imports such that import prices to consumers will more accurately reflect their carbon content. The cost imposed by the CBAM is dependent on the embedded emissions of the covered product and the carbon price, which will be calculated as the weekly average auction price of EU ETS allowances (expressed in € / tonne of CO_2). Thus firms will be able to reduce the cost of the CBAM by either reducing emissions intensity of production or by applying a domestic carbon price.

If installations producing CBAM exports do not provide embedded emissions values to EU importers, a "default value" will be applied that is based on the worst performing EU installations, which will increase costs to exports. Thus North Macedonia should establish a robust monitoring, reporting, and verification system to track and report GHG emissions and production data for CBAM goods.

Taking effect in October 2023, the CBAM will start slowly. It initially applies to products from cement, iron and steel, aluminum, fertilizers, electricity, and hydrogen and in the two-year pilot phase importers will report the embedded emissions of CBAM goods but not face compliance costs. Beginning in 2026, the CBAM will require importers of covered products in the EU to buy and surrender CBAM certificates representing the *embedded emissions* in those products (that is, the estimated GHG emissions released in their production). However, compliance costs will begin to apply gradually with the number of CBAM certificates required to be surrendered reduced initially to reflect free allocations of allowances under the EU ETS, but then increasing over time to correspond the phase out of free allowances under the EU ETS (which will be gradually removed in the period to 2034). In addition, the EU has signaled that the scope of the CBAM—both of the types of emissions and the covered products—will expand over time.[41] The purposes of the EU CBAM are to address the risk of production being relocated to another jurisdiction with laxer emission constraints (i.e., carbon leakage)[42] contribute to the EU decarbonization objectives and reinforce the EU ETS, and to encourage greater mitigation ambition and improved emissions intensity by producers in third countries.[43]

There are no exemptions under the CBAM for non-electricity products. However, the CBAM Regulations includes special provisions for electricity to account for situations where electricity markets are connected. This

[38] Article 2(7) of Regulation (EU) 2023/956 of the European Parliament and of the Council of 10 May 2023. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32023R0956

[39] Article 9 of the CBAM Regulations sets out that a domestic carbon price in a third country can reduce CBAM costs. Article 2(12) sets out that the EU may enter agreements with third countries in order to take into account carbon pricing mechanisms in the third country.

[40] Paragraph 11, European Commission (2021)

[41] The European commission will use reported scope 1 and 2 data to evaluate the CBAM's operation and coverage, including a potential extension to indirect electricity emissions.

[42] Partnership for Market Readiness. 2015. Carbon Leakage: Theory, Evidence and Policy Design. Partnership for Market Readiness Technical Papers. World Bank, Washington, DC. https://openknowledge.worldbank.org/handle/10986/22785

[43] Paragraph 12, proposed regulations https://ec.europa.eu/info/sites/default/files/carbon_border_adjustment_mechanism_0.pdf

includes specific exemptions. Article 2(6) of the CBAM Regulation sets out that the CBAM will not apply to exports of electricity from a third country if the EU ETS applies in that country or if the third country has an ETS linked to the EU ETS (e.g., Switzerland), and a carbon price was effectively paid in the third country. Article 2(7) of the CBAM Regulation provides for specific exemption of electricity exported to the EU. However, exemption under Article 2(7) requires satisfying several specific criteria, including that the third country's electricity market is coupled with the EU's internal electricity market; and there is no technical solution for the application of the CBAM to the import of electricity into the EU. The third country must also have domestic legislation that implements the main provisions of the EU's electricity market legislation, have legislation that implements a 2050 carbon neutrality commitment, and have made substantial progress towards carbon pricing at an equivalent level to the EU.

The potential impact of the CBAM on North Macedonia will likely grow over time unless a carbon price is introduced. The introduction of the EU CBAM will mean that jurisdictions exporting to the EU with more emission-intensive production will face relatively higher costs and risk losing market share to more carbon-efficient producers in other countries. Around 80 percent of North Macedonia's total exports go to the EU.[44] The value of CBAM products exported from North Macedonia ranged from around USD 350 million to USD 700 million over the past four years, representing between 5-8 percent of total value of exported products (Figure 10). Based on historic trade volumes and an assumed carbon price of USD 100, the annual CBAM compliance costs applied to North Macedonia's exports will be in the order of USD 120 million (based on the 2022 trade volume), depending on the assumed embedded emissions and the level of adjustment to reflect free allocation for Emissions-Intensive Trade-Exposed sectors in the EU ETS (see Annex V).[45] The extent to which these costs are borne by exporters (as opposed to being reflected in higher product prices) is unclear. Iron and steel and electricity products will attract the largest CBAM compliance costs in North Macedonia. Importantly, North Macedonia has no domestic carbon price so it would face the full carbon price imposed by the EU ETS. CBAM impacts will likely increase over time as the EU expands the CBAM to additional products, such as organic chemicals, plastics, and other countries implement their own CBAM policies (or similar). For example, the United Kingdom has announced the introduction of a CBAM by 2027, and other countries, such as Australia and, Canada are considering options.

The Government can help reduce administrative and transaction costs by establishing a robust MRVA system aligned with EU requirements. In addition to financial costs, cross-border measures, including the EU CBAM, impose additional administrative and transaction costs. As an example, each year EU importers are required to submit verified emission reports for all imported CBAM goods (articles 6 and 8 of the CBAM Regulations[46]). This places an additional burden on trade-exposed manufacturers in North Macedonia, with a need to provide EU importers with sufficient information to comply with the CBAM regulations. Establishing a domestic Monitoring, Reporting and Verification system can help prepare manufactures for reporting obligations established through the EU CBAM, or any future international frameworks. An additional challenge is the limited availability of accredited verifiers, which must be accredited in accordance with Article 18 of the CBAM regulations.[46] The majority of accredited verifiers are EU-based and have historically focused on verifications under the EU ETS. With an increasing demand on verifiers' services as a result of the CBAM, access to verifiers (particularly those with knowledge of North Macedonia) may be limited. To reduce this potential bottleneck, the government can help local firms obtain the accreditation necessary to undertake

[44] World Integrated Trade Solution. 2019. World Trade Indicators, 2019, ComTrade Export Data. https://wits.worldbank.org/CountryProfile/en/Country/WLD/Year/2019

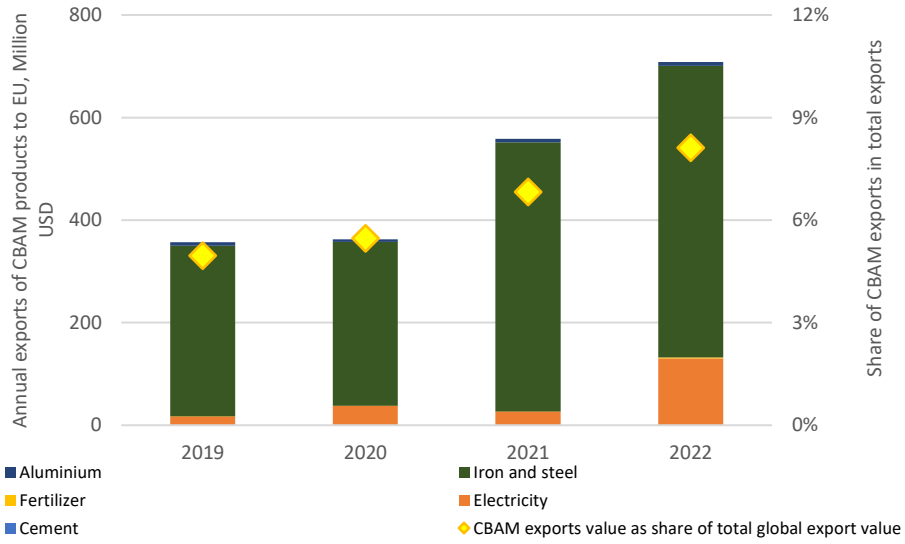
[45] Assumed embedded emissions are based on default values published by the Directorate-General for Taxation and Customs Union, which are intended to reflect the proposed "default values," as set out in Article 7 of the CBAM Regulations. The estimates use scope 1 emissions data for steel and aluminum and scope and 2 for cement and fertilizer. This estimate also assumes no adjustments for free allowances under the EU ETS (see Box 1)

[46] 2021/0214 Regulation of the European Parliament and of the Council establishing a Carbon Border Adjustment Mechanism.

CBAM verification. This could also create the pool of available verifiers in North Macedonia, who could also offer services to producers in other countries.

Transition risks pose a hazard and an opportunity. Reduced demand for North Macedonia's emission-intensive products would reduce output and therefore tax revenue as well as employment and income. But these risks are not limited to industries with large direct emissions: changes to commodity prices will flow through the value chain, affecting input costs for industries using emission-intensive products, particularly if those imports are trade exposed (e.g. car manufacturing facing higher steel and aluminum prices or construction facing higher cement costs). However, exposure to the CBAM also presents an opportunity to capture revenue: implementing a domestic carbon price would allow the government to collect and use revenue collected by a carbon tax/fee, rather than exporters paying a carbon tax to the EU via the CBAM. Such shocks will generally shift economies away from emission-intensive manufacturing towards service sectors. Preempting this kind of transformation can help manage the pressure on tax collection caused by a decline in activities that are currently large contributors to revenue.

Figure 10. Value of CBAM exports to EU and share of CBAM exported products in total exported products



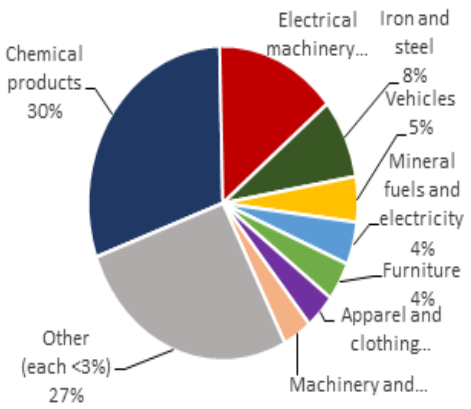
Source: World Bank, based on COMTRADE data.

The greatest areas of risk are in the manufacturing sectors, which are generally emission-intensive and exporters. North Macedonia's top five sectors by export value are all potentially exposed to various forms of transition risks (Figure 11). Chemical products (which include fertilizers) was the highest exporting sub-sector. It had a total export value of around USD 2.6 billion in 2022. Iron and steel were the third highest export sub-sector (total export value of over USD 700 million in 2022). In addition to being trade exposed, these sectors are also emission-intensive and exposed to the CBAM. Other manufacturing industries may be exposed to transition risks through other avenues as well, such as electrical machinery and equipment (USD 1.3 billion export value in 2022) and vehicle manufacturing (USD 408 million export value in 2022). In both sectors changing consumer preferences and increasing demand for equipment and vehicles that move beyond status quo technology (e.g., away from internal combustion engines) highlight the need to evolve and change the type of equipment/vehicles produced. Fortunately, North Macedonia's automotive manufacturing industry is well placed to succeed in this transition in that most of its vehicle exports employ next generation technologies.[47]

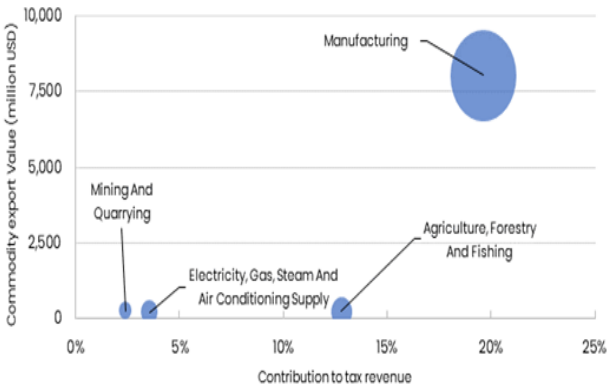
Figure 11. Largest value exports in 2022, North Macedonia

Figure 12. Export value and contribution to tax revenue, with bubble size representing relative employment

[47] Statistics based on the UN Comtrade Database, accessed November 20, 2023. https://comtradeplus.un.org/



Source: COMTRADE.



Source: World Bank analysis based on Comtrade 2022 export data and government of North Macedonia 2019 data on tax (direct and indirect) and 2020 employment data.

The sectors most exposed to transition risk are also economically, fiscally, and strategically important. Manufacturing accounts for around 20 percent of the country's domestic workforce and a similar proportion of tax revenue[48]. Over 90 percent of North Macedonia's total export value is from manufacturing sectors, noting that around 5 percent of total export value is from CBAM products in these sectors exported to the EU, with another 1.5 percent coming from electricity (Figure 12). These sectors are large taxpayers, and large employers highlighting the transition risk exposure. At the same time, while other sectors, such as coal mining, are exposed to transition risks, they have a significantly smaller potential impact on key transition issues, such as labor force adjustments—the entire mining and quarrying sector accounts for less than 3 percent of the labor force. Approaches to promote a just transition is discussed in section 3.3.

2.3. Climate risks puts pressure on public finances

Climate change physical hazards impact the public budget through multiple channels, which can have complex interactions and can ultimately reduce fiscal space and compromise macro-fiscal sustainability. When a physical risk is realized (e.g., when a climate-related disaster occurs) it can reduce the accumulation of capital, which shrinks economic output. This can deteriorate macro-fiscal sustainability in multiple ways, including by reducing the revenue base, increasing public expenditure, stranding government assets, and potentially increasing borrowing costs (Table 2). Many of these interactions are overlapping and provide reinforcing feedback effects, which increase impacts on public finances and the economy more generally in ways that are difficult to estimate (Figure 13).[49]

Table 2. Fiscal risk factors and illustrative climate change channels

	Risk factor	Conventional examples	Climate change channels
Macroeconomic risks	Economic growth (GDP or industry-level growth)	Tax revenue collected differs from planned/estimated level	Extreme heat waves, drought, excessive rainfall, storms, etc., disrupt agriculture, tourism, transport, hydro-power, insurance, etc.
		Payouts for unemployment insurance and other social protection schemes are higher than the planned level	Note that weather shocks in other countries can potentially boost demand for exports
	Commodity prices	Changes in oil prices affect government procurement spending, customs duty collection, energy subsidies (for extractives exporters): government revenue is lower than expected	Increased severity and likelihood of extreme climate events in large producers increase the volatility of world commodity prices

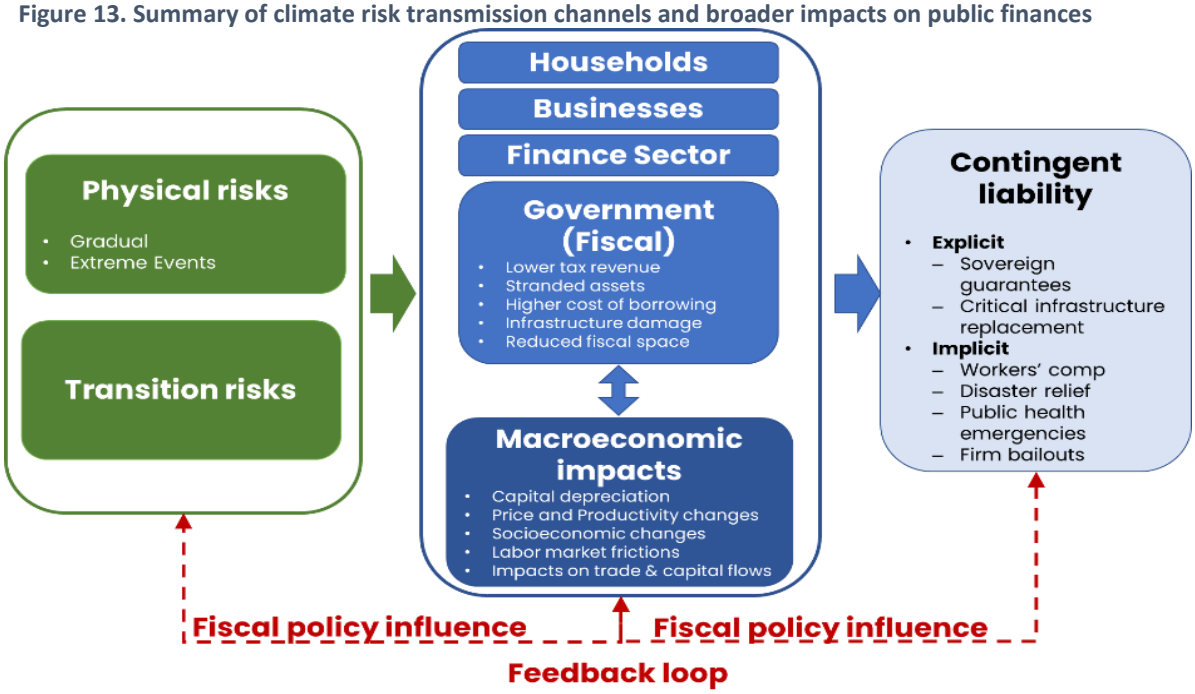
[48] Including direct indirect tax (such as VAT, custom duties, and excise taxes)
[49] Dunz, Nepomuk; Power, Samantha. 2021.

		Changes in global agricultural prices may affect domestic farm and food subsidy spending (depending on national policies)	
Contingent liabilities	State-owned enterprises (SOEs)	Sovereign loan guarantees are called	Climate-sensitive SOEs suffer losses due to extreme weather events
		Expectation that the government will cover SOE losses	
	Public–private partnerships (PPPs)	Contractual obligations (for example, service-level guarantees)	Infrastructure PPPs suffer damages or losses from extreme weather
		Expectation that government will cover losses if the project fails	
	Natural disasters	Shocks to economic growth affect revenue and spending (see above)	Increased severity and likelihood of extreme weather events (for example, torrential rain or heat waves) increases the chances of natural disasters
		Unexpected spending on repair and reconstruction of government buildings and other public assets	
		Unexpected relief and recovery spending; increased spending to cover private sector losses (including, for example, government-run fire, flooding, and crop insurance)	
	Public health emergency	Increased health spending	Changing climate and increased severity and likelihood of extreme weather events may affect the spread of vector-borne diseases, deaths from heat events, etc.
		Reduced income tax revenue if health emergency affects employment and production	
	Judicial awards	Court judgments made against the government result in unexpected spending	Courts may determine that governments are liable for climate adaptation measures

Source: Adapted from Schuler et al (2018).[50]

[50] Schuler, Philip; Oliveira, Luiz Edgard; Mele, Gianluca; Antoni; Matias. 2018. Chapter 4: Managing the fiscal risks associated with natural disasters. In Fiscal Policies for Development and Climate. Ed. by Pigato, Maria. World Bank, Washington DC. https://documents1.worldbank.org/curated/en/340601545406276579/pdf/133156-REPLACEMNET-PUBLIC.pdf

Figure 13. Summary of climate risk transmission channels and broader impacts on public finances



Source: Adapted from Dunz and Power (2021)[51] and Network for Greening the Financial System (2020).[52]

Realized physical risks can reduce the tax revenue base through declined economic activity and reduced productive capacity or output. This can occur, for example, as a result of diverting capital to rebuilding or downtime because of an inability to access critical infrastructure (e.g., power). Realized physical risks can also increase public expenditures as funds are diverted to governments funds created to respond to emergency and reconstruction needs. Such outlays can include relief payments to the affected population and repairing damaged public assets. The result is eroded macro-fiscal sustainability. Gradual events also reduce economic activity, which can also affect public finances. For example, at 34°C, labor productivity drops by 50 percent.[53] Climate scenarios for North Macedonia suggest maximum daily temperatures could increase by up to 5°C (under a high climate change scenario), which would lead to more days at higher temperatures, decreasing productivity and output, and decreasing direct tax revenue.[54]

North Macedonia's fiscal balance is expected to deteriorate due to higher frequency and intensity of natural hazards, resulting in rising debt levels. Under current growth rates, the budget deficit is projected to increase by around 1 percentage point across all RCPs, while public debt levels are expected to increase to 70 percent of GDP by 2050. As noted in section 2.1, financing adaptation investments will place an additional burden on public finances, but this will more than offset economic losses.

Government finances are exposed to climate-related contingent liabilities. Such liabilities include relief payments, asset reconstruction, cash transfers to public health facilities, and costs associated with rebuilding public (and sometimes private) assets. They may be either explicit or implicit (Box 2).

[51] Dunz, Nepomuk; Power, Samantha. 2021.

[52] Network for Greening the Financial System. 2020. NGFS Climate Scenarios for central banks and supervisors. June 2020. https://www.ngfs.net/sites/default/files/medias/documents/820184_ngfs_scenarios_final_version_v6.pdf

[53] United Nations Office for Disaster Risk Reduction, Global Assessment Report on Disaster Risk Reduction, Special Report 2023, Mapping Resilience for the Sustainable Development Goals. 2023. https://www.undrr.org/media/88718/download?startDownload=true

[54] Djurdjevic, Vladimir. 2020.

Between 1993 and 2021, North Macedonia experienced an estimated USD 667 million in cumulative direct asset losses in real terms (USD 2021) from climate-related disasters and extreme weather events.[55] That such losses will increase is clear, but climate-related contingent liabilities are far more uncertain than other liabilities such as public pensions and state guarantees on external debt, which makes them more difficult to manage.[56]

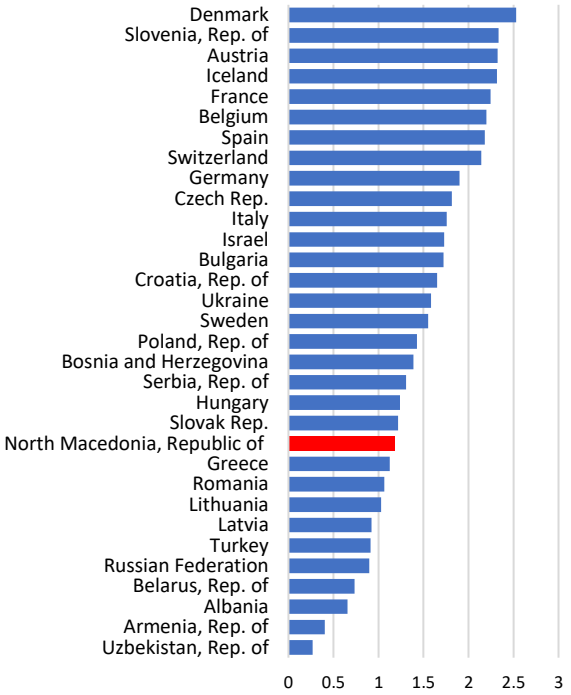
Box 2. Contingent Liabilities

Explicit liabilities are those where the government has a financial commitment through contracts, laws, or policies. *Implicit liabilities* are where government expenditures are not legally required but where public and/or political pressure to help speed up recovery leads to government making payments. Such payments might cover the cost of restoring public assets or uninsured private assets. The role of public sentiment and other exogenous factors introduce additional uncertainty into the cost of implicit liabilities.[57] This includes the cost of restoring public assets, but also meeting expectations to restore uninsured private assets.

The private sector's relatively low uptake of insurance products in North Macedonia increases macro-fiscal risks. Non–life insurance spending,[58] which is an indicator of the relative uptake of insurance, is lower in North Macedonia than many other countries in Europe or Central Asia and neighbouring regions (Figure 14).[59] The government is often implicitly expected to cover private losses through its budgetary processes where insurance coverage is limited.[60] Increased uptake of private insurance, particularly catastrophe insurance, is an important part of climate risk management and can reduce economic vulnerability and reliance on public finances.

Critical infrastructure disruptions from climate events can be widespread, catastrophic, and expensive to address. Failure of critical

Figure 14. Average nonlife insurance premium to GDP between 2008 and 2017



Source: The World Bank Global Financial Development Database.

[55] The Emergency Events Database (EM-DAT). 2023. Centre for Research on the Epidemiology of Disasters. EM-DAT. www.emdat.be.

[56] Gamper, Catherine; Signer, Benedikt; Alton, Luis; Petrie, Murray. 2017. Managing disaster risk related contingent liabilities in public finance frameworks, OECD Working Papers on Public Governance, No 27, OECD Publishing, Paris. https://read.oecd-ilibrary.org/governance/managing-disaster-related-contingent-liabilities_a6e0265a-en#page1

[57] OECD/The World Bank. 2019. Fiscal Resilience to Natural Disasters: Lessons from Country Experiences, OECD Publishing, Paris, https://doi.org/10.1787/27a4198a-en

[58] Insurance spending is defined as the ratio of received direct gross premiums to GDP and is expressed as a percentage of GDP.

[59] OECD/The World Bank. (2019).

[60] Gamper, Catherine; Signer, Benedikt; Alton, Luis; Petrie, Murray. 2017.

infrastructure[61] can have cascading consequences on essential services, the economy, and how society functions due to adverse impacts on environment, society order and public services. Businesses may not be able to operate, and people may not be able to work. Even relatively short disruptions can have long-term adverse consequences on essential services including health care or education, which can be particularly detrimental for vulnerable groups.[62] These disruptions are in addition to direct asset and consumption losses and are not reflected in the economic impacts. This can occur even when the original hazard does not directly affect those businesses or workers. The interdependencies between critical infrastructure also increases the risk. That is, a material disruption to say water or transport infrastructure could flow through to energy supply infrastructure. Indirect losses from these disruptions (e.g., from reduced production and lost wages) can form a significant component of the total economic loss. Energy supply provides a useful example. In 2019, a year without a significant climate event in North Macedonia, the cost to business in North Macedonia from reduced utilization rate caused by disruptions of any cause to the power supply was about $2 million and power sector revenue losses were almost $15 million. Further, running electricity generators during power outages costed almost $7 million.[63] Similarly, the cost of lower utilization rates of transport infrastructure because of disruption was almost $28 million in 2019. While these figures are relatively low, the disruptions from climate events have the potential to be orders of magnitude higher in any given year. As climate change increases extreme events, such risks will increase absent significant measures to address the vulnerability of infrastructure.[64]

Critical infrastructure in North Macedonia is not adequately climate-proofed, exposing the country to future economic and fiscal impacts. There have been several efforts to help improve the resilience of North Macedonia's infrastructure, but more needs to be done. For example, at the end of 2022, the Ministry of Defense submitted a draft Critical Infrastructure Law, which aims to define critical infrastructure sectors, including the electricity grid, but with a focus on security issues and does not consider climate change risks. In addition, the government's Crisis Management Center has a register of important assets, facilities, and other goods, which can serve as a useful starting point. However, this register is not systematically processed and is not publicly available. The United Nations Development Programme's (UNDP's) study on the climate-resilient infrastructure in North Macedonia assessed the benefits of climate-resilient infrastructure and offered useful recommendations that would help protect critical infrastructure from future shocks.[65] The new EU Strategy on Adaptation to

[61] Critical infrastructure typically includes assets, networks and systems relating to energy supply, information and communication technology, transport/logistics, and water supply and wastewater management. North Macedonia's draft law on critical infrastructure references physical or virtual assets, systems, facilities, networks, or their parts that perform vital functions of society, and which are of essential importance and the interruption of their work or their destruction would have a significant impact or serious consequences for national security, the health and life of people, the environment, the safety of citizens, economic stability, that is, the functioning of the state (https://ener.gov.mk/Default.aspx?item=pub_regulation&subitem=view_reg_detail&itemid=77229).

[62] Hallegatte, Stephane; Vogt-Schilb, Adrien. 2016. Are Losses from Natural Disasters More Than Just Asset Losses?: The Role of Capital Aggregation, Sector Interactions, and Investment Behaviors. Policy Research Working Paper; No. 7885. World Bank, Washington, DC. https://openknowledge.worldbank.org/handle/10986/25687

[63] The numbers in this paragraph are based on the methodology set out in Hallegatte, Stephane; Rentschler, Jun; Rozenberg, Julie. 2019. Lifelines: The Resilient Infrastructure Opportunity. Sustainable Infrastructure;. Washington, DC. World Bank. https://openknowledge.worldbank.org/entities/publication/c3a753a6-2310-501b-a37e-5dcab3e96a0b

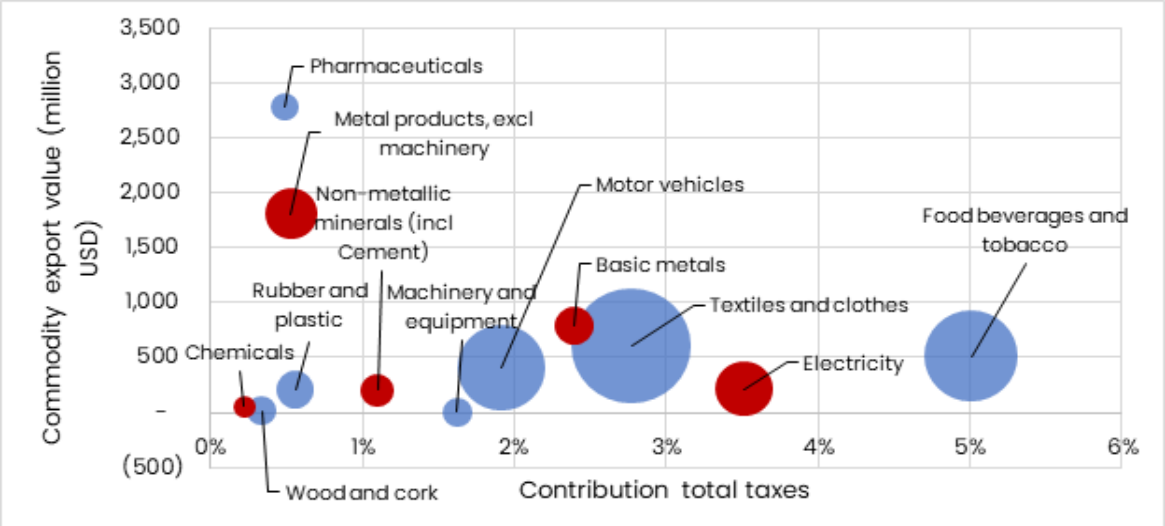
[64] Popovski, Vasko, et al. 2023. Crisis prevention and critical infrastructure in Western Balkans. Institute for Democracy "Societas Civilis" – Skopje. https://idscs.org.mk/en/2023/05/02/crisis-prevention-and-critical-infrastructure-in-western-balkans/

[65] Gajšak, Marijan; Ilieva, Lili; Grujić, Miodrag; Trumbić, Tamara; Blažev, Dragan. 2022. Study on the Climate-resilient Infrastructure in North Macedonia, UNDP North Macedonia 26 May 2022.

Climate Change is largely focused on investing in resilient, climate-proof infrastructure. As a candidate for EU membership, North Macedonia has committed to transposing the EU legal framework into its national legal system, including the strategy. As a first major step in the Western Balkan states' compliance, the Energy Commission developed extensive climate proofing guidance for new major infrastructure projects[66] ("*Technical guidance on the climate proofing of infrastructure in the period 2021-2027*"), with special attention to critical infrastructure and an update of relevant standards and codes. In implementing these changes, new infrastructure assets should be planned, designed, built, and operated considering climate change that will occur over their lifetimes.

Transition risks can also expose the government's fiscal position. There are industries, like food, beverages, tobacco, and textiles, that are large taxpayers and employers with minimal exposure to transition risks. However, reduced demand for North Macedonia's emission-intensive products can reduce output and therefore tax revenue. Manufacturing sectors generally carry the greatest risk to public finances due to emission-intensity, trade exposure, and their relatively high contributions to the workforce and tax revenue (Figure 15). Electricity production and metals manufacturing are both emission-intensive, trade exposed, and significant contributors to tax revenue. The automotive industry, which is also a large employer and taxpayer, is exposed to transition risks through changing international regulatory requirements and consumer preferences. Other emission-intensive industries like cement and chemical manufacturing also pose risks, although their contributions to taxes are smaller.

Figure 15. Export value and contribution to tax revenue for select industries in the manufacturing sector, with bubble size representing relative employment, emissions-intensive industries in red.



Source: World Bank analysis based on Comtrade 2022 export data, MOF 2019 data on tax (direct and indirect), State Statistical Office on input-output tables and employment.

2.4. Fiscal policies can help reduce exposure to climate risks and increase resilience

Fiscal policies can help manage climate risks. Fiscal and economic impacts can be mitigated by reducing asset losses. This is generally done by reducing exposure or asset vulnerability.[67] Land use and urbanization planning and building regulations are critical, but public investments and fiscal incentives are also vital to reduce asset vulnerability (and therefore future asset losses) and improve

https://api.klimatskipromeni.mk/data/rest/file/download/b8600f4a08a5020202a2deb79ef7b893eecb7173c1f001c5c96d9c1c791e5f0d.pdf

[66] https://op.europa.eu/en/publication-detail/-/publication/23a24b21-16d0-11ec-b4fe-01aa75ed71a1/language-en

[67] Hallegatte, Stephane; Vogt-Schilb, Adrien; Bangalore, Mook; Rozenberg, Julie. 2017.

resilience to climate impacts (Table 3). Resilient infrastructure is expensive, and attracting private capital is difficult, not least because it is difficult to quantify (and monetize) avoided loss benefits. Thus fiscal policies, including the resilience requirements, play an important role in determining the type of infrastructure investments and how those investments are financed. Vulnerability to transition risks can be reduced through helping existing sectors to lower their emission-intensity and by developing new sectors that will see growing demand in a low-carbon world. Fiscal policy can play a major role in steering the economy through the transition, encouraging growth and output (see Chapter 3).

Table 3. Policy reforms to help reduce future asset losses and increase resilience to climate-related disasters.

Policy focus	Policy actions focusing on asset loss reduction	Policy examples
Asset loss reduction	Reduce the exposure of households	Adopt risk-informed land use and urbanization plans; influence future urban development; neighborhood upgrades with improved drainage; initiate preventive resettlement programs away from at-risk areas; undertake ecosystem conservation
	Reduce the exposure of households' assets	Record land tenure to enhance investments in housing; improve infrastructure that serves the poor; change construction and building norms; improve general infrastructure
	Provide universal access to early warning systems	Invest in hydrometeorological observation systems and weather forecasting capacity; ensure capacity to issue and communicate early warning and for people to react
Increasing resilience	Favor savings in financial forms	Develop banking sector and favor mobile banking; support development of savings instrument for the poor
	Accelerate reconstruction	Develop access to borrowing and insurance for people, firms, and local authorities to facilitate recovery and reconstruction; ensure the government has the liquidity to fund reconstruction; streamline administrative processes (e.g. building permits and post-earthquake inspection checks); fund debris clearing
	Increase income diversification (social protection and remittances)	Strengthen the existing social assistance; ensure that contributory social protection schemes are available to vulnerable people; reduce the cost of remittances
	Make social safety nets more scalable	Implement a budgetary process to increase social expenditures after a disaster; create the right delivery mechanisms; develop indicators and procedures for the automatic scale-up of social safety nets
	Develop contingent finance and reserve funds	Create reserve funds with utilization riles; transfer part of the risk to global reinsurance or global capital markets
	Improve access to insurance for firms and households	Create insurance markets and ensure their sustainability

Source: Adapted from Hallegatte et al (2017) and World Bank (2020).

Strategic disaster risk planning can reduce direct asset losses and improve resilience. Through improved planning and reprioritization of investments, the government can reduce vulnerability, minimize direct damages from disasters, and help ensure responses are better and faster, which also reduces indirect losses.[68] This also helps reduce future contingent liabilities. It includes incorporating climate consideration into new construction and refurbishments into public assets and infrastructure, which reduce the economic impacts of future climate hazard. It likewise includes structural measures

[68] Clarke, Daniel; Dercon, Stefan. 2016. Dull Disasters? How planning ahead will make a difference. Oxford University Press.

to account for higher flood levels or improving drainage systems, as well as management measures, such as changing maintenance schedules. Such investments to improve resilience are also worthwhile even if a disaster does not take place for many years because they stimulate innovation and improve economic activity.[69] However, resilience spending will need to be financed—disaster risk financing is a critical component of disaster preparedness. For example, an appropriately layered[70] regional approach to disaster risk financing protects social spending and delivers fiscal savings.[71]

Climate resilience is essential for improving debt and macro-fiscal sustainability. It will minimize post-disaster rebuilding, reduce unavailability of critical infrastructure, and minimize diversion of consumption. The government should build resilience by assessing risks and prioritizing investment in both existing and new infrastructure also having in mind the obligations related to climate change as criteria for assessing projects of Energy Community interest (PECI) and Projects of Mutual Interests (PMI) between Contracting Parties and EU Member States from the new TEN-E Regulation, which will be relevant in particular for new projects such as energy storages, hydrogen etc. In line with previous reports on climate-resilient infrastructure in North Macedonia, the existing law on construction should be amended to include climate resilience. While this increases costs, it is only around 3 percent of the total investment needs.[72] In addition to reducing direct impacts from climate-related disasters, improved resilience in critical infrastructure can minimize indirect losses, and therefore can minimize impacts on tax revenue (e.g., impacts resulting from reduced productivity).

Investments in projects that improve resilience carry high returns. The Global Commission on Adaptation found that the typical benefit-cost ratio ranged from 2:1 to 10:1, and in some cases, it was even higher.[73] Priority must be given to sectors and activities with greatest vulnerability to physical risks, particularly those relating to critical infrastructure. Such investment can also be used to achieve multiple objectives, such as to enhance disaster resilience and to improve the energy efficiency of public buildings.

The agility of public finance is critical to managing climate risks and to government response to climate-related hazards, including realized contingent liabilities. Frameworks and tools that expedite post-disaster recovery can minimize indirect (consumption) loses. Unlike direct asset losses, consumption losses are highly dependent on the duration of reconstruction and the availability of tools to assist with recovery. For example, if reconstruction is completed within one year, consumption losses are only around 10 percent larger than asset losses, whereas a 10-year reconstruction period increases consumption losses, such that they are 50 percent larger than asset losses.[74] The government has an important role in reducing recovery times. Government access to finance to fund emergency and social protection spending and ability to quickly transfer funds between government institutions and then distribute them (e.g., through social transfer payments, standing contracts, short-term finance, or financial support) is key to an agile disaster response.[75] Funding sources include international aid, government insurance, contingent finance, or government

[69] World Bank. 2020. Economic Analysis of Prevention and Preparedness in European Union Member States and Countries under EU Civil Protection Mechanism. Inception Report 8 June 2020.

[70] Risk layering combines financing tools involving risk retention by the government, risk transfer to markets, and rapid post disaster fund disbursement. Risk laying is important to cost-effectively combine different sources of financing.

[71] Melecky and Skalon, 2022. How layering and pooling the disaster risk across Central Asia can better protect livelihoods and public investment.

[72] Hallegatte, Stephane; Rentschler, Jun; Rozenberg, Julie. 2020. Adaptation Principles: A Guide for Designing Strategies for Climate Change Adaptation and Resilience. World Bank, Washington. https://openknowledge.worldbank.org/handle/10986/34780

[73] Global Commission on Adaptation. 2019. Adapt Now: A Global Call for Leadership on Climate Resilience. September 2019. https://cdn.gca.org/assets/2019-09/GlobalCommission_Report_FINAL.pdf

[74] Hallegatte, Stephane; Vogt-Schilb, Adrien. 2016.

[75] Hallegatte, Stephane; Vogt-Schilb, Adrien; Bangalore, Mook; Rozenberg, Julie. 2017.

reserve funds. Government can also improve access to other sources of finance and planning and coordination of reconstruction, increasing private sector uptake of insurance products, and streamlining access to social protection payments (balancing timelines with accuracy). The high unpredictability of disasters (in both the degree and timing), of course, makes this challenging; contingency funds, credit lines, and insurance may be helpful and should be regularly assessed for preparedness.

North Macedonia's government should work to decrease its risk through insurance options. Such efforts should include increasing uptake of catastrophe insurance, which requires making such products affordable for both households and businesses. The agriculture sector, in particular, has limited historical exposure to insurance and yet, even under current low uptake, gross claims paid by insurance companies for disaster relief increased by 148 percent between 2016 and 2021 (to USD 6.2 million in the period 2016 to 2021).[76] The government should act on its recent commitment to explore the creation of a national agricultural insurance pool.[77] Pooling funds internationally and engaging with international risk-sharing markets is also wise. Participating in the Southeast Europe Catastrophe Risk Insurance Facility would also be advisable. Administered by Europa Re, the facility was established to develop a catastrophe risk insurance market to help reduce Balkan states' financial vulnerability to natural disasters by partnering with private insurers to offer low-cost insurance products. At EUR 1-20 per year, its products should be obtainable for even the lowest welfare segments of the population, but its success requires that participating countries increase uptake to achieve the facility's pooling of risk and resources and achievement of economies of scale and risk diversification. The government would continue to be exposed to a residual risk even if insurance uptake increases in any case.

To meet government obligations, climate-related contingent liabilities (explicit and implicit) should be quantified and included in budgets and fiscal projections to help reduce budget volatility when they materialize.[78] The Ministry of Finance (MoF) could take three key actions to reduce budget volatility.[78] The first is to establish a central inventory of public assets and assess the corresponding contingent liability and criticality associated with each. The second is to assess and finance contingent liabilities from emergency and social protection spending. The third is to quantify liabilities (explicit and implicit) and risks to GDP, expenditures, and tax revenues and incorporate them into budget planning and associated documents. Appropriate budget planning and fiscal forecasting will help shift North Macedonia away from emergency borrowing and help smooth the economic and fiscal impacts from disaster-caused shocks.

To help minimize total costs associated with contingent liabilities, responsibilities should be well-defined and clearly communicated. This includes ensuring laws, regulations, and contracts identify responsibility for explicit contingent liabilities and ensuring policies and practices clearly establish responsibility for implicit contingent liabilities. Ensuring businesses and local governments are aware of their respective responsibilities can help establish an upper limit on the government's contingent liabilities.

Fiscal policies can provide an incentive to decarbonize North Macedonia's economy and shift toward lower risk sectors. Carbon pricing, discussed in Chapter 3, creates a price signal to incentivize changes in investment, production, and consumption decisions. By incentivizing improvements to energy efficiency and emissions intensity, carbon pricing provides a useful risk management tool to address a large component of transition risks.

Encouraging or requiring reporting and disclosure of climate risks can help the private sector manage both physical and transition risks and shift the risk away from government. Initiatives such as the Financial Stability Board's Taskforce on Climate-Related Financial Disclosures have become

[76] World Bank. 2022. Data collected for the Green Finance Diagnostic report
[77] World Bank, 2021 SEE Catastrophe Risk Insurance Facility TA SECO (P156455),
[78] Hallegatte, Stephane; Rentschler, Jun; Rozenberg, Julie. 2020

mainstreamed and are an important tool to help companies and their investors understand and report on the physical and transition risks affecting their operations and supply chains. The Strategic Plan of the National Bank of the Republic of North Macedonia for 2022–2024 calls for increasing awareness of climate change. Adopting mandatory disclosure will also help bring rules in line with Europe, which adopted sustainability reporting standards in July 2023.[79] The standards cover climate change as well as other environmental, social, and governance issues and require reporting on how climate issues create financial risks and opportunities.

[79] European Commission. 2023. The Commission adopts the European Sustainability Reporting Standards. July 2023 https://finance.ec.europa.eu/news/commission-adopts-european-sustainability-reporting-standards-2023-07-31_en

3. Using fiscal policy to achieve North Macedonia's climate objectives

Significant resources (almost EUR 35 billion by 2050 in energy sector investments) are required to achieve North Macedonia's climate objectives, while public finances are already stretched, and public debt is expected to increase over the medium term. Accordingly, a concerted effort is required to shift the burden away from government. Adjusting incentives in fiscal policies are central to this effort, including via enhanced Green Public Procurement and Climate Budget Tagging, as well as broader environmental fiscal reform, such as ensuring the implementation of carbon pricing, removing fossil fuel subsidies and reforming transportation tax frameworks on vehicles and fuels. Importantly, environmental tax reforms can provide an important new source of revenue (around EUR 700 million annually), which can be used to manage climate impacts or help manage a just transition.

Effective fiscal frameworks can mitigate risk from climate change and contribute to North Macedonia's decarbonization and climate resilience goals. This chapter offers an overview of the climate investments necessary for implementing the adopted climate actions and explains why these investments are more cost effective than dealing with the potential impacts and costs of climate change. The narrative then shifts its focus to the constraints of the existing fiscal framework and further on required fiscal reforms to finance the investments necessary to meet North Macedonia's climate goals and achieve decarbonization while addressing the fiscal gap. This will also provide a framework to help North Macedonia achieve its climate, economic, fiscal, and social objectives in the long term.

3.1. The financing gap to achieve climate objectives is large

After multiple crises, North Macedonia's public finances are already stretched, making financing climate objectives challenging. The economic outlook and fiscal space in North Macedonia are already under pressure from responding to multi-dimensional crises, including raising cost of living and the Russia's invasion of Ukraine. The country's economic output for 2023 declined below 2 percent. Increased public investments, recovered consumption, and exports should drive a moderate acceleration of economic growth to 2.5 percent in 2024, towards 3 percent by 2026. The annual inflation in North Macedonia declined to 9.4 percent in 2023 and is expected to stay elevated in 2024 before decreasing to the long-term average of 2 percent from 2025. Public debt did not benefit from the inflationary impact and stood at 62 percent of GDP in 2023 (Figure 16). It is projected to rise over the medium term. Government budget increased in the last couple of years, crossing the EUR 5 billion threshold in 2023—42 percent higher than in the pre-crisis 2019 (Figure 17).[80]

[80] World Bank. 2023. Europe and Central Asia Economic Update "Sluggish Growth, Rising Risks." https://reliefweb.int/report/ukraine/europe-and-central-asia-economic-update-sluggish-growth-rising-risks-fall-2023-enkaaz

Figure 16. Fiscal Performance, North Macedonia

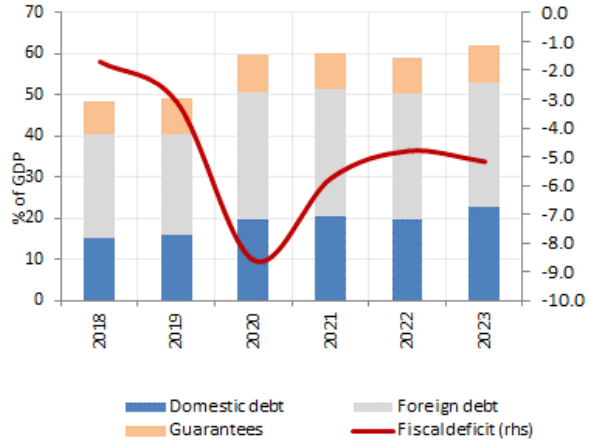
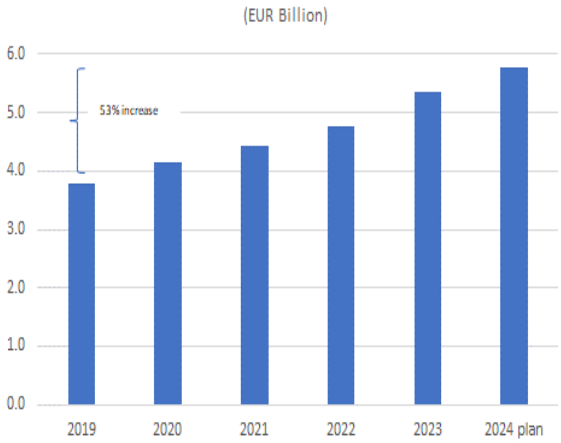


Figure 17. General Government Spending, North Macedonia, EUR billion



Source: MOF.

North Macedonia's ambitious climate mitigation goals require a significant level of investment in the energy sector—almost EUR 25 billion through 2030 and EUR 35 billion by 2050, cumulatively.[81] Achieving the target of 82 percent net reduction of GHG emissions by 2030 will require average yearly investments in North Macedonia of 7.7 percent of the total average annual GDP and major regulatory and tax measures.[82] Almost all (~99%) of these decarbonization expenses relate to capital investments in energy, encompassing energy supply, as well as consumption across households, industry, and transport (Table 4). While these costs are significant, the costs with enhanced measures are 12 percent lower than the projected expenses under a BAU scenario.[83] As highlighted in Chapter 2, adaptation and resilience investments carry high returns. Such investments are currently lagging mitigation investments. The forthcoming National Adaptation Plan should address this issue.

Table 4. Estimated investment requirements to achieve North Macedonia's climate mitigation objectives

Cumulative Investments per Sector	Enhanced Nationally Determined Contributions on Climate Change by 2030 [EUR million]	Long Term Strategy on Climate Actions by 2050 [EUR million]
Energy	24,571	34,623
Agriculture, Forestry and other Land Use	93	115
Waste	59	67
Total	24,723	34,805
Included in the cost estimation:		
Capital investments	√	√

[81] Republic of North Macedonia Ministry of Environment and Physical Planning. 2021. Enhanced Nationally Determined Contributions on Climate Change. https://api.klimatskipromeni.mk/data/rest/file/download/060cb9db7eeedc24bae3c127f2afb7139283bec07324b04956c364a7e9868f2b.pdf. Republic of North Macedonia Ministry of Environment and Physical Planning. 2021. Long Term Strategy on Climate Action and Action Plan. https://api.klimatskipromeni.mk/data/rest/file/download/61ae4e7b2a98595427e5ab19a736414084e75ba743df2165f80dba996a82eb62.pdf

[82] Ministry of Environment and Physical Planning. 2020. Third Biennial Update Report on Climate Change. https://api.klimatskipromeni.mk/data/rest/file/download/10570a8a0a52fe235c083ebbbbf7045926511ff4e4478fbf5e1feb17757bd5c4.pdf

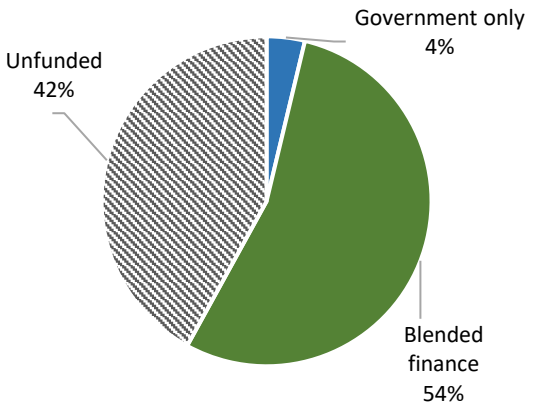
[83] Ministry of Environment and Physical Planning. 2021. Long Term Strategy on Climate Action and Action Plan. https://api.klimatskipromeni.mk/data/rest/file/download/61ae4e7b2a98595427e5ab19a736414084e75ba743df2165f80dba996a82eb62.pdf

Operation costs	√	√
Maintenance costs	√	√
Energy efficiency	√	√
Fuel supply	√	√
Carbon costs	√	√
Delivery costs	√	√

Source: Macedonia's Long-Term Strategy on Climate Action and Enhanced Nationally Determined Contributions on Climate Change.

The Government needs to avoid policy inconsistency to provide appropriate price signals, increase private sector investments, and reallocate public resources for decarbonization. Since late 2021, the government has allocated EUR 760.2 million to help respond to the energy crisis. Most of this investment has been to avoid electricity or heating outages or restrictions and to mitigate the price shock to the economy, companies, and households, keeping the electricity prices below market rates.[84] A very small part of these public funds was invested in energy transition to renewables, but a significant portion was used to purchase coal, secure domestic electricity baseload, and delay closure of the already outdated coal thermal power plants in Bitola and Oslomej once planned for 2027 but now scheduled for 2030. This introduces significant challenges to achieve the country's 2030 climate target, necessitating greater investment in the future for a full energy transition.

Figure 18. Investments towards NDC Targets



Source: Financing Strategy for the North Macedonia's Enhanced Nationally Determined Contributions to Climate Change

Government investment is important, but it is constrained by the existing fiscal framework. There is a need for additional sources to bridge the financing gap. Existing public financing is either through "government-only" investments or "blended finance," which encompasses all collaborative efforts involving the government and various stakeholders to leverage public funds. However, 42 percent of investments needed to finance North Macedonia's ENDC goals remain unfunded (Figure 18). The remainder could come from non-government budget sources, including the private sector. The Strategy for Financing North Macedonia's ENDC on Climate Change prioritizes climate investments per eight criteria, as described in Box 3.

Box 3. North Macedonia ENDC prioritization for climate investments.

1. Invest first in those sectors that contribute the most to ENDC targets.
2. Invest in high-return technologies.
3. Target technologies with rapidly decreasing cost curves.
4. Maximize green infrastructure jobs.
5. Finance measures that maximize external investment sources.
6. Choose measures that can be highly leveraged by regulation.
7. Leverage funds made available from a national carbon tax.
8. Maximize impact and benefits of carbon markets.

3.2. Additional funding sources and strategies

Additional public finance has been provided through the EU, which could grow as accession nears. The EU Instrument for Pre-Accession Assistance (IPA) is the largest provider of financial support to

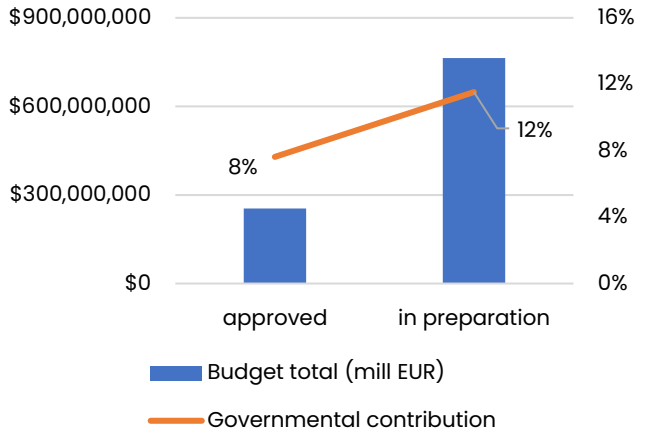
[84] Government of the Republic of North Macedonia. https://vlada.mk/node/30706

deliver North Macedonia's ambitious energy and climate 2030 targets.[85] In the period 2014–2020, North Macedonia has benefited from total allocation of EUR 608.7 million, out of which 34 percent (or EUR 205.98 million) is climate change relevant.[86] IPA assistance for the period 2021–2027 could provide up to EUR 100 million annually to support climate negotiations and structural reforms in North Macedonia (including sustainable growth, green transport, shifting to a low-carbon, climate-resilient, and resource-efficient economy). In addition, the IPA Rural Development Programme has gained traction in supporting sustainable agriculture and food production. In 2021–2027, the EU's indicative contribution is EUR 97 million, out of which one third (app. EUR 32 million) are planned for agri-environment—climate and organic farming, implementation of local development strategies, investments in rural public infrastructure, farm diversification and business development, and technical assistance and advisory services.

North Macedonia can also tap into EU pre-accession and guarantee funds to leverage additional financing. In 2020, the European Commission adopted a comprehensive Economic and Investment Plan for the Western Balkans 2021–2027 of up to EUR 9 billion in EU funds, which aims to support the green transition and foster regional integration and convergence with the EU, with a focus on transport, energy, buildings, waste management, digital infrastructure, competitiveness, skill-building, and quality employment for the youth. Additionally, North Macedonia can make use of the EU Western Balkan Guarantee Facility, which provides guarantees to help reduce the cost of financing for both public and private investments and to reduce the risk for investors. Through the facility, the EU is expecting to mobilize up to EUR 20 billion in investments. For PMI projects under the EU TEN-E Regulation, projects could also have access to Connecting Europe Facility that is not directly available to candidate countries.

The Green Agenda for the Western Balkans through the Western Balkans Investment Framework (WBIF) enables North Macedonia to blend public funds for green investments. To date North Macedonia has blended EUR 19.4 million of its own funds with EUR 235 million from the WBIF towards decarbonization process.[87] So far, 15 Energy Flagship projects have been approved through the WBIF for North Macedonia (seven country specific and eight regional) with the following financial structure: 20 percent grants, 72 percent loans, and 8 percent government own contributions. Seven more projects in the Energy Flagship are in preparatory stage (six country specific and one regional). Reliance on EU funds will remain, but it will diminish, as North Macedonia's governmental contributions increase highlighting an increased reliance on North Macedonia's budget for funding (Figure 19). However, the country needs to increase the maturity of project proposals that can be financed through the WBIF. Currently 37 percent of the

Figure 19. WBIF Energy Flagship projects for North Macedonia under Renewable Energy and Transition from coal, 2013–23



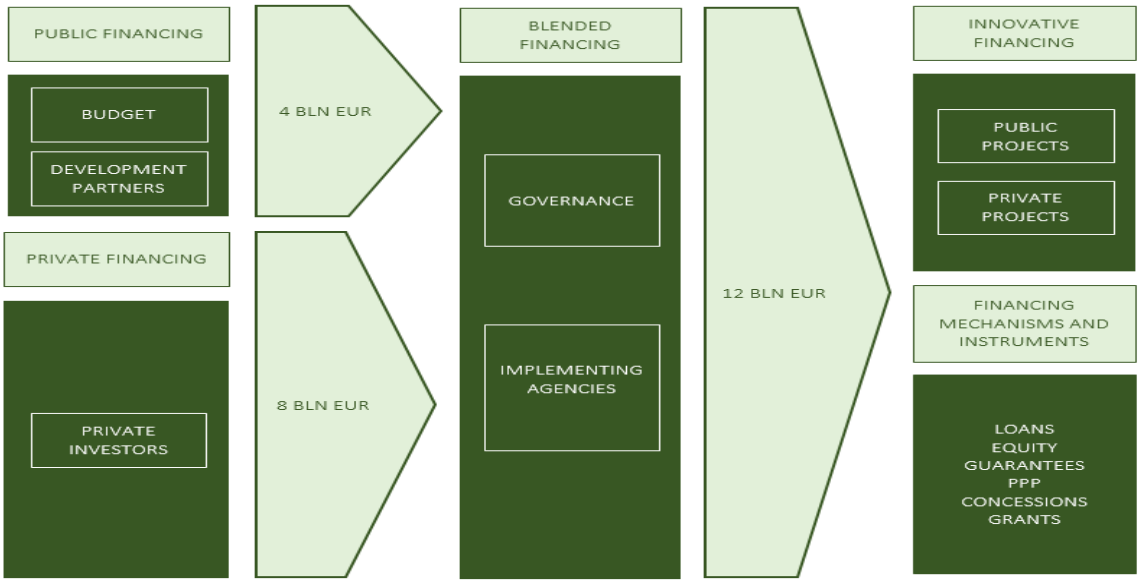
Source: Own calculation based on the information provided on the WBIF website.

[85] Ministry of Environment and Physical Planning. 2020.
[86] North Macedonia - financial assistance under IPA. European Commission website, accessed April 2023. https://neighbourhood-enlargement.ec.europa.eu/enlargement-policy/overview-instrument-pre-accession-assistance/north-macedonia-financial-assistance-under-ipa_en
[87] Western Balkans Investment Facility web site, accessed on March 22, 2023. https://www.wbif.eu/wbif-projects

projects are in non-mature phase,[88] which may reduce the effectiveness and efficiency of the investments needed.

Existing measures are looking to leverage additional private capital to support the green economy and climate change, but results remain to be seen. The Growth Acceleration Plan for 2022-2026 introduces innovative tools and mechanisms to diversify the financing sources and introduce new types of financing instruments**.** Such instruments include Green Bonds, the Hybrid Green Strategic Investment Fund (Fund for Innovations and Technology Development), the Energy Efficiency Fund, Public-Private Partnership, and blended financing. The Growth Acceleration Plan estimates public investments totaling EUR 4 billion will leverage an additional EUR 8 billion investments from the private sector (Figure 20). In the short to medium term, fiscal strategies and growth plans are embracing the principles of green development and incorporate green financing instruments. The integration of current fiscal policies with climate change policies is also making progress, yet there are still noticeable gaps, such as relying on outdated climate policies instead of the climate targets set forth in the ENDCs.

Figure 20. The Growth Acceleration Plan: Transmission Mechanism



Source: North Macedonia Ministry of Finance. BLN=billion.

Implementing the Growth Acceleration Plan requires public investments to more than double and an additional EUR 1.3 billion from the private sector over the next five years. Achieving these goals necessitates increasing total gross investments from an average of EUR 3 billion (as observed from 2010 to 2019) to EUR 4.8 billion (averaged over the 2022–2026 period) (Figure 21). The nominal EUR amounts of the annual public investments estimates a 2.5-fold increase by 2026. But in addition, the allocation of financing resources should be channeled to priority investment areas, with the green economy being on top of the list.

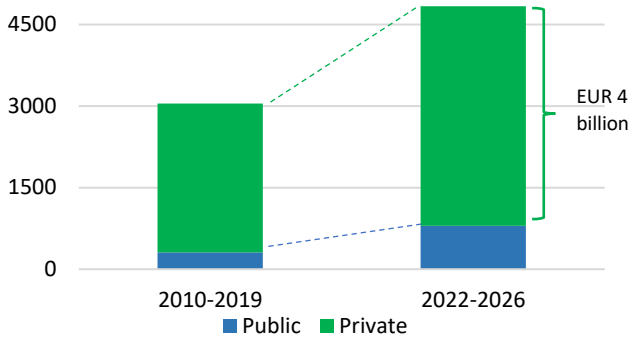
Issuance of debt instruments can help mobilize financing for decarbonization-induced investments. Green bonds can help the country scale up public and private investment to facilitate the realization of mitigation and adaptation priorities. North Macedonia issued the first green bond in October 2023, with a two-year repayment period and an interest rate of 4.75 percent in the amount of EUR 10 million. The instrument has no monitoring and verification process attached to ensure investors that the funds will be used for green investments; however, it is expected to finance investments via the

[88] The Green Agenda for the Western Balkans: Opportunities for North Macedonia, 2022, Wilfried Martens Centre for European Studies, Konrad Adenauer Foundation (KAS) in the Republic of North Macedonia, Institute for Democracy "Societas Civilis" – Skopje. https://idscs.org.mk/wp-content/uploads/2023/02/Green-Agenda-WB-Final.pdf

Energy Efficiency Fund. The latter is a revolving fund for energy-efficiency investments in the public sector currently with a funding size of 5 million from the World Bank-financed Public Sector Energy Efficiency Project. The government can also tap into additional funds (e.g. Green Climate Fund and EU IPA).

Accessing PPPs can help close the investment gap. PPPs can bring in additional resources (capital and expertise) and allow for risk-sharing between public and private partners but can increase fiscal risks and costs without a strong institutional and legal framework.[89] The current PPP legislation in North Macedonia (2012 Law on Concessions and Public-Private Partnerships) lacks clarity regarding the rules and procedures of PPPs and is not fully harmonized with the EU directives. Aiming to align with the EU acquis, a new draft law aims to address the issue of fragmented terms and conditions and lack of central oversight of fiscal risks related to PPPs. Additional efforts need to be made to integrate PPPs within the overall public investment management framework, ensure consistency between strategic priorities and capital spending, strengthen the institutional system for oversight, and further improve management and reporting of fiscal costs and risks associated with PPPs.

Figure 21. Gross investments (EUR million), 2010-19 vs. 2022-2026



Source: Ministry of Finance

Green Public Procurement (GPP) and Climate Budget Tagging (CBT) are crucial public finance tools to help ensure government expenditures are aligned with broader environmental goals. The former aligns financial resources with environmental priorities, fosters responsible resource management, and contributes to the achievement of national environmental and climate targets. The latter is the practice of identifying and tracking government expenditures related to climate change mitigation and adaptation efforts within the budget. It involves labeling or "tagging" specific budget allocations, expenditures, or projects that are directly aimed at addressing climate change or reducing its impact. The existing budget structure and coding are too general to facilitate the identification and allocation of green and climate financing. Adoption of appropriate methodologies and enhancing the integrated financial management information system coding structure can enable the government to effectively monitor and enhance the environmental sustainability of expenditures, thereby advancing climate-related objectives.

While GPP in North Macedonia is improving, more needs to be done. The analysis of contracts on e-procurement portal revealed 4,760 contracts that can be defined as sustainability-oriented in 2011-22 period in North Macedonia.[90] These contracts target energy efficiency improvements, sustainable waste management, or emissions reduction. The GPP analysis of North Macedonia's government contracts indicated a rise in total number of such contracts (Figure 22) and their total value (Figure 23) in the past 10 years. However, considerable annual fluctuations in the value of GPP contracts indicate that further efforts are required to strengthen procurement procedures, such as measures to revise the tender criteria or improve the advertisement of GPP tenders. These results are in line with the recent efforts that North Macedonia has made to harmonize its national legislation with the EU acquis

[89] International Monetary Fund. 2023. The Future of PPPs in the Western Balkans. https://www.imf.org/en/Publications/WP/Issues/2023/02/10/The-Future-of-PPPs-in-the-Western-Balkans-529696

[90] The analysis was done by the Bank through web scraping technique using keyword searches of lot/tender titles and lot/tender descriptions and the identification of relevant products based on CPV codes.

for GPP procedures.[91] But harmonization must be accompanied by the implementation of innovative practices and/or the establishment of continuous monitoring and optimization measures.

Figure 22. Number of GPP Contracts

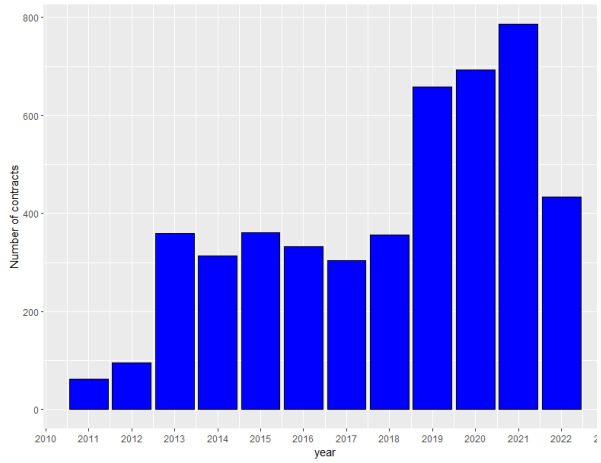
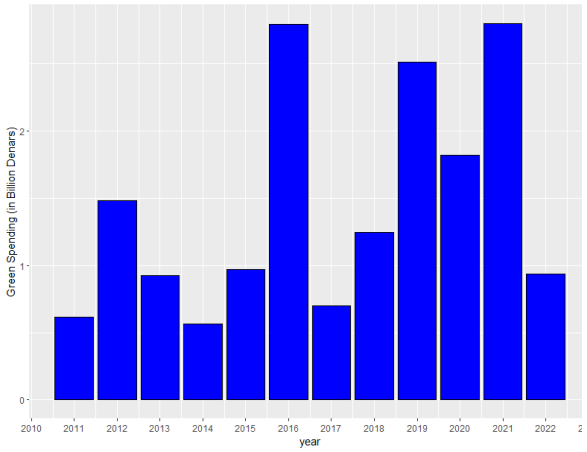


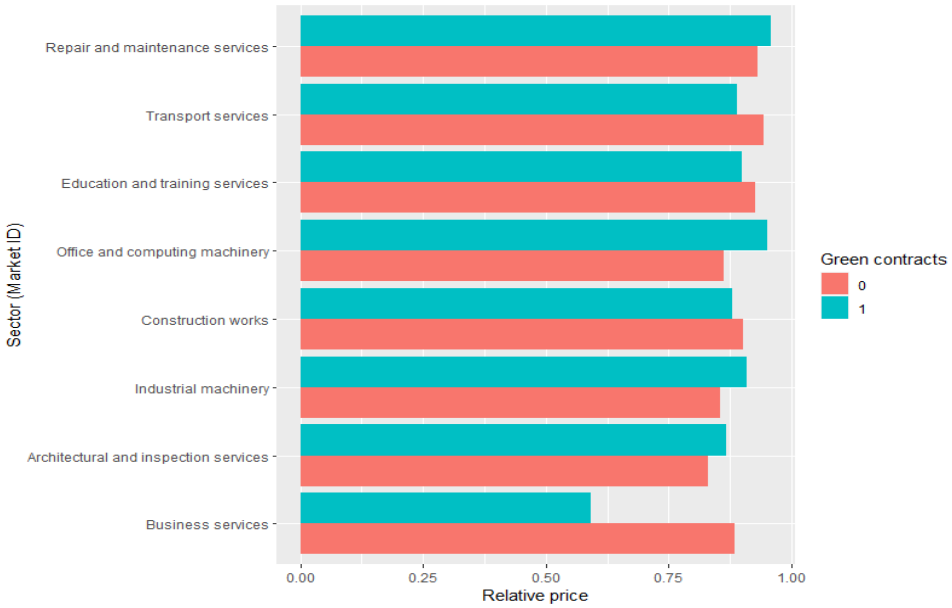
Figure 23. Total GPP Spending



Source: World Bank 2024 Public Finance Review, forthcoming.

GPP contract prices tend to be lower than those of non-GPP contracts, suggesting GPP contracts are more efficient (Figure 24). The analysis of relative contract prices indicates that education of public servants and strengthening business services offer the greatest potential for green procurement, as prices for GPP construction works or transportation services contracts identified as GPP have a lower mean relative price compared to all other tenders.

Figure 24. Relative price by market and green tenders



Source: World Bank 2023 Public Finance Review, forthcoming.

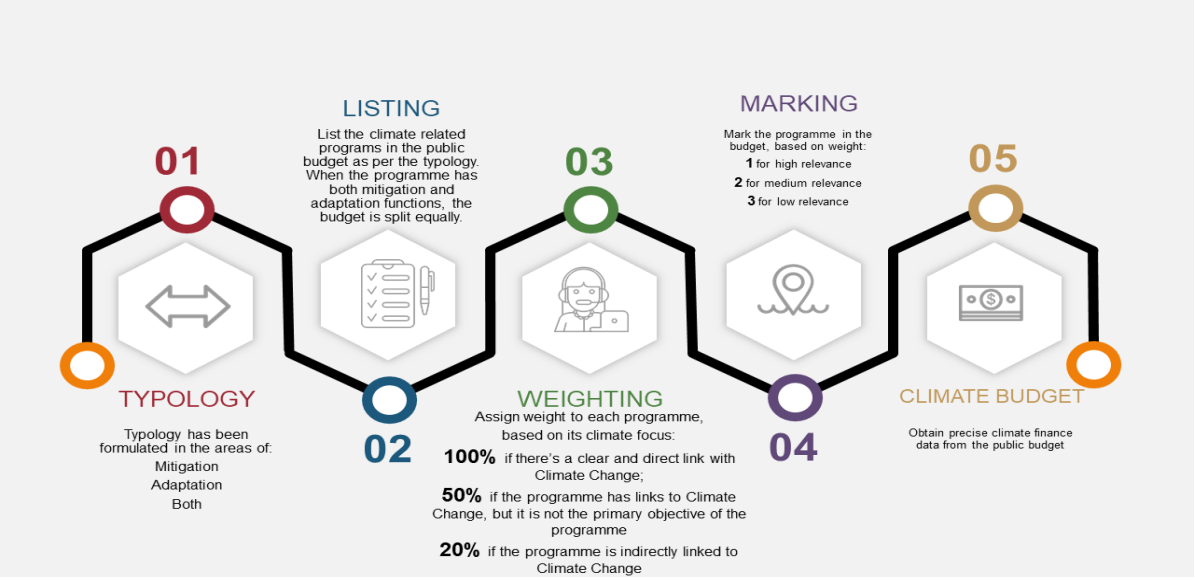
Improved legislated tender procedures have streamlined procurement and reduced contracting costs, but these improvements can be expanded. Since the adoption of North Macedonia's 2019 Public Procurement Law, the largest share of procurement spending has been allocated through the open procedure, the simplified open procedure, and the low-value procurement. Measures that further expand the use of these procedures could yield additional savings, and the government should offer training and revise its guidelines to broaden their application. Implementing monitoring and control mechanisms can help ensure that public buyers use these types of procedures correctly. For

[91] Public Procurement Bureau. Guidelines for Green Public Procurement. https://bjn.gov.mk/prirachnici-za-avni-nabavki/upatstvo-za-zeleni-avni-nabavki/.

example, engaging civil society groups in monitoring procurement, which is already in place in North Macedonia, [92] increases the probability of detecting wrongdoing and decreases costs. Efforts to strengthen processes must be complemented by measures to increase competition in the bidding process to maximize cost savings. Finally, there is a need to build awareness and capacity on GPP tenders for government as well as bidders. This will increase the uptake of green procurement and deliver lower-priced contracts for public buyers.

The government has also taken the first steps towards climate budget tagging to promote greener development. With support from the MoF and international development and finance institutions, the Ministry of Environment and Physical Planning has set the legal baseline for Climate Budget Tagging (CBT) in the Law on Climate Action (submitted to the government for adoption in October 2023), but detailed methodology and CBT procedures are yet to be defined in by-laws. A country-specific methodology and guidelines for introduction of CBT was outlined in 2021.[93] It proposes a set of six country-specific stepping stones to ensure a precise amount of public resources is allocated to climate action (for mitigation or adaptation or both), as well as to support monitoring the implementation of North Macedonia's ambitious climate and energy policies (Figure 25). In September 2023, the Ministry of Finance (with assistance from the US Treasury) commenced development of a new budget classification, which will include a climate budget tagging component. Implementation of the aforementioned initiatives will require at least a couple of years.

Figure 25. Proposed climate budget tagging methodology for North Macedonia



Source: Guidelines for implementing CBT in the Republic of North Macedonia, 2021.

Mainstreaming CBT remains a challenge requiring cross-ministerial coordination and improvements to existing infrastructure. Ultimately, it requires integrating CBT into the integrated financial management information system (IFMIS), defining a distinct climate budget classification system, and establishing governance arrangements for effective implementation.[94] The Ministry of Finance's new budget classification system will be integrated into the IFMIS with climate CBT, which will enhance accountability, encouraging environmentally responsible behavior as well as promoting monitoring of the effectiveness of public climate finance. To help facilitate CBT adoption, it is also recommended that the budget circular incorporates CBT guidelines, with ministries appointing focal points to consolidate climate budget data. This can be complemented by climate performance audits to further

[92] https://www.ccc.org.mk/images/stories/zelenimk.pdf

[93] Ministry of Environment and Physical Planning. 2021. Guidelines for implementing Climate Budget Tagging in the Republic of North Macedonia.

[94] World Bank. 2023. Climate Budget Tagging (CBT) for North Macedonia - proposed methodology & implementation mechanism.

enhance transparency, with the potential for future CBT expansion and coverage of additional areas as institutional capacities progress.

CBT is vital for climate investments in North Macedonia. Numerous attempts have been made to evaluate the government's budget and that of pilot ministries, including the Ministry of Environment and Physical Planning. However, the outcomes have proven neither precise nor dependable. An exception to this is the City of Skopje, which sets an example of transparency and detailed financial reporting. With the adoption of its climate change strategy, named *Resilient Skopje*, the city took a proactive approach. By applying CBT to the City of Skopje's budget for the period 2018–2019, the analysis revealed the implementation of 37 climate-related projects, entirely funded from the municipal budget, amounting to EUR 5.3 million. This represents a notable commitment with climate finance accounting for 4.7 percent of the total budget in 2018 and 5.2 percent in 2019.

While implementing a CBT system is an onerous task, implementation effort will ease over time as capacities increase. Accordingly, implementing a smaller, more targeted system in the short term, but expanding over time can help reduce the burden and minimize risks. The CBT system may be expanded in future to cover additional elements such as fossil fuel subsidies and environmental tax expenditures, as well as other government spending related to activities that are environmentally harmful.[95] Similar efforts to promote green investments have also been adopted by the National Bank of the Republic of North Macedonia (NBRNM; Box 4).

Box 4. NBRNM embraces green financing as key ingredient to tackling the climate crisis.

NBRNM is working on integrating sustainability and addressing climate-related risks within its financial stability framework and promoting green finance. Supplementing its 2020–2022 Strategic Plan accordingly, NBRNM made "green finance" a strategic goal, prioritizing monitoring and managing the risks of climate change on the banking system and conducted surveys on climate risk awareness of these risks and how the banking sector manages them.

Supporting the green agenda, the NBRNM established a regular system of collecting more detailed data on green financing (from 2019) and started publishing quarterly data on green financing loans approved to households and non-financial corporations. Green loans restrict the borrower to invest in projects with significant positive environmental impact and in projects that reduce the negative effects from climate change. Green loans have doubled as a portion of total issued loans in North Macedonia since 2019, reaching 3.7 percent, supported by the National Bank's measures, including changes in mandatory reserves.

In the new Strategic Plan 2023-2025, the NBRNM is embracing support from the World Bank in taking further steps to integrate sustainability into its financial stability framework:

- Developing a green or sustainability dashboard with relevant indicators to assess climate risks impact on financial stability, following international best practices;
- Assessing climate-related risks for the country's banking sector, aiming to understand exposures to climate risks; and
- Building capacity for a macro stress test exercise for climate risks in 2024, focusing on workshops and international experiences.

Meeting the incremental investment needs implies tapping into multiple funding sources, including the bank-dominated financial sector. More than 50 percent of the total bank portfolio in Climate Policy Relevant Sectors (CPRS) is already exposed to climate change shocks, in terms of buildings, transport, and energy-intensive sectors,[96] where most of the additional investments need to be made.

[95] Known as brown expenditures, such activities can include subsidies to the fossil fuel industry, support for activities with high GHG emissions, or funding for projects that have negative environmental impacts.

[96] The identification of Climate Policy Relevant Sectors is based on a classification of economic activities developed to assess climate transition risk. It has been refined over the years and has been widely used by practitioners and policy makers to assess investors' exposure to climate transition risk. It was first developed in Battiston, Stefano; Mandel, Antoine; Monasterolo, Irene, Schütze, Franziska; Visentin, Gabriele. 2017. A climate stress-test of the financial system. Nature Climate Change volume 7, pages 283–288. https://doi.org/10.1038/nclimate3255

The direct exposure of banks to fossil-fuels and utilities is on average limited, although transition risk exposures can differ strongly amongst individual banks, depending on their specialization. Exposure to physical risks is most pronounced in real estate loans due to a potential reduction in the value of the collateral, with half of the household and corporate portfolio being placed in the region of Skopje that is under high risk of floods and landslides.

Figure 26. Share of banks' exposure to CPRS and other sectors

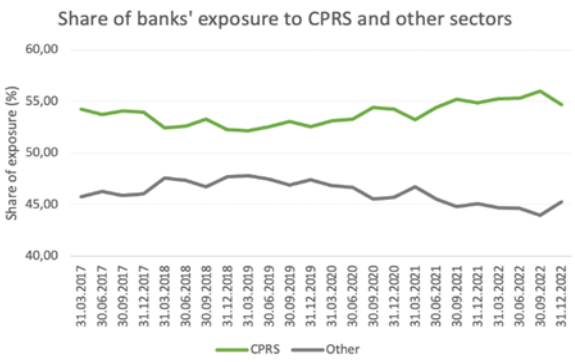
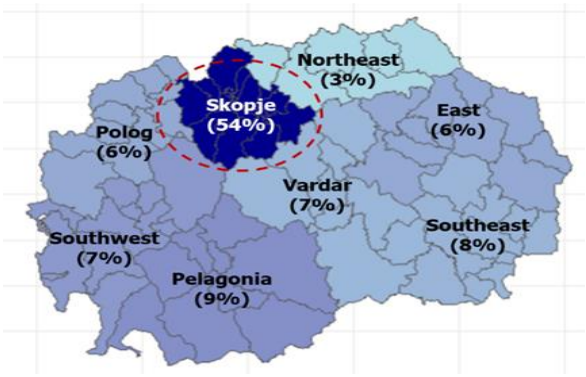


Figure 27. Distribution of bank loans by region



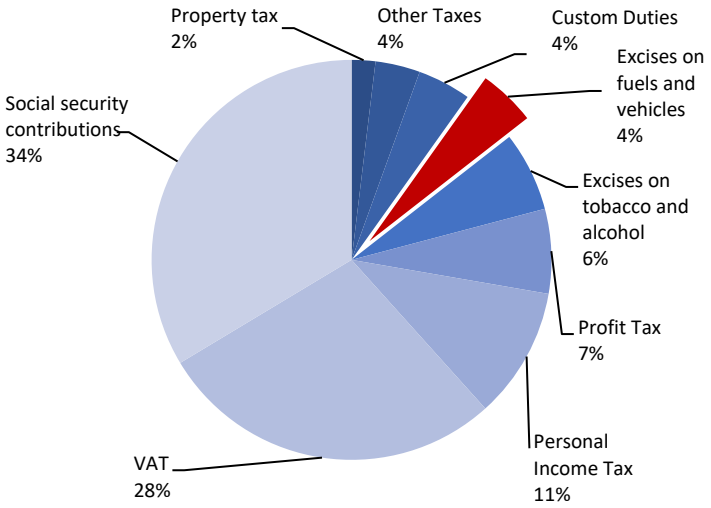
Source: Data from Central Banks and World Bank staff calculations.

Raising capital to finance decarbonization investment also requires creating an enabling regulatory environment. A green finance ecosystem requires the development of a green taxonomy, the adoption of disclosure and reporting standards, and the development of green markets. The green taxonomy to be adopted by North Macedonia should be aligned with its climate-related national strategies, laws, and action plans, and be interoperable with the EU green taxonomy.

3.3. Fiscal reforms can help finance the investment gap while promoting the green transition

The government has embraced environmental fiscal reform, but implementation is lagging. North Macedonia highlighted green fiscal reform and climate considerations as a priority in its Tax System Reform Strategy (2020–2023) laying the groundwork for the implementation of environmental taxation to implement the polluter pays principle. [97] Similarly, both the strategy for financing the ENDC and the assessments for De-

Figure 28. Taxes and contributions in North Macedonia in 2022



Environmental taxes (7 percent of total):

Source: MOF and State Statistical Office

[97] Ministry of Finance. 2020. Tax System Reform Strategy 2020-2023. https://finance.gov.mk/wp-content/uploads/2020/02/Tax-Strategy_2020_2023.pdf

Risking Climate Investments[98] highlight the need to realign the existing fiscal policies and measures with the ambitious climate policies, pinpointing the most appropriate fiscal instruments and sources of funding.[99] They emphasize that the cost of inaction is much higher than the cost of proposed policies. For example, application of the energy-efficiency-first principle further contributes to 21 percent of savings of energy consumption relative to BAU and 35 percent of savings of primary energy consumption. However, mainstreaming climate considerations into fiscal policies is progressing slowly.

North Macedonia's historical tax base focuses on social security contributions, the value added tax (VAT), and the personal income tax, and thus is ripe for broader reforms. Strong reliance on income-based taxes fails to capture the informal workforce and can disincentivize formal workforce participation (and further shrink the tax base).[100] Taxes on fuels and vehicles contributed only 4 percent to total government revenue in 2022 (Figure 28). According to the State Statistical Office data, environmental taxes in North Macedonia, which include fuel taxes, were around EUR 232 million in 2021, representing around 7 percent of total tax revenue. Most of the environmental taxes are in the form of fuel taxes, with pollution taxes only representing 1 percent.

The existing tax framework does not adequately reflect the actual costs of environmental damage caused by the subsidized production/use of fossil fuels. Of the total of 27 environmental fees/tariffs/taxes that are collected in North Macedonia, just a few are climate change relevant (taxes related to fuels, vehicles, logging etc.). Among these the fee for producing electricity from fossil fuels is set to an extremely low value of 0.007 Macedonian denars (0.000001 EUR) per kWh produced electricity. The excise tax for the highest emitting fuels (natural gas, coal, and lignite) is zero. This favorable tax treatment puts them in a preferential position compared to other fuels. As a result of such policies, the carbon intensity of the power production, measured as emitted CO_2 per GDP, continues to be seven times higher than in the EU-27. Namely, for EUR 1000 of GDP, North Macedonia emitted 285 kg carbon dioxide, compared to 41 kg in the EU in 2022.[101]

Tax rates on transport fuels, particularly diesel and liquefied petroleum gas (LPG), are lower than the EU minimum and that in other Western Balkans countries. The tax on diesel is more than 10 percent below the EU minimum. Lower fuel taxes and excises contributed to rapid growth of diesel use and import of old vehicles, while transport is the second largest contributor in the overall GHG emissions. Over the period 1990–2019 the GHG emission from the transport sector increased by almost 200 percent.[102] Fiscal revenue from excise duties on road transport fuels peaked at around EUR 250 million in 2021 and slightly decreased in 2022 (Figure 29).

In addition to the excise duties, energy and fuels are also taxed by VAT and tariffs. Energy products are taxed at the standard VAT rate of 18 percent, although there a few exceptions that have a reduced

[98] International Renewable Energy Agency. 2021. : Renewable energy finance and policy landscape focusing on power, heating and cooling, in line with the Macedonian Nationally Determined Contributions on Climate Change.
https://api.klimatskipromeni.mk/data/rest/file/download/c8dea4b912c2be2599b741652b632587d6546dd01e9eb30ad3a0803c9aeb87c4.pdf

[99] McClellan, Karen. 2021. Financing Strategy for the Macedonian enhanced Nationally Determined Contributions to Climate Change.
https://api.klimatskipromeni.mk/data/rest/file/download/2eb6e2d2f9cfb6ca33ae563e2589a0fb82ff06131a97f0faa5be358812f33423.pdf

[100] Pigato, Maria. 2019. Fiscal policies for development and climate action. Washington, DC: World Bank.
https://documents1.worldbank.org/curated/en/340601545406276579/pdf/133156-REPLACEMNET-PUBLIC.pdf

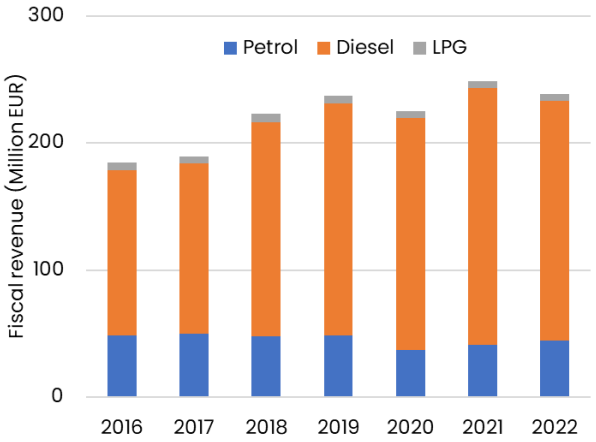
[101] Energy Community Secretariat, 2023, CBAM-Readiness tracker. https://www.energy-community.org/dam/jcr:d6e80d5e-9290-4e8b-ac7e-5170ec59808a/EnC Tracker 06_2023_final.pdf

[102] Ministry of Environment and Physical Planning, 2021. National GHG inventory report for the Fourth National Communication on Climate Change.

VAT rate of 5 percent, including derived heat, wood pellets and pellet stoves and boilers. VAT rate differentials can incentivize environmentally negative outcomes if, for example VAT rates on fuels are below the standard VAT rates.

The price incentive provided by taxes discussed above is lower in North Macedonia than in most neighboring countries and significantly lower than in the EU. While North Macedonia does not have a direct carbon price (such as an ETS or a tax), it does have a range of other taxes that can provide an *indirect* incentive affecting investment, production, and consumption choices. Analysis based on estimating the total carbon price (TCP) indicate that while North Macedonia has a positive incentive, it is lower than that of regional peers, and of the EU (Figure 30).[103] Relatively low energy taxes for non-transport fuels such as coal and natural gas are driving this difference. In fact, the majority of the TCP is from transport fuels (primarily gasoline), and the distribution of the TCP across sectors, where industry and power have a TCP close to zero and households have a negative TCP, illustrate this (Figure 31).

Figure 29. Fiscal revenue from excise duties on road transport fuels



Source: World Bank, 2023, Road Vehicle Emission Management Roadmap in North Macedonia.

Figure 30. Total carbon price across selected economies, 2021

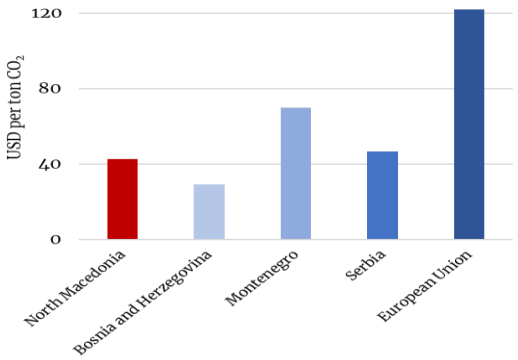
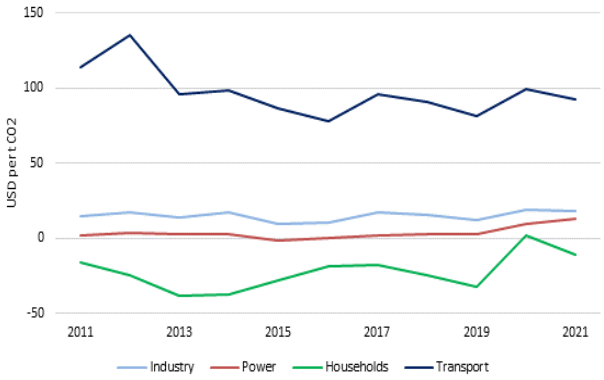


Figure 31. Total carbon price across key sectors



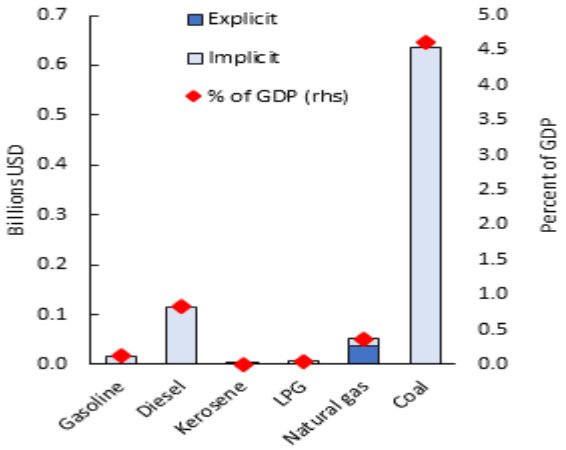
Source: World Bank calculations.
Note: the TCP provides an estimate of the carbon price incentive, including the impacts of fossil fuel taxes and subsidies.

The low level of carbon price and general taxation on coal highlights the relatively high level of implicit subsidies. The International Monetary Fund (IMF) analysis using the price-gap approach infers the explicit and implicit subsidy based on the difference between retail prices, supply costs, and/or optimal price (where the optimal price estimates the price after accounting for country-specific

[103] The methodology and data to calculate the TCP is outlined in Agnolucci, Paolo; Fischer, Carolyn; Heine, Dirk; Montes De Oca Leon, Mariza; Pryor, Joseph; Hallegatte, Stephane. Measuring Total Carbon Pricing. Policy Research working paper no. WPS 10486. World Bank Group. http://documents.worldbank.org/curated/en/099548206152339098/IDU124d2b624145531468a1a4d418173bf51a4fd The methodology takes into consideration the combined effect of energy taxes, fossil fuel subsidies, and direct carbon pricing measures (such as a carbon tax and/or an emissions trading system). When considering different fiscal instruments applied across several fuels and sectors, a common measurement unit needs to be established to make comparison possible. In the case of the TCP, the rates of all fiscal instruments are converted into CO_2 units so that the indicator conveys the equivalent monetary fiscal burden cost per tCO2 associated with a set of policy instruments.

externalities, such as air pollution, GHG emissions and traffic congestion). Explicit subsidies reflect where supply costs are greater than retail prices, while implicit subsidies reflect where retail prices are lower than the optimal price. This analysis highlights the high level of implicit subsidies in coal and, to a lesser extent, diesel, because of relatively lower levels of fuel excise compared to the externality cost (e.g., coal faces a zero-fuel excise). This analysis also suggests the presence of an explicit subsidy on natural gas (Figure 32).

Figure 32. Subsidies in North Macedonia by fuel, 2021



Source: IMF, World Bank, Western Balkan 6 Climate Change Development Report, North Macedonia Country Compendium, forthcoming

Tariffs on vehicles are also disincentivizing purchase of modern and more efficient vehicle types. Existing tariffs do not make a distinction across vehicle types—electric, hybrid, and internal combustion vehicles all incur the same tariff of 5 percent. Similarly, there is no difference in the treatment of electric and combustion engine motorcycles/scooters; both have a 15 percent tariff.

However, progress has been made, as North Macedonia was the first Western Balkan country to link vehicle registration taxes to vehicle emission levels. Since 2020, a new tax on motor vehicles has been introduced, merging both the value of the vehicle and its CO_2 emissions in the equation[104] (electric passenger cars exempted). In 2021, the CO_2/km-based coefficient of the Motor Vehicle Tax rate was increased by 25 percent compared to the 2020 level, with a further 25 percent increase in 2022, leading to the average car emissions decline from 141 g CO_2/km in 2021 to 135 gCO_2/km in 2022 for passenger cars (petrol and diesel). Still, the equivalent tax rate in EUR for the same value and emission cars falls below the EU average or some EU peers. For example, in Slovenia, for a diesel-powered car with value 10,000 EUR and emitting 160g CO_2/km, motor vehicle tax is 1,100 EUR, while it would be731 EUR in North Macedonia. The fiscal revenue from the motor vehicle tax peaked at EUR 26 million in 2021 and was around EUR 24 million in 2022. To reduce road transport carbon emissions and boost fiscal revenues, in October 2023, the government amended the Decree on the method of calculation of the motor vehicle tax and the amount needed for the calculation of the motor vehicle tax, allowing the applications of the new WLTP method (Worldwide Harmonized Light Vehicle Test Procedure) for assessment of the CO_2 emissions, as a base for calculation of the CO_2/km-based component of the Motor Vehicle Tax for car registrations. Given that the WLTP testing considers more realistic driving conditions, it results in higher measurements of CO_2/km compared to the old NEDC (New European Driving Cycle) testing. Compared to the current scheme, the MoF introduced tax increases for 6 categories of vehicles with NEDC-tested emissions above 140g CO_2/km. This would target around 34 percent of new car registrations with the tax obligations increasing by 13-85 percent depending on the category, with higher increases for higher emission levels.

Tax reform targeting fuel excise duty, motor vehicle tax, and carbon pricing yields dual benefits: it decarbonizes the economy while boosting revenue collection. The World Bank has undertaken a detailed assessment and modelling of several policy scenarios to assess the environmental, economic, and distributional impacts of these policy reforms on the transport sector.[105] This analysis suggests that aligning the fuel tax rate with the EU average is the most effective in terms of cumulative GHG emissions reduction in the transport sector through 2050—reducing emissions by up to 2.4 Mt CO_2-e

[104] Motor Vehicle Tax = Value of Vehicle * Rate + CO_2 Emission of Vehicle * Coefficient
[105] World Bank. 2023. Road Vehicle Emission Management Roadmap in North Macedonia.

by 2050. The resulting cumulative tax revenue increase was estimated at EUR 3.5 billion, an average of EUR 140 million per year through 2050.

For the transport sector, reforms focused on road transport fuel excises, in line with the EU Energy Taxation Directive, emerges as a prudent step that could also facilitate EU accession. This reform not only has the capacity to generate additional fiscal revenue but also serves as a powerful incentive for reduced consumption of fossil fuels in road transport. To complement this, a motor vehicle tax reform, characterized by an increased CO_2 coefficient rate and an expanded scope encompassing light-duty vehicles, can further advance the country's environmental and economic objectives. Through these strategic measures, North Macedonia has an opportunity to enhance sustainability, reduce emissions, and bolster its fiscal position.

As North Macedonia aspires to join the European Union, it is taking an active role in shaping Europe's ambitious vision of becoming the first carbon-neutral continent by 2050. As a candidate country, North Macedonia is not bound by the EU ETS until its accession, but it is required to implement Monitoring, Reporting, Verification and Accreditation (MRVA) and to establish ETS based on Ministerial Council Decision of the Energy Community. However, aligning with the principles set forth in the Sofia declaration, North Macedonia has expressed its commitment to implementing carbon pricing mechanisms in line with the EU ETS framework (Figure 33). This commitment encompasses the gradual phasing out of coal subsidies and the promotion of renewable energy adoption,[106] mirroring the objectives outlined by the Energy Community Secretariat. In 2021, the Energy Community Secretariat released a carbon pricing design report, recommending that Contracting Parties, including North Macedonia, progressively introduce pricing mechanisms, notably through a cap-and-trade ETS, specifically targeting the power and heating sectors. The 2023 update of North Macedonia's draft Climate Action Law, introducing the possibility of a carbon fee as part of its evolving climate strategy, also underscores its dedication to aligning its policies with European environmental goals.

Putting a price on carbon will ensure phasing out of fossil fuels and support tax revenues. The introduction of a carbon tax is still pending, but it is an integral part of the new climate action law. A carbon price offers a way for governments to take advantage of market forces to encourage a broad set of low-cost emissions reductions from across the energy sector in support of goals related to the Paris Agreement and Energy Community. Implementing a carbon price would also help align with the European Commission's Growth Plan and would help put North Macedonia on a path towards EU accession (Box 5). Multiple country-specific assessments have been conducted to pinpoint the optimal scenario for the introduction of a carbon tax, providing a robust foundation for its implementation. The most recent modeling analysis, outlined in Chapter 4 of this report, reflects baseline and ambitious scenarios for carbon pricing. Under the ambitious scenario, carbon price initiates at a relatively high EUR 50 per ton of CO_2 in 2026 with a swift escalation, reaching EUR 250 per ton of CO_2 by 2050. This proactive stance not only reflects a commitment to combating climate change but also anticipates the highest revenue generation potential, with an estimated EUR 700 million collected per year. In combination with reforms to vehicle taxes, the amount of additional revenue is significant – almost the equivalent of that raised through existing excise taxes on fuels, vehicles, tobacco, and alcohol (Figure 34). Chapter 4 provides additional quantitative results on the potential impact of carbon pricing and how different revenue use options influence fiscal and economic outcomes. Carbon pricing design and implementation considerations are discussed in the Environmental Tax Reform Options and Outcomes Updated Policy Note.[107]

[106] The obligation to implement Directive (EU) 2018/2001 on renewable energy (RED II) was by December 31, 2022. North Macedonia has still not transposed the RED II, as the new draft law is pending adoption.
[107] World Bank. 2021. *North Macedonia: Environmental Tax Reform Options and Outcomes*. http://hdl.handle.net/10986/35862

Box 5. Overview of the EU's CBAM

On 8 November 2023, the European Commission adopted a new "Growth Plan" for the Western Balkans through a Communication[108] and a Proposal for a Regulation of the European Parliament and the Council.[109] The Growth Plan seeks to promote economic convergence to help Western Balkan countries advance EU accession, including by incentivizing the adoption and implementation of the EU *acquis*. In particular, the European Commission requires establishment of a ***Common Regional Market***. This effectively requires implementation of the Energy Community Treaty, which includes carbon pricing. While there is no explicit requirement to implement an ETS to comply with the Growth Plan, implementing a carbon price aligned with the EU ETS would streamline this process. It would also help North Macedonia meet its commitments under the Energy Community and help prepare for future EU accession.

Figure 33. Evolution of EU ETS Carbon price 2005-2023

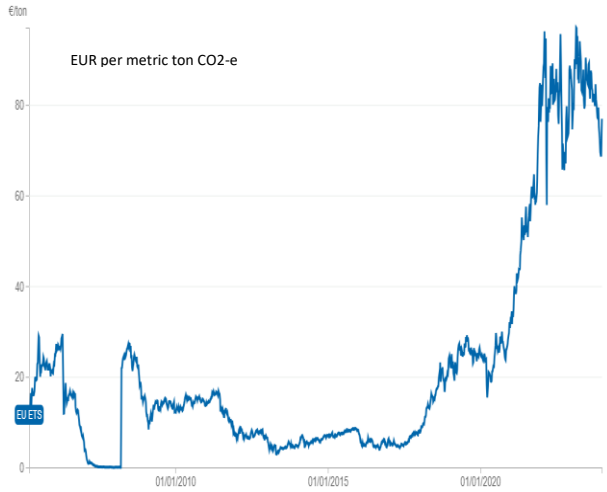
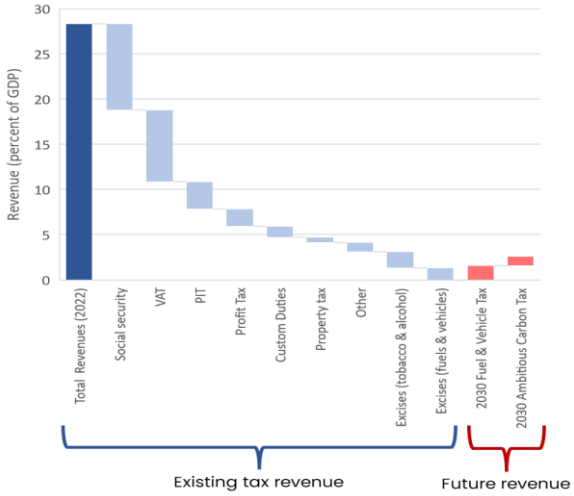


Figure 34. Tax revenues, 2022 and 2030



Source: International Carbon Action Partnership, accessed in January 2024.

A carbon price can also yield broader benefits, but transition needs to be equitable and just. Implementing a carbon price will help North Macedonia build experience and capacity needed to join the EU ETS. It will also provide broader benefits, including improved local air quality, which has health and economic benefits. However, it will also lead to rise in electricity costs (see Chapter 4) and job losses related to the closure of thermal power plants. The Just-Transition Roadmap, endorsed by the Government of North Macedonia in June 2023, presents four key development pathways for a green transition, putting in spotlight Pelagonija and the Southwest, regions heavily reliant on coal. These pathways (Private Investments and Startup Economy, Green and Smart Infrastructure, Clean Energy, and Skills Development) promote an integrated approach. Recognizing structural challenges like the coal-income trap and high unemployment, the roadmap advocates vocational education, enhanced non-formal education, early retirement options, and upskilling/reskilling packages with subsidies for affected workers. Addressing governance at national and municipal levels, the roadmap encompasses infrastructure, energy efficiency, water, wastewater, public transport, solid waste, and district energy for both households and businesses. Estimated at EUR 29.4-44.6 million annually, the proposed actions consider technological and policy factors, including carbon prices/taxes, energy storage technologies, and repurposing existing power plants. Beyond infrastructure, the roadmap aims to support individuals in the coal value chain, facilitating adaptation to new plant requirements and offering career change opportunities in evolving regional landscapes (Table 5). North Macedonia signed a joint declaration at COP28 with international financing institutions and development banks on an investment platform worth EUR 3 billion, of which most are planned to be mobilized from the

[108] COM(2023) 691 final, 08.11.2023
[109] COM(2023) 692 final, 08.11.2023

private sector to fund a coal phaseout by 2030, grid strengthening, new capacities, and the just transition of its two coal regions.[110]

Table 5. Just Transition Roadmap pathways

Clean energy	Private investments and startup economy	Green and smart infrastructure	Skills development
Conversion of the existing lignite-fired thermal power plants Increase participation of storage units in electricity markets and energy systems by prioritizing the coal-dependent regions Increase in the share of renewables in gross final energy consumption through large scale industrial development Promoting prosumers as one of the key actors of the just energy transition	Improving the attractiveness of coal-dependent regions for investment Connecting local business with large enterprises Setting up a startup ecosystem to boost local innovation Promoting networking and creating a critical mass of start ups Removing infrastructure barriers Upgrading the industrial zones Greening production processes	Energy efficiency Smart and sustainable local mobility Waste management Water supply and management Digital innovation	Systemic interventions Continuing vocational training Integrated actions for ALMPS Work-based learning Youth guarantee initiative Active labor market measures Smooth transition on the labor market

Source: Just-Transition Roadmap for North Macedonia, May 2023.

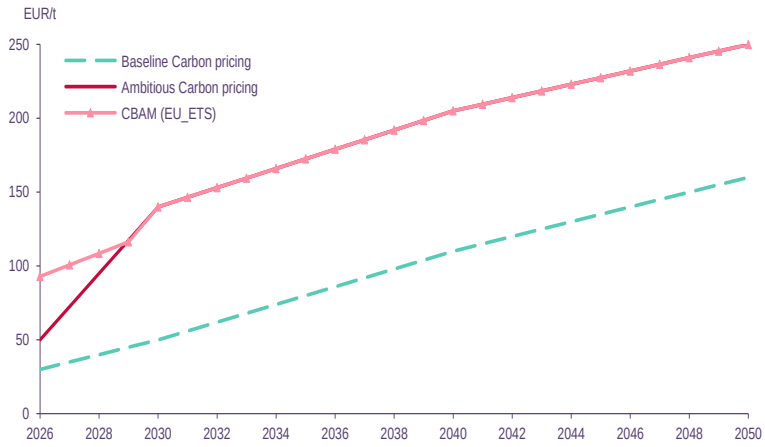
[110] In-Country Platform to Accelerate a Just Energy Transition signed on COP28. https://balkangreenenergynews.com/north-macedonia-presents-just-energy-transition-platform-worth-eur-3-billion/

4. Impact assessment: environmental fiscal reform supports economic, fiscal and environmental goals

A major part of the fiscal response to climate change is environmental fiscal reform, led by the introduction of carbon pricing. Carbon pricing provides an incentive to decarbonize, thereby helping to manage transition risks such as through reducing energy consumption by over 16 percent and improving energy productivity and efficiency. Additionally, carbon pricing reduces national GHG emissions by around 60 percent and provides a significant source of revenue—between EUR 400 and 700 million per year by 2050 (baseline and ambitious carbon scenarios, respectively). Strategic use of carbon revenues can help households and businesses transition to a carbon constrained world. For example, using carbon revenues (representing around 1.2 percent of GDP) to support energy efficiency investments in industry and households can lead to the smallest decline in growth due to carbon tax but will reduce emissions by 54 percent by 2050 compared to the business as usual (BAU). Same reduction in emissions would be achieved with the targeted cash transfers to the lowest income households, which would reduce household consumption only by around 1.9 percent compared to BAU in 2050.

The fiscal reforms highlighted in Chapter 3 can yield economic, environmental, and social benefits, but they also have impacts on the economy and households. Central to these reforms is the introduction of carbon pricing. This chapter presents an assessment of the economic and distributional impacts of fiscal reforms implemented through carbon pricing policy scenarios. It also presents a potential strategy to support a just transition. The macroeconomic analysis uses the World Bank's Climate Change Macroeconomic-Fiscal Model (CC-MFMod)[111] with feedback loops from the MARKAL[112] North Macedonia energy system model developed by the Macedonian Academy for Arts and Science (MANU). This combination allows for a comprehensive assessment with a simple structural representation and detailed insights into energy system impacts, assumptions, and policy choices. The modeling presents carbon pricing scenarios as deviations from the baseline scenario, while distributional analysis looks at options to address adverse social impact. Additional detail on CC-MFMod and MARKAL models is provided in Annex II and III, respectively. The modeling done for this report differs somewhat from the ongoing Country Climate and

Figure 35. Assumed CO_2 prices under different scenarios



Source: World Bank analysis.

[111] CC-MFMod is a structural econometric model developed by the World Bank that establishes relationships across economic and climate variables and provides insights into how economic activity affects climate, and how the climate affects the economy over the long term. It can track well economic dynamics whilst retaining a simpler structural representation relative to general equilibrium models.

[112] The MARKAL model is a widely used, commercially available, linear programming energy systems modelling framework. The model relates economic growth to the necessary energy system resources, trade, and investments, while satisfying national environmental goals. It aims to identify the least-cost energy future, discounted over the planning horizon. This provides a comparative framework for examining the impact of key assumptions (e.g., fuel price, availability of natural gas etc.), policies (e.g. renewable energy targets, climate change mitigation goals), and programs to inform decision-making and policy formulation.

Development Report (CCDR) for the Western Balkans. While historical data, growth and population assumptions are the same, the CCDR uses the TIMES model for the energy sector. Projected investments are similar but not the same as the approach the government used is the energy efficiency first then least cost options. The CCDR imposes net zero by 2050 to the energy sector.

The main policy scenarios explore the potential impacts arising from the introduction of a carbon pricing mechanism in North Macedonia. Five different policy scenarios are envisaged to provide a comprehensive understanding of the potential outcomes, as outlined in Table 6, with the carbon price assumptions shown on Figure 35. Results from the MARKAL model (e.g., investments, production factors, and sectoral shares) were inserted into CC-MFMod to produce the climate-informed development narrative and ensure consistency across labor markets, national, financial, and external accounts. Further policies are explored for their potential to recycle revenues from carbon pricing to offset the adverse impact of energy price increases.

Table 6. A Summary of the main policy scenarios

Scenario	Description
1. Business as Usual (BAU)	Provides an indication of the base case, based on the latest projections energy system development in the Republic of North Macedonia reflecting the 4th National Communication on Climate Change of North Macedonia, ***but without a carbon price***.
2. Baseline Carbon Pricing (B_CO_2)	Incorporates a carbon price that gradual increases over time. The price starts at 30 EUR/tCO_2 in 2026 and reaches 160 EUR/tCO_2 by 2050 (see Annex II). This scenario represents a moderate approach, aiming to curb carbon emissions without imposing excessive economic burdens.
3. Ambitious Carbon Pricing (A_CO_2)	Incorporates a more ambitious (higher) carbon price. The pricing starts at 50 EUR/t in 2026 reaching 250 EUR/tCO_2 by 2050 (see Annex II). This price trajectory aligns with estimates for the EU ETS prices used in the World Energy Outlook 2022 Net zero emissions by 2050 scenario.
4. Carbon Border Adjustment Mechanism (CBAM)	Introduces a CBAM to the BAU scenario. This scenario assumes that the EU ETS prices is applied to CBAM industrial sectors: chemical, iron and steel, non-metal mineral, and non-ferrous metals. While electricity exports to the EU are covered by the CBAM, North Macedonia has historically been a net importer of electricity meaning the impacts will likely be relatively low.
5. CBAM + Baseline Carbon Pricing (CBAM+B_CO_2)	This scenario assumes that North Macedonia introduces a carbon price at levels similar to the Baseline scenario, except that the industrial sector pays higher CO_2 costs for products exported to the EU, bridging the difference between EU ETS and domestic CO_2 prices. Essentially, this creates two-tiered carbon pricing, with the industrial sector adhering to EU ETS levels, and other sectors following the domestic baseline.

Modeling was used to project the impact of carbon tax and decarbonization investment policies. This begins with establishing a business as usual (BAU). The BAU outcomes were compared against the outcomes from various scenarios, including potential impacts of the EU carbon border adjustment mechanism, carbon pricing, and alternative carbon tax revenue use options (providing social assistance to vulnerable, investments into research and development, and investment into energy efficiency). As per the assumption, the carbon price is introduced in 2026. On this basis the modeling was used to estimate the impacts of a carbon price on four main areas:

1. *Energy:* including energy prices and energy consumption, including the potential change in the fuel mix.
2. *Emissions:* with a focus on changes to GHG emissions.
3. *Economy:* including potential impacts on GDP, employment, government revenue, and trade.
4. *Distributional impacts:* an assessment of the potential impact on households.

The modeling indicates that introducing a carbon price leads to a relative increase in the price of carbon-intensive fuels which improves energy productivity, reduces energy consumption, and increases use of low-emissions fuels. North Macedonia had access to relatively low-cost energy, in the form of domestic coal, and thus electricity prices in North Macedonia have been lower than in

other countries in the region.[113] Applying a carbon price to fuels will cause the price of carbon-intensive fuels, like heavy-fuel oil and coal, to increase. As a result of higher fuel prices, electricity prices are also projected to rise above BAU levels. Consumers are incentivized to improve how they use energy and energy intensive products. The reduction in energy consumption and a reduced reliance on fossil fuels (particularly natural gas) reduce energy imports, improving energy security. Improved energy productivity (e.g., energy efficiency) reduces energy demand and shifts the fuel mix towards lower emission fuels (e.g., renewables), an effect particularly evident in the power sector where the share of renewables increases as the carbon price increases. Increased uptake of renewables also must be managed (e.g., to ensure reliability, security, and stability), which may include the need for large-scale energy storage. Lower energy demand and increased use of renewables also leads to reduced reliance on energy imports, including fossil fuel-based imports. The increase in government revenues from the carbon tax improves the fiscal balance and largely offsets the rise in capital spending under the assumption that the private sector will carry out around 84 percent of needed investments.

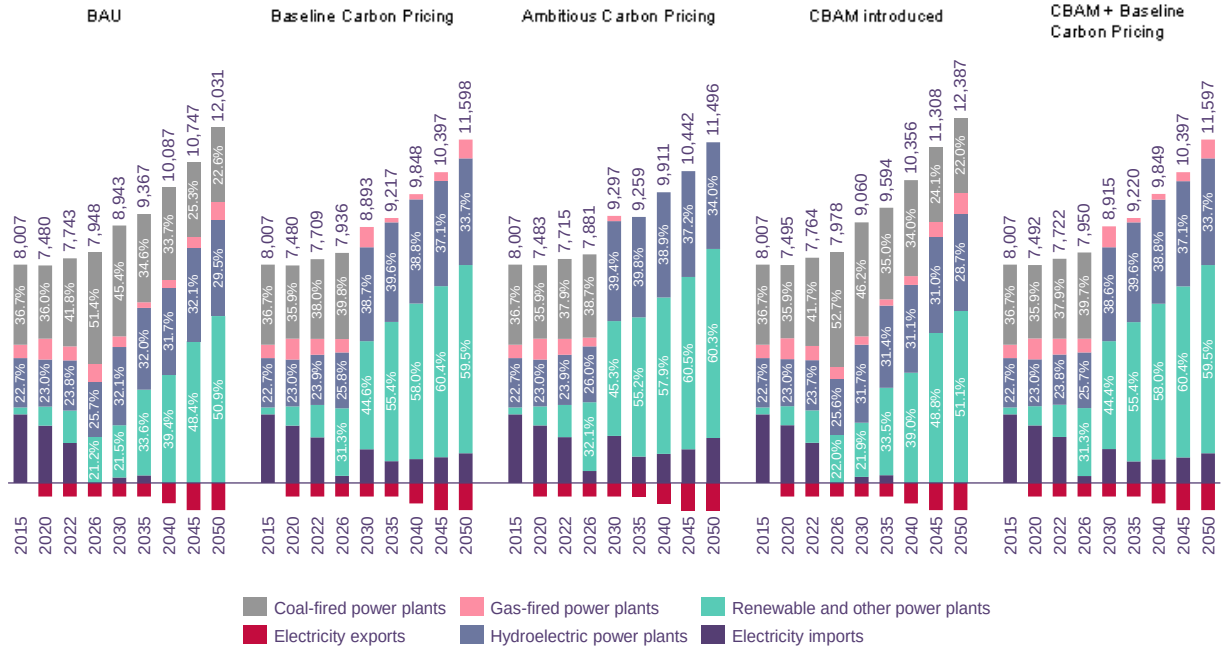
The resulting GHG emissions reductions put North Macedonia on the path to meet its ENDC, although models show that carbon pricing policy will be insufficient. Additional action is required to meet the ENDC, particularly to ensure non-energy sectors, like transport, contributing to the target.

4.1. Higher carbon prices will be effective, but insufficient without other changes

A carbon price makes renewable energy more competitive. Ambitious pricing will contribute more to mitigating climate change, but every scenario will shift the electricity generation away from fossil fuels to some degree compared to BAU. Together with hydro, other renewable sources would account for 94 percent of electricity generation in 2050 under Ambitious scenario compared to 26 percent in 2015, when 43 percent of electricity came from coal or gas-fired power plants (Figure 36). Electricity generated from hydropower plants will remain a stable and substantial source throughout the years while other renewables, especially wind and solar, will increase significantly over time. In the CBAM scenario, the electricity generation portfolio is almost the same as in the BAU scenario, because the CBAM will in reality affect only the industrial sector, given North Macedonia has historically been a net importer of electricity.

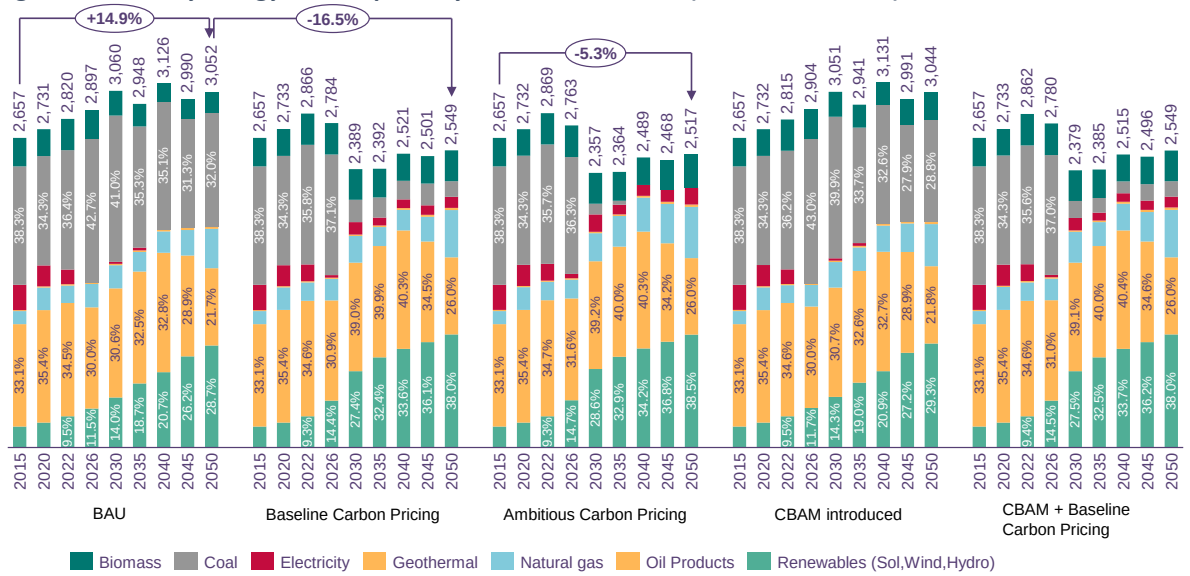
[113] World Bank. 2021. North Macedonia: Environmental Tax Reform Options and Outcomes. https://openknowledge.worldbank.org/entities/publication/14d371ef-778e-5af1-8c2a-e5db01f518d8

Figure 36. Electricity generation by scenarios (5-year cumulative, unit GWh)



A carbon price improves energy productivity and incentivizes energy efficiency. Without the introduction of carbon tax, the primary energy is projected to increase by around 15 percent in 2050 compared to 2015 (Figure 37). The introduction of a carbon tax, as in the Baseline Carbon Scenario, would decrease the consumption by 16.5 percent in 2050 compared to the BAU. Renewable energy sources, including solar, wind, and hydroelectric power, would witness substantial growth: from the 2015 consumption at 179 kiloton of oil equivalent (ktoe), it will increase to 969 ktoe by 2050 making them the fuels with the highest share (around 38 percent in 2050). A biomass would see the unchanged consumption in 2050 as in 2015 (of around 10 percent of total primary energy consumption). The biggest drop in consumption would be of coal (to around 5 percent of total), which has traditionally been a major source of energy in North Macedonia. From around 1,000 ktoe in 2015, it would drop to 130 ktoe in 2050 in both the Baseline and Ambitious Carbon Pricing scenarios.

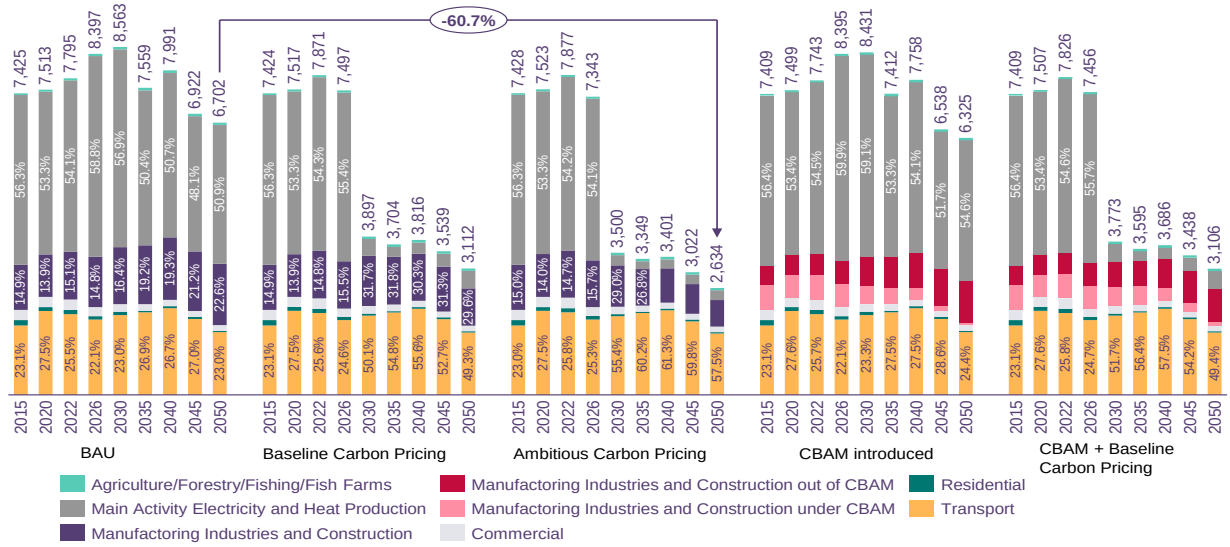
Figure 37. Primary energy consumption by fuels and scenarios (annual, unit, ktoe)



A carbon price can reduce national emissions by around 60 percent by 2050, but the transport sector will be slow to respond. In the energy sector, the trend reflects a transition from fossil fuel-based power generation to renewable energy sources (Figure 38). Higher carbon prices lead to more

substantial emission reductions, incentivizing the adoption of low-carbon energy technologies. Emissions from manufacturing industries and the construction sector exhibit a gradual decline in most scenarios. Industries subject to CBAM show a higher reduction in emissions, indicating the CBAM would accelerate a shift to cleaner technologies and processes to remain competitive in international markets. Both commercial and residential sectors demonstrate a decreasing trend in emissions, primarily due to energy efficiency measures and use of cleaner energy sources. The introduction of a carbon price in the transport sector leads to more aggressive vehicle electrification and the reduction of emissions, but even so it will have the biggest share in emissions of any sector, declining by only around 10 percent compared to 2015 in the Ambitious Carbon Scenario.

Figure 38. CO_2 emissions by scenarios ($ktCO_2$, annual emissions)

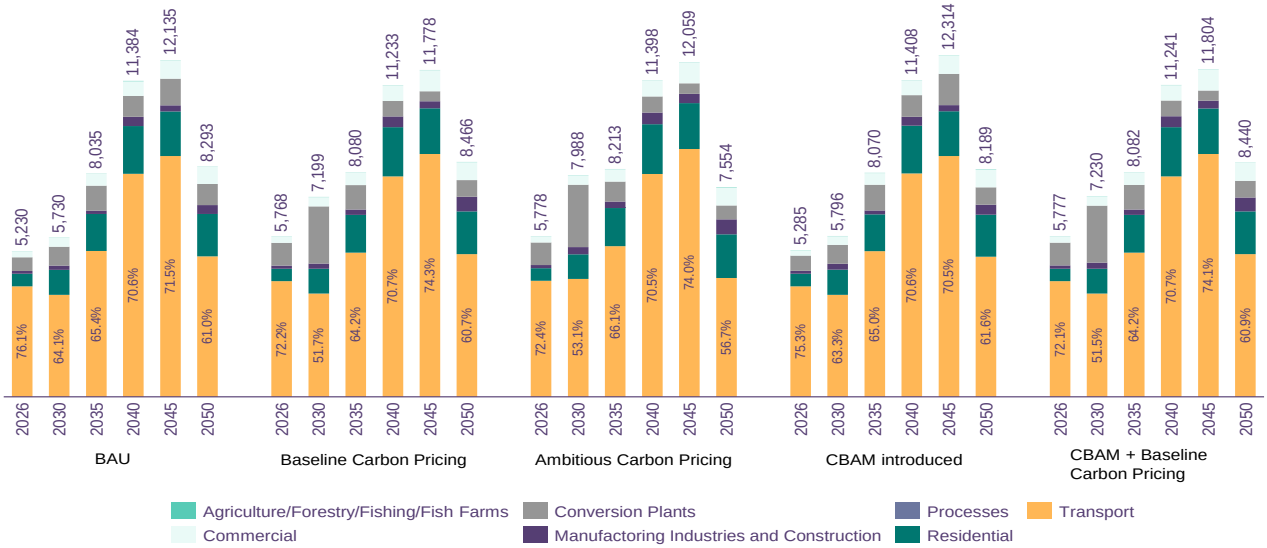


Note: Due to slight adaptations in the emission factor due to the separation of CBAM from non-CBAM sectors, there are minor adjustments observed in the emissions for the year 2015.

4.2. Investments needed to decarbonize are substantial, particularly for transport, and the government should tap into multiple funding sources

The total value of investments required by 2050 is more than EUR 50 billion, of which two-thirds would be needed for decarbonizing the transport sector. The largest brunt of investments is expected in the period of 2035-2045, with EUR 12 billion between 2040 and 2045, cumulatively. Investments in power plants, accounting for around 10 percent of total investment needs, range from approximately 363 to 2,251 million EUR (Figure 39). The variation in investments in power plants depends on the level of carbon price set under different years: in the Ambitious Carbon Pricing scenario, the biggest investments in conversion plants should be realized in the period 2026-2030. The level of investment in the residential sector is around 450 to 1,794 million EUR, while the investments in manufacturing industries and construction vary from 104 to 530 million EUR. The decarbonization of the transport sector is the most demanding. The investments in this sector vary widely across scenarios, ranging from approximately 3.67 to 8.93 billion EUR. These investments are crucial for the transition to cleaner and more sustainable transportation means, especially for the introduction of electric and hydrogen vehicles.

Figure 39. Investments by sectors (5-year cumulative, millions of current EUR)



Introducing carbon pricing incentivizes additional investments in several sectors of the economy, in particular for conversion plants, transport, manufacturing and construction. Relative to the BAU, incremental investments under the Baseline Carbon Scenario total 1.7 billion EUR largely directed to conversion plants as fossil-fuel based energy generation is phased out. Additional investments (e.g., from firms looking to minimize compliance costs) under an ambitious carbon tax scenario peak earlier relative to the baseline carbon tax as most of the investments are frontloaded. The Ambitious Carbon Pricing scenario suggests lower investments in 2050 for the transport sector where the decarbonization is most costly overall.

4.3. Carbon pricing increases electricity prices, but macroeconomic impacts are relatively small

Electricity prices will increase, but they are shaped by a combination of factors, including but not limited to the level of the carbon price. While Baseline and Ambitious Carbon Pricing leads to higher prices that reflect the cost of carbon emissions, the introduction of CBAM can have varying effects on prices, depending on its implementation and industry responses. The price projections indicate varying electricity price trends. By 2050, under the BAU, electricity prices for the industry are expected to decrease to 38 EUR/MWh; in contrast, the introduction of Ambitious Carbon Pricing could lead to a price of 137 EUR/MWh in the same year (Figure 40). Prices under different scenarios is almost the same for the households reaching 186 EUR/MWh in 2050 under Baseline Carbon Pricing (Figure 41).

Figure 40. Electricity prices for the industry sector under different scenarios, EUR/MWh

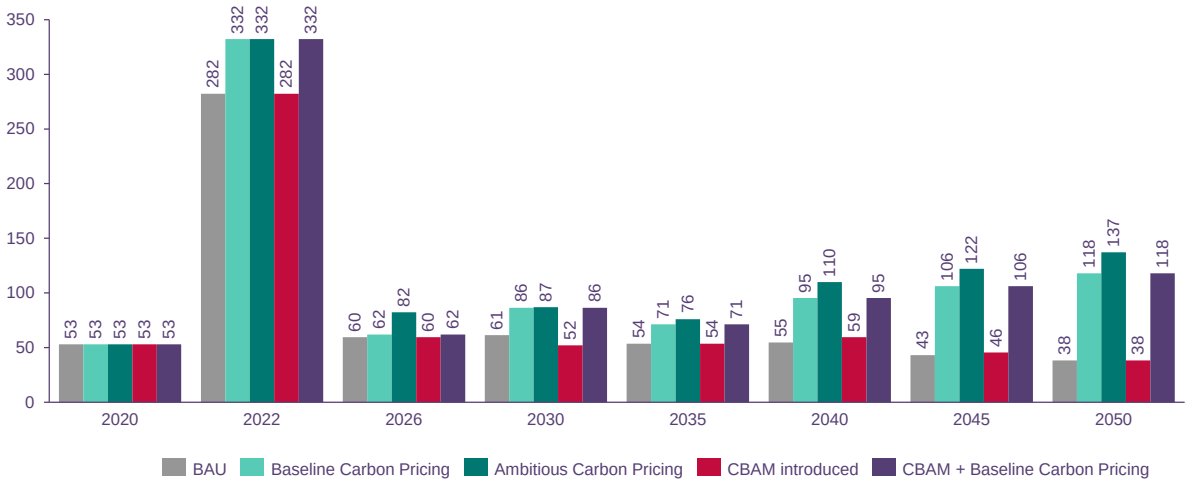
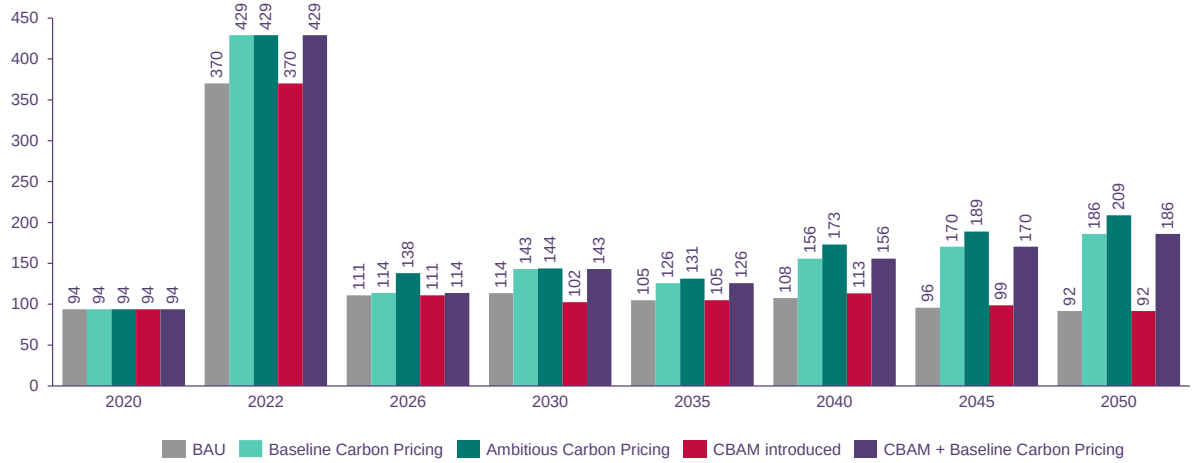


Figure 41. Electricity prices for the households under different scenarios, EUR/MWh



Higher carbon prices improve fiscal space but slow economic growth. In the absence of domestic policy intervention, the introduction of the CBAM results in the economic growth 0.2 percent lower relative to the baseline by 2050 (Figure 42), while emissions are reduced by 5.6 percent (Figure 45) and budget balance is 0.3 percent lower by 2050 compared to BAU (Figure 43). Under the Baseline Carbon Pricing scenario, output will be 2.1 percent lower than in BAU, unemployment rate increases by 0.1 percentage point (Figure 44), while emissions drop by 54 percent (Figure 45), and budget balance improves by 2 percent of GDP compared to the baseline by 2050. Ambitious Carbon Pricing leads to higher output losses (by 2.7 percent compared to the baseline by 2050), and significant emissions reductions of up to 61 percent relative to the baseline in 2050. Additional revenues generated by ambitious carbon tax, primarily from the transport, manufacturing, and energy sectors, lead to an improved budget balance by 3.4 percent of GP by 2050. The impact on the labor market remains largely the same as in the baseline carbon pricing scenario. This clearly calls for looking at revenue recycling options to minimize the adverse impacts.

Figure 42. Real GDP, percent deviation from baseline

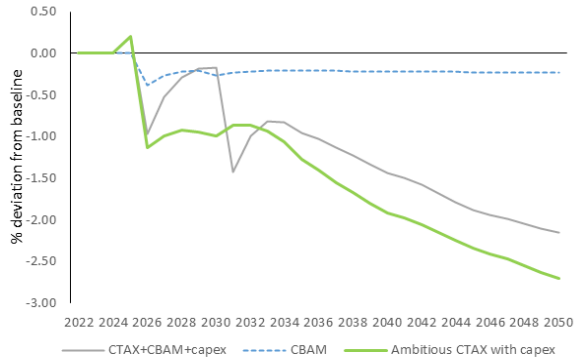
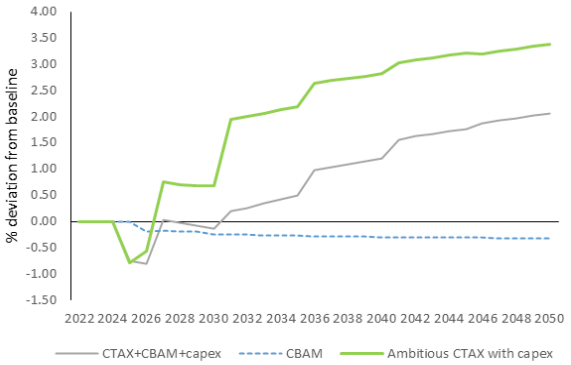


Figure 43. Budget balance, percentage point of GDP deviation from baseline



Source: World Bank staff estimates.

Figure 44. Unemployment rate, percentage point deviation from baseline

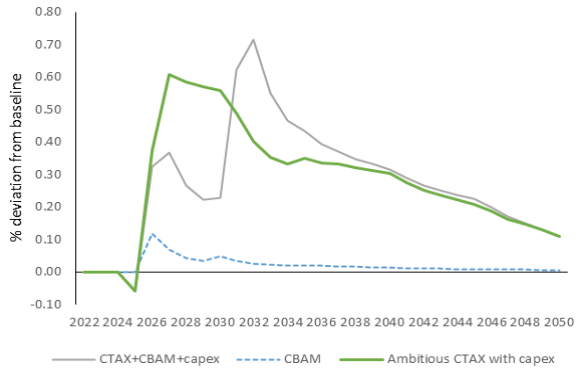
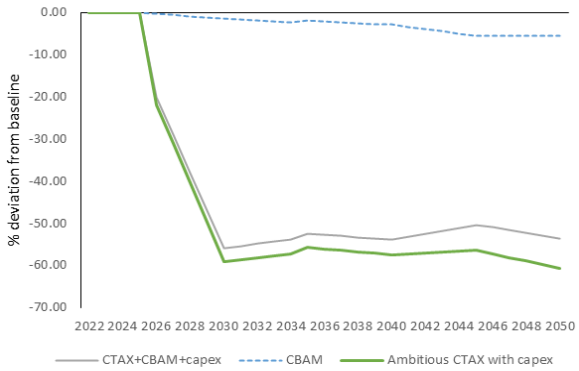


Figure 45. Emissions, percent deviation from baseline



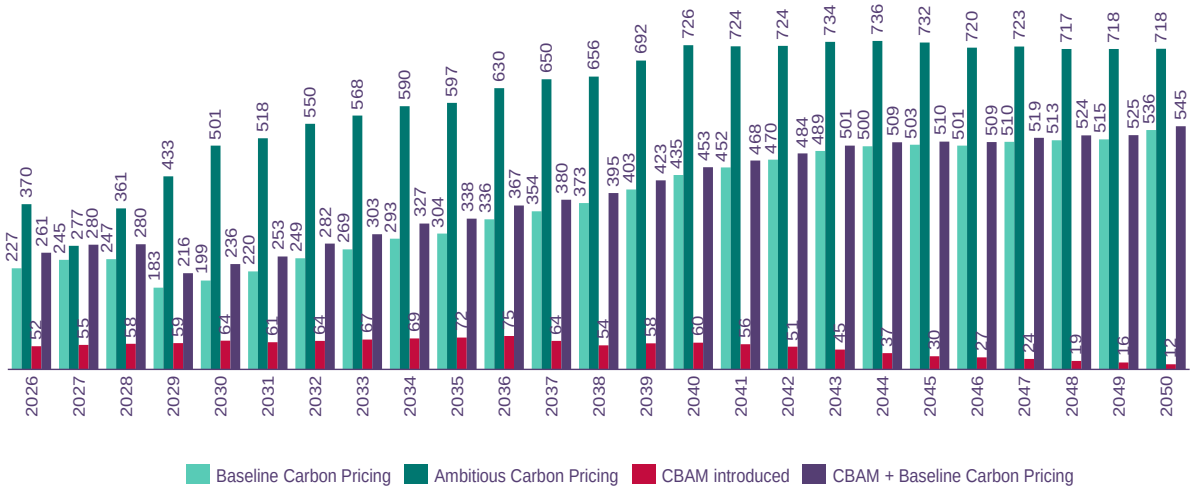
Source: World Bank staff estimates.

4.4. Carbon pricing provides an important source of revenue that can help improve fiscal space and manage distributional impacts

Revenue from carbon pricing can provide between EUR 530 and 730 million a year, depending on the level of the carbon price (Figure 46). Importantly, under the CBAM scenario, companies are paying around EUR 100-170 million a year, but this is a tariff paid to the EU and does not help the North Macedonia's fiscal position. Despite the rise in carbon price, over time as the economy decarbonizes, a declining revenue base also slows the growth of these revenues. This is especially the case for the CBAM scenario, where the revenue is reduced to EUR 12 million in 2050.

The revenue generated can be used for different purposes: from supporting green technologies to providing support to vulnerable consumers or boosting energy efficiency. In all scenarios, subsidies for electricity generation from renewables in the form of feed-in premiums are projected to be around EUR 380 million.

Figure 46. Annual carbon tax revenue under different scenarios (millions of current EUR)

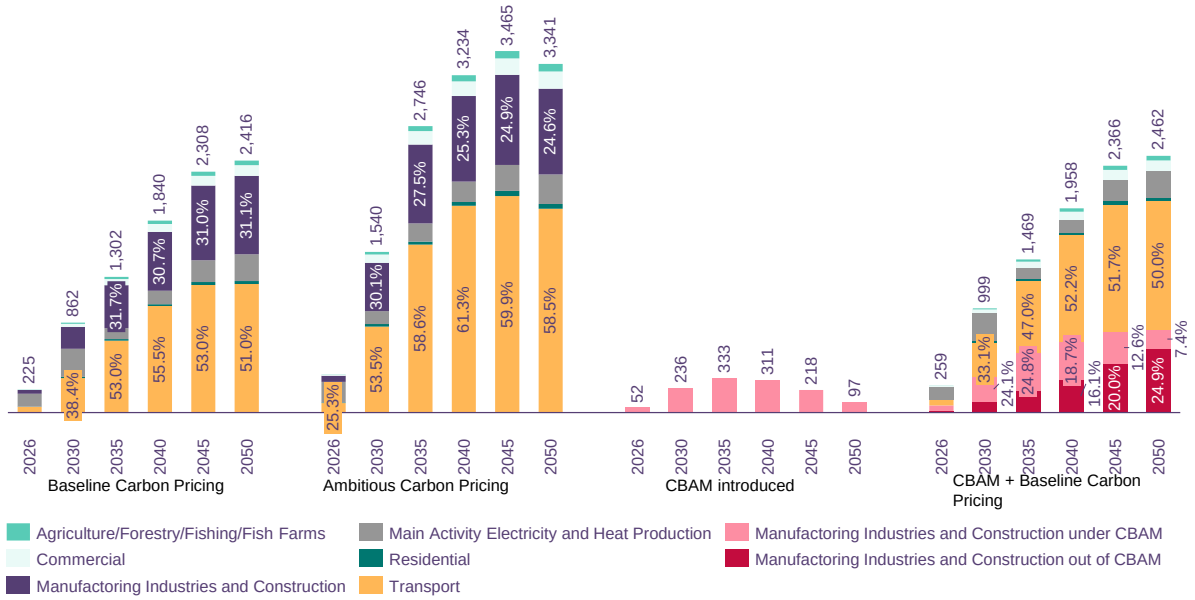


Note: Annual carbon tax revenues include the tax from aviation, while Figure 50 does not include the aviation carbon tax revenues.

The revenue collected from carbon pricing mechanisms varies across different sectors, reflecting their contributions to GHG emissions and their responses to carbon pricing incentives. Around half of the carbon revenues come from the transport sector in the Baseline Carbon Scenario (Figure 47), while manufacturing industries and construction account for almost a third of carbon revenues. With Ambitious Carbon Pricing, revenue is even higher, with transport accounting for 59 percent of total reaching EUR 390 million a year by 2050. As mentioned earlier, despite implementing measures such

as electrification in the transport sector, emissions are expected to remain high, establishing this sector as the primary contributor to revenue. While this makes it a lucrative sector from a revenue standpoint, allocating funds for more ambitious electrification and the widespread use of hydrogen could lead to a substantial reduction in revenue.

Figure 47. Revenue from carbon tax under different scenarios by sectors (millions of current EUR, 5-year cumulative)



Note: Does not include the carbon tax revenues from aviation.

Carbon pricing can raise revenue in a more efficient manner than alternatives. The additional revenue collected from a carbon price can be used to achieve various objectives. As with all fiscal decisions, there are complexities and competing priorities. Choice of revenue use does not affect emissions outcomes, but it can affect economic ones, and each choice has trade-offs. For example, the government may (i) reduce debt, saving money in interest payments, and borrow at a lower cost; (ii) transfer the funds to households directly, targeting lower income households (a progressive approach) or giving each household equivalent compensation; (iii) subsidizing firms to boost energy efficiency or green innovation; or (iii) reduce other taxes during the transition period.

The economic impact of carbon taxes depends on how the government spends the resulting revenue. To test the potential impacts of different revenue uses, modeling simulated three different policy options to highlight the economic responses assuming 100 percent of the *ex-ante* carbon revenues are: (i) used to boost energy efficiency of households and firms in equal amounts;[114] (ii) allocated to vulnerable households; and (iii) invested into green research and development.[115]

Each choice of revenue use has distinct impacts. Transferring money to households at the bottom of income distribution can cushion the negative impact of electricity price increases due to a carbon tax on household living standards and thus consumption. Under the Baseline Carbon Pricing scenario this approach reduces the consumption loss from 3 percent to 1.9 percent by 2050 compared to the

[114] To estimate the rate of returns the simulation uses the following evidences: https://www.semanticscholar.org/paper/Return-on-investment-from-industrial-energy-from-Alcorta-Bazilian/7ff813c215a6c255d4d306a2e5f1954588e2a8e2 and https://epic.uchicago.edu/wp-content/uploads/2019/07/Research-Summary-4.pdf.

[115] This simulation follows Van der Mensbrugghe (2018) and Peszko et al. (2020) based on the assumption that research and development promotes the accumulation of human capital (e.g. through education and training), which translates into productivity spillovers. Peszko, Grzegorz; van der Mensbrugghe, Dominique; Golub, Alexander. 2020. Diversification and Cooperation Strategies in a Decarbonizing World, Policy Research Working Paper 9315, World Bank, July 2020. https://openknowledge.worldbank.org/handle/10986/34056

baseline (Figure 48). Financing firms' research and development expenditure affects output positively leading to a lower output loss by 1.1 percent in domestic activity by 2050 but increases the fiscal deficit (Figure 49). Investments into energy efficiency of households and firms improve output growth, boost fiscal revenues through higher consumption, but has somewhat lower impact on the employment growth (Figure 50).[116]

Figure 48. Real GDP, Baseline Carbon Pricing, percent deviation from baseline

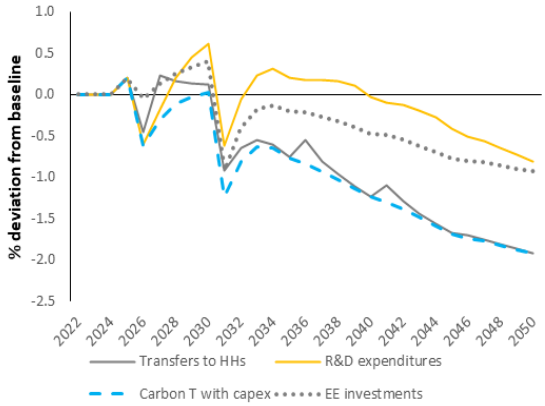
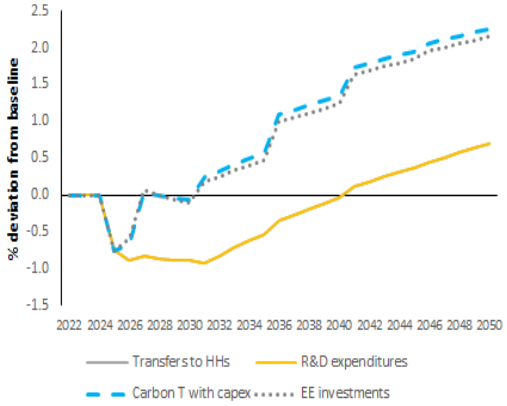


Figure 49. Budget balance, Baseline Carbon Pricing, percentage point of GDP deviation from baseline



Source: World Bank staff estimates.

Figure 50. Unemployment rate, Baseline Carbon Pricing, percentage point deviation from baseline

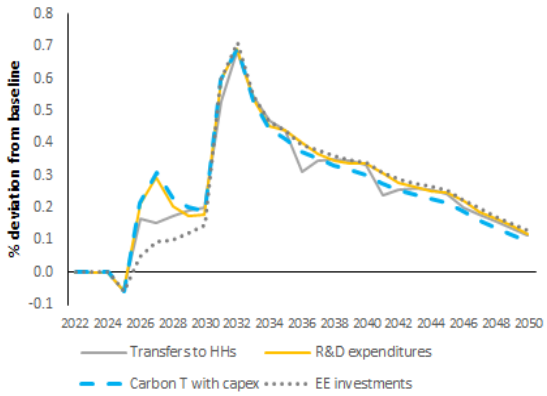
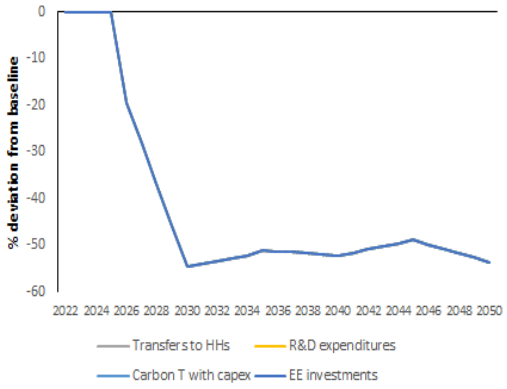


Figure 51. Emissions, Baseline Carbon Pricing, percent deviation from baseline



Source: World Bank staff estimates.

Without revenue recycling, introducing a carbon price could reduce household total consumption by around 3 percent (under the Baseline Carbon Pricing scenario and CBAM in 2030). Applying the IMF-World Bank Climate Policy Assessment Tool (CPAT)[117] to estimate the household consumption incidence effects,[118] almost all the consumption losses can be explained through higher electricity bills

[116] These calculations reflect an assumption that the elasticity of productivity with respect to knowledge accumulation is 0.3, meaning a 1% increase in knowledge accumulation translates to a 0.3% increase in productivity.

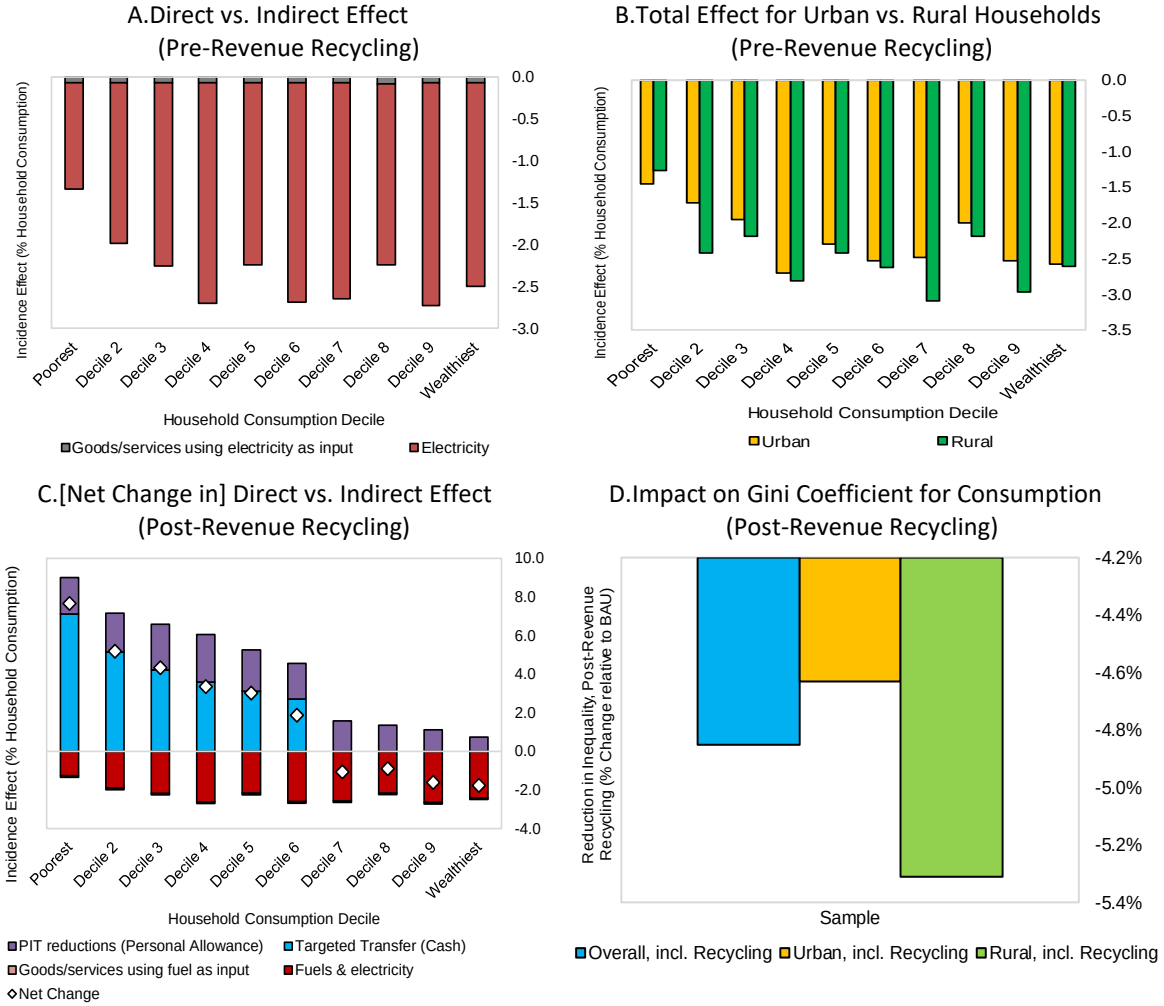
[117] CPAT has been jointly developed by IMF and World Bank staff and evolved from an earlier IMF model. CPAT (or earlier versions of it) have been routinely used in bilateral and multilateral analysis of climate mitigation policies. A more detailed description of the model is available in Black et al (2023) and official documentation compiled by the World Bank's CPAT team.

[118] Specifically, annual household consumption incidence effects were calculated based on a static microsimulation model, which combines the expected electricity price increase of 25.92 percent above Business-As-Usual/BAU in 2030 from the World Bank Macro-Fiscal Model (MFMod) with household budget survey (HBS)

faced by households (*the direct incidence effect*) as opposed to the consumption of electricity-intensive non-energy/fossil fuel products by households (*the indirect incidence effect*). This pattern holds across all deciles (Figure 52, Panel A). Importantly, these economic impacts can significantly impact the community and political acceptance of carbon pricing. Businesses and households are highly politically sensitive to energy price increases and such impacts must be managed and communicated effectively land strategically.

Figure 52. North Macedonia: Distributional Impacts Analysis, 2030

(In Percent [of Household Consumption] and Gini Points, for the "CBAM + Baseline Carbon Pricing" Scenario)



Source: World Bank staff estimates based on the IMF-WB Climate Policy Assessment Tool (CPAT). *Note:* Positive (negative) incidence "effects" represent gains (losses) in percent of total household consumption. See Appendix 1 for details on the methodology.

Household consumption losses seem to be relatively progressively distributed, but generally higher within the (poorer) rural household sample. Specifically, average losses for the top 30 percent of the consumption distribution are roughly 35 percent higher than those of the bottom 30 percent. This could be explained mainly by the disproportionately large share of direct electricity consumption in wealthier household consumption baskets. The middle class (deciles 4-7) is expected to face the highest losses, at around 2.6 percent of total consumption on average. This pattern is more likely to hold within rural areas (Figure 52, Panel B), highlighting the likelihood of spatial incidence effects. The above-mentioned findings point to the need of designing means-tested or place-based compensation

and input-output table (IOT) data in CPAT's Distribution Module. The Annex IV contains further information on the methodology and data conventions applied in the analysis.

mechanisms that could be deployed the ensure a 'just transition' process and political acceptability for the simulated policy scenario.

Using revenues raised by the Baseline Carbon Pricing scenario for compensation could substantially reduce household consumption losses (Figure 52, Panel C). The MFMod-simulated policy Scenario of using carbon revenues as transfers to households would raise revenues (above BAU) by approximately 2 percent of GDP by 2050. Assuming that half of these revenues are recycled into targeted cash transfers to the bottom 60 percent of the consumption distribution and half into reducing the burden from payroll tax liabilities across the entire population by increasing the nontaxable personal allowance (see Annex IV) could more than offset the consumption losses from higher electricity prices. More precisely, deciles 1-6 would enjoy net gains ranging between 7.65 and 1.87 percent of total household consumption. This finding is, in part, due to the targeted nature of the cash transfers to the first 6 deciles. In a similar vein, consumption losses for deciles 7-10 would halve relative to their level in the absence of revenue recycling – a feature entirely accounted for by reductions in their payroll liabilities (relative to the BAU).

The progressive character of the revenue recycling simulated here is reflected in a decrease in the Gini coefficient for household consumption of approximately 4.85 percent compared to BAU. Household consumption inequality is expected to fall mostly for the rural sub-sample (around 5.31 percent Gini drop) as opposed to the urban sub-sample (around 4.63 percent Gini drop) (Figure 52, Panel D).

5. Policy priorities

Addressing legal and political commitments to reduce carbon emissions, while preserving jobs, growth, and fiscal sustainability will require careful prioritization of policies and investments. Policy priorities related to the public finances identified in this report are a subset of a more comprehensive set of policies required to decarbonize and build resilience. The priorities identified in Table 7 below do not attempt to provide a complete strategy to address North Macedonia's climate change objectives and provide additional insights that complement other recent analyses, including the Country Climate Development Report (CCDR) for the Western Balkans. The policy priorities in this report are selected with the focus on achieving the following three objectives:

(i) Reducing exposure to, and impacts of, climate risks (physical and transition risks);

(ii) Improving fiscal policies, frameworks, and institutional arrangements to deliver on climate objectives, including Paris Agreement goals; and

(iii) Preparing North Macedonia for the EU accession.

To achieve those objectives, three priority categories require action in the following order: (i) strengthening institutional foundations; (ii) adjusting policies; and (iii) mobilizing financing.

Table 7. Short-to-Medium Term Policy Priorities

Policy priority	**Description**	**Timeframe (Short or medium)**	**Targeting (Risk management, fiscal reform, EU accession)**	**Lead institutions**
		Institutions		
Promote climate risk reporting and disclosure of climate risks	• Develop the green taxonomy to avoid greenwashing. • Require reporting and disclosure of climate risks by banks to help the private sector manage both physical and transition risks and shift the risk away from government • Introduce ESG reporting by corporate sector to disclose risks and raise awareness	ST MT MT	EU accession Risk management Risk management	MOF/NBRNM/ Ministry of Environment and Physical Planning (MOEPP) NBRNM MOE (Economy)
Build fiscal risks assessment capacity	• Strengthen the modeling capacity in the MOF to understand and undertake macro-fiscal risk assessments stemming from climate change.	MT	Risk management	MOF
Introduce budget and climate action monitoring	• Introduce and implement Climate Budget Tagging and align it with green taxonomy	ST	Fiscal reform	MOF and Local Government
Establish planning and investment framework	• Include climate-related contingent liabilities (explicit and implicit) in budgets and fiscal projections to be better prepared when they materialize • Develop a disaster risk financing plan, which considers risk layering and regional pooling, to manage contingent liabilities and protect social spending.	MT ST MT	Fiscal reform Fiscal reform Risk management	MOF/Local Government MOF MOF

	• Promote climate system proofing to enhance resilience across all new capital infrastructure investments.			
Establish disaster response mechanisms	• Consider mechanisms that allow for quick financial response to disasters and access to social protection payments	ST	Risk management	MOF/MOEPP/Local Government
		Policy		
Implement carbon pricing to help manage transition risks	• Establish a carbon price domestically to reduce liability under CBAM.	ST	EU accession Risk management	MOF/ MOEPP/MOE
Adopt the climate policy-critical legislation	• Adopt the REDII, the Energy Efficiency Directive, the MRVA package and ETS readiness, as well as the new TEN-E Regulation.	ST	EU accession Risk management	MOEPP/MOE
Progress vehicle tax reform	• Build on October 2023 amendments to extend the motor vehicle tax to light commercial vehicles and increase the pollution tax component	ST	Fiscal reform	MOF/ MOE
Reform fuel taxes	• Bring base excise rates of diesel closer to the rate for petrol before or when applying pollution pricing. • Provide a rebate for fuel used as a feedstock to ensure non-combusted fuel is not charged.[119]	ST	Fiscal reform	MOF
Remove fossil fuel subsidies	• End subsidies to coal-fired electricity to prevent distortion or dilution of the price signal provided through the excise system (or other environmental policies).	ST	Fiscal reform	MOF/MOE
Shift responsibilities to the private sector, where possible	• Introduce policies to promote uptake of private sector insurance. • Mandate minimum level of insurance to increase uptake of private insurance	ST MT	Risk management Risk management	MOF/MOE/MOA MOF/MOE/MOA
Secure just transition	• Compensate low-income households for increased energy costs to be affordable. • Invest in vocational education, enhanced non-formal education, early retirement options, and upskilling/reskilling packages for affected workers	MT MT	Risk management Risk management	MOF/MOE/MLSP/Local Government MOF/MOEPP/MOE
		Financing		
Develop new instruments to fund the climate and resilience finance gap	• Develop the market for green bonds • Develop Green Equity Fund • Operationalize Energy Efficiency Fund to fund EE investments including for the residential sector	ST MT ST	Fiscal reform Fiscal reform Fiscal reform	MOF/NBRNM MOF/MOE/FITD MOF/MOE/DBRNM

[119] World Bank (2021). North Macedonia: Environmental Tax Reform Options and Outcomes.

	• Develop budgetary instruments that account for climate related physical risks such as contingency funds, traditional insurance, and insurance in the form of catastrophe risk bonds and regional risk pools that help to transfer risk and enable fast recovery.	MT	Fiscal reform	MOF/MOEPP
Prioritize green R&D	• Reallocate state aid for green R&D from existing state aid programs	MT	Risk management	MOE/FITD
Promote renewable energy	• Retain an existing premium support scheme for renewable energy sources in the short to medium term to promote investment certainty but evaluate its role over time	MT	Fiscal reform	MOE
Strengthen public finance's role in boosting climate response	• Enhance and implement Green Public Procurement	ST	Fiscal reform	MOF/Local Government

Adverse climate risks to the North Macedonia's economy and public finances are clear. Addressing the risks to the economy from the global low-carbon transition requires reducing the exposure of vulnerable sectors while building the industries that will thrive in a low carbon world. Increasing MoF's understanding of climate-related risks to improve its input on policies, budgets, and regulations is of paramount importance. Smart fiscal policies can help absorb climate-related losses while ramping up efforts toward climate objectives. From making fossil fuel subsidies obsolete to developing new fiscal policies that drive climate action in the country to diversifying the sources for public financing with new types of financing instruments, the ambition is to mitigate the negative externality caused by climate change. Some key policies have already been embraced; others should be, as soon as possible.

Pricing carbon is an immediate priority. Not only due to the imminent exposure to a carbon border adjustment to be faced from 2026 by Macedonian exporters to EU, but also to incentivize climate actions. The importance of carbon pricing is recognized in the government's Tax System Reform Strategy (2020–2023), which includes environmental taxation as one of its five priority areas for reform. Introducing a price on fuels that reflects GHG emissions aligns with the objectives of this priority area. A carbon price has already been included as an element of North Macedonia's new climate action law but has not yet been implemented.

Adopting climate budget tagging (CBT) as a government-led process of identification, measurement, and monitoring of climate-relevant public expenditures would help with monitoring public funding that is allocated to climate action. North Macedonia should amend the existing legal framework to make CBT a legally binding part of the budget formulation process and incorporate climate change into the MOF's budget template. This will involve enabling use of specific codes or tags that indicate that a particular expenditure is related to climate change mitigation, adaptation, or both. It is also necessary to enhance the capacities of administrative personnel working on budget programming and development with necessary training for climate change and CBT. Further, any future green taxonomy for public finance should be aligned with adopted CBT to avoid inconsistency in financial markets and national planning.

Building strong institutions, mobilizing financing, and investing in research and innovation are critical. North Macedonia must inform the Public Debt Strategy and the Accelerated Growth Strategy with climate change policies such as the strategy for financing the ENDC and the recommendations from the de-risking investments in renewables, transport, waste, agriculture, forestry, and industrial

processes are taken into account. Investing in knowledge and skills about green development and putting in place internal processes and systems to assess and show that every public financing flow is Paris-aligned would be highly recommended. Finally, greater budget allocation for research and innovation and policy measures that will stimulate higher investments in research and innovation activities by the research and business sectors are vital for faster climate action.

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Annex I. Mapping ENDC measures Against Investment Criteria

	Data from ENDC			North Macedonia ENDC Goals		Commercial Appeal to Private Sector		Intl Finance	Govt Policy Leverage		
ENDC measures and policies	Cost/ budget € million	No of Jobs	GHG emission Reductions (tons)	1. Contributes most to ENDC GHG targets	2. Maximizes jobs	3. Rapidly declining cost curve	4. High return or low risk technology	5. Appeals to intl finance sources	6. High leverage through regulation	7. High leverage thru carbon tax	8. High leverage thru carbon
Reduction in network losses	€170.0	N/A	323.4								
Large hydro	€1716	N/A	740.7								
Feed in Tariff and Feed in Premiums	€312.1	372	383								
Biomass CHP	€24.3	28	21								
Rooftop solar	€318	443	142								
RES w/o incentives	€1046	1377	189.2								
Solar thermal	€34.8	401	7.2								
Heat pumps	€330.6	38	392.3								
New construction	€282.7	553	19.8								
New passive buildings	€1068	1324	17								
Street lighting municipalities	€19.5	9	32.5								
Replace incandescent lights	€558	274	401.8								
Retrofitting residential buildings	€941.8	1576	49								
Retrofitting commercial buildings	€530	482	98.2								
Central heating	€3.2		9.3								
Energy mgmt, manufactng industries	N/A	N/A	67.8								
Efficient electric motors	€99.7	N/A	14.9								
Intro of advanced technologies	€344.8	N/A	128.3								
Renew car fleet	€1659.5		24								
Railways	€180.6		37.2								
Renewal national fleet	€1660		24								
Advanced mobility			3.6								
Renewal, other fleet	€2300		64.6								
Electrification of transport	€4132		41.9								
Reduction of CH_4 emissions from dairy cows	€.2		41.9								
Reduction of N_2 from swine	€1		2.1								

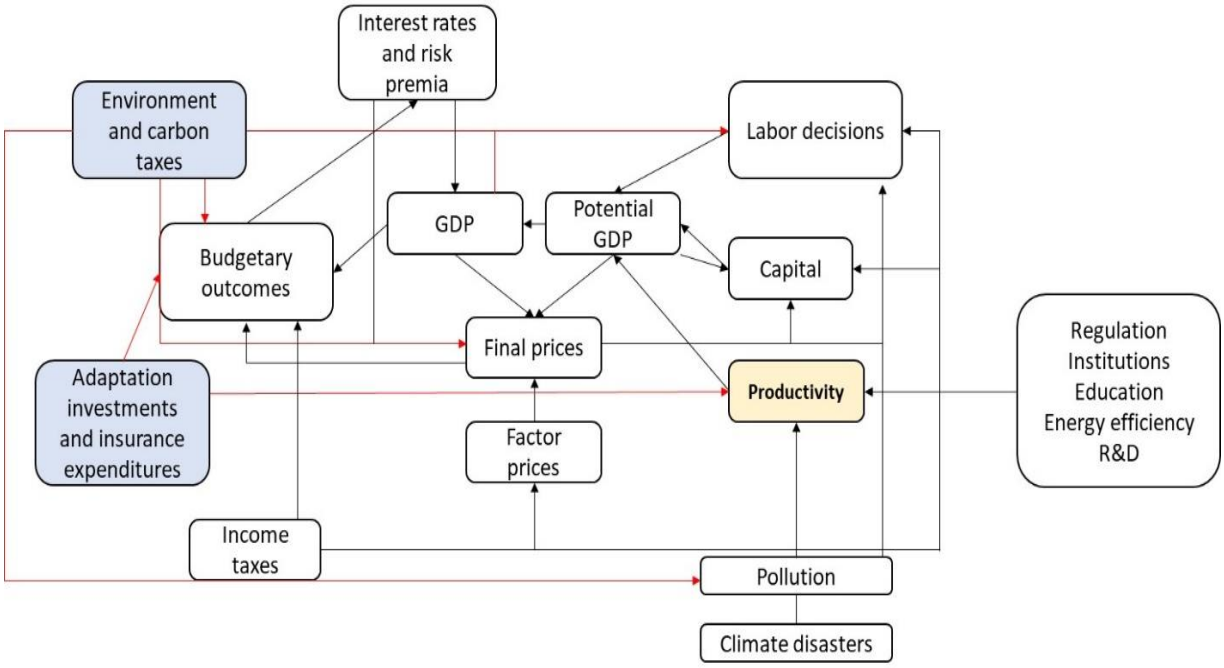
Integrated management of forest fires	€1.5		345								
Afforestation	€7.8		312								
Biochar for carbon sink, agricultural land	€47		110								
Solar irrigation	€47		93.3								
Landfill gas flaring	€20.5		489.7								
Treatment w/ composting	€36.1		108								
Selection of waste - paper	€2.0 €2.1		62.5								

Annex II. Description of the World Bank's Macroeconomic and Fiscal Model with Climate Policy Modules

Several extensions to the World Bank's Macro-Fiscal Model (MFMod) were made to introduce climate policy, which include:

- A top-down modeling of energy demand is split between hydrocarbons and renewables in a nested constant elasticity of substitution framework. A carbon tax drives a wedge between fossil fuel prices and renewables, leading to a substitution away from fossil fuels to renewables and hence a change in the energy mix. The energy block is split into electricity and non-electricity. The model accounts for direct fossil fuel emissions as well as the changes in pollution by tracking particulate matter less than 2.5 micrometers in diameter.
- Exports are split into several sub-categories to model the impact of a carbon border adjustment. North Macedonia loses export competitiveness if the EU imposes a border tax on exports with significant embedded carbon.
- A rudimentary transport module is added to model the economic impact of equalizing the fuel levy. Number of vehicles by fuel type and the passenger kilometers traveled are explicitly modelled.

Figure 53. Modeling interactions



Source: Author's elaboration.

There are additional modules in MFMod: the energy-emissions block; mapping commodity quantities to value-added activity; carbon emissions; tracking air pollution from hydrocarbons; damages due to pollution: working days lost and cause of death.

A bird's eye view of the model is depicted in the Figure 53 above. MFMod's long-run is anchored on neo-classical principles where households make intertemporal choices based on a budget constraint and firms minimize profits. The components of GDP are explicitly modeled from the expenditure, income, and production side. The model has a balanced growth path that links real growth components to that

of real potential GDP growth, which is a function of structural employment, the capital stock, and total factor productivity. [120]

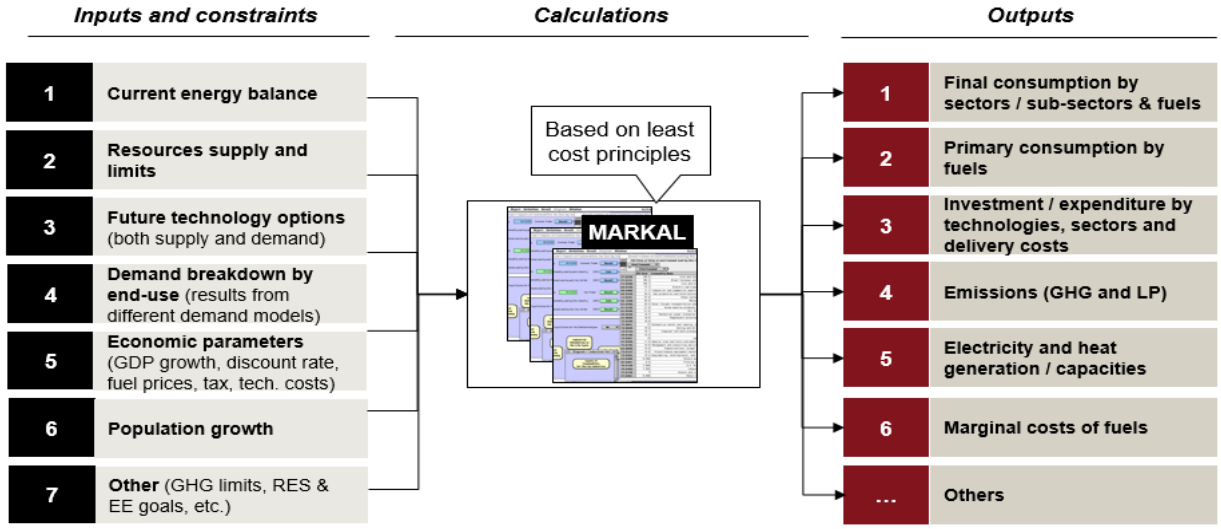
[120] Burns, Andrew; Campagne, Benoit; Jooste, Charl; Stephan, David; Bui, Thi Thanh. 2019. The World Bank Macro-Fiscal Model Technical Description. Policy Research Working Paper 8965. World Bank, August 2019. https://documents1.worldbank.org/curated/en/294311565103938951/pdf/The-World-Bank-Macro-Fiscal-Model-Technical-Description.pdf

Annex III: MARKAL Model

The MARKAL-North Macedonia model was developed for these simulations. The MARKAL model produces robust, scenario-based projections of a country's energy balance, fuel mix, and energy system expenditures over time. The model relates economic growth to the necessary energy system resources and investments, while satisfying national environmental standards (or goals), to identify the least-cost energy future for the country that satisfies all the requirements. The MARKAL-North Macedonia model includes the whole energy system starting from recourses through conversion technologies to end-use sectors. The base year in the model is 2012 and it is run to 2050 on a yearly basis.

The MARKAL objective is to minimize the total cost of the system, adequately discounted over the planning horizon. While minimizing total discounted cost, the MARKAL model takes into account a large number of input data as well as potential constraints (e.g. limits for GHG emissions, goals for renewable energy share and energy efficiency level) which express the physical and logical relationships that must be satisfied in order to properly depict the associated energy system. In the MARKAL North Macedonia model, only constraints related to resource potential are used. MARKAL analyses not only show what is to be constructed, but also when and for how much. Based on the engineering and economic representations of energy supply, conversion plants and end-use devices in each country, national experts can explore the least cost energy supply and demand balance that can satisfy the physical and policy requirements (Figure 54).

Figure 54. MARKAL model energy structure



Source: Strategy for energy development of the Republic of North Macedonia

The demand side of the MARKAL North Macedonia model is divided into five sectors: household, commercial, industry, transport, and agriculture. All but agriculture are divided into sub-sectors, in order to calculate useful energy demand more precisely. Furthermore, for each of the subsectors, end-use services are defined. Energy demand projection for each sector is calculated using GDP and population growth. For the household sector, the parameter of person per household is also used to calculate the number of households. To satisfy the useful energy demand, the model includes a considerable number of technologies on the demand side, including high-efficiency that use different fuels. The fuels include domestic biomass, lignite, electricity, heat, solar, geothermal, and almost all refinery products (gasoline, diesel, LPG, heavy fuel oil) and imported brown coal, coke, hard coal, lignite, natural gas, distillate, gasoline, heavy fuel oil, kerosene, LPG, aviation fuel, and electricity.

On the supply side, except the existing technologies, new potential technologies that run on lignite and gas are included, as well as hydro, wind, photovoltaic, and biomass/biogas technologies.

The MARKAL model can be used to analyze the elasticity of energy prices. The implementation of a carbon price would result in an increase in electricity prices, potentially influencing consumer demand. The more elastic the demand, the more individuals reduce their energy consumption for heating purposes in their homes or consider alternative fuel sources in response.

A sensitivity analysis was done related to the useful energy consumption in the industry and household sector and the impact on the electricity price in these two sectors. Results are as follows: In the BAU scenario, the useful energy consumption increases by 140 percent in 2050 compared to 2015. The introduction of carbon price at an ambitious level could reduce useful energy consumption by around 12 percent. For example, the iron and steel industry demonstrate varying levels of elasticity in energy demand. While the demand appears somewhat less elastic during certain periods, it becomes more elastic in others. This suggests that the industry can make efforts to adapt to changing energy prices. As a result of the flexible demand, the price in industry could be reduced by 37 percent in 2050 in the scenario with ambitious carbon pricing with elastic demand compared to the scenario without elastic demand. The situation is almost the same at the household sector. In the case where aggressive carbon pricing is combined with demand flexibility, the result shows that households become highly responsive to price changes, actively adjusting their energy usage to minimize costs. The useful energy consumption is decreased by 4.5 percent in 2050 with the introduction of carbon price at an ambitious level. As a result of carbon pricing and the possibility for flexible demand, the electricity price of households could be reduced by 29% in 2050 in the scenario with ambitious carbon pricing with elastic demand compared to the scenario without elastic demand.

Annex IV. CPAT Distribution Module Methodology[121]

The variation in consumption (gain if positive; loss if negative) for household consumption deciles d = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10} from changes in end-user electricity prices under the "CBAM + Baseline Carbon Pricing" Scenario is estimated as:

$$\text{(A)} \qquad \sum_g \pi_t^{dg} \cdot \rho_t^{dg}$$

where *g* stands for the main categories of goods/services consumed by households, π_t^{dg} is the share of decile *d*'s total consumption spent on good/service *g* at time *t*, and ρ_t^{dg} is the relative price change for good/service *g* due to the "CBAM + Baseline Carbon Pricing" Scenario. For example, for a good with a budget share of 2 percent of total household consumption, expression (A) implies that a 5 percent increase in said good's price will reduce decile d's consumption by 0.1 percentage points.

Data on household budget shares was obtained from the 2019 Household Budget Survey (HBS) for North Macedonia[122]. After the data is aggregated into CPAT-compatible good/service categories[123], households are grouped into population-weighted, per-capita consumption deciles and budget shares are computed by dividing total consumption expenditure on each CPAT good/service category by each household's total consumption expenditure across all goods/services.

The percent price change for electricity under the "CBAM + Baseline Carbon Pricing" Scenario is calculated relative to a Business-As-Usual scenario (assuming the absence of new – or tightening of existing - climate mitigation policies) and set to 25.92 percent, in accordance with output from The World Bank Macro-Fiscal Model (MFMod). Calculating (A) above in terms of the electricity price change and HBS budget shares for electricity (Table 8) yields an estimate of the loss in household consumption from higher household electricity bills (i.e., the "direct" household consumption incidence effect).

Table 8. North Macedonia: Budget Shares for Household Fossil Fuel Consumption by Product and Decile

(In percent of total household consumption)

Product | Decile	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10
Coal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity	5.8	8.8	10.1	12.1	10.0	12.1	11.8	10.0	12.2	11.2
Natural Gas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-Road Oil	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.1
Gasoline	3.2	3.3	3.2	2.7	3.8	3.0	4.7	3.3	3.8	3.6
Diesel	2.7	1.4	2.5	1.7	1.3	1.8	1.1	1.8	0.9	1.2
Kerosene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

[121] The methodology described here is primarily based on Coady and Newhouse (2006) and applied within several other studies (e.g., Parry, Mylonas and Vernon (2019), Mercer-Blackman, Milivojevic and Mylonas (2023), and IMF (2019b)). For more information on the overall CPAT methodology, see Black et al (2023) and official documentation compiled by the World Bank's CPAT team.

[122] Source information available here.

[123] To facilitate relative cross-country comparability of results, CPAT uses a standardized classification of goods and services across all countries, distinguishing among 8 fuel (coal, electricity, natural gas, oil, gasoline, diesel, kerosene, LPG) and 14 non-fuel (appliances, chemicals, clothing, communications, education, food, health services, housing, other, paper, pharmaceuticals, recreation and tourism, transportation equipment, public transportation) good/service categories. This classification is, in part, informed by the implicit carbon intensity of non-fuel goods/services (i.e., goods/services with similar carbon intensities are classified under the same category).

LPG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: World Bank staff estimates using CPAT and the 2019 national Household Budget Survey (HBS).

Price increases for other consumer goods/services (due to higher electrical energy input prices) are calculated, assuming full pass-through of producer electricity-related cost increases onto consumer prices domestically (i.e., flat/perfectly elastic supply curves). In particular, non-energy price increases are obtained as the sum-product of: i) each sector's input intensity in electricity; and ii) the price increase of electricity of 25.92 percent under the "CBAM + Baseline Carbon Pricing" Scenario (relative to BAU). Sectoral electricity intensities are generally obtained from input-output tables (IOTs)/direct requirements matrices. For North Macedonia, these matrices were sourced from the GTAP-10 database[124], which includes 2014 data for 65 sectors[125] that are, in turn, mapped to the CPAT non-fuel consumption good/service categories mentioned above to re-estimate equation (A). Summing the estimates across all non-fuel goods/services yields a measure of the loss in household consumption from price increases of non-energy products (e.g., food, clothing, housing, etc.) due to electricity becoming more expensive under the "CBAM + Baseline Carbon Pricing" Scenario (i.e., the "indirect" incidence effect).

Adding up the direct and indirect effects yields an estimate of the total household consumption incidence effect. All incidence effects are scaled by household consumption decile (and consumption item)-specific price elasticities of demand (assuming a Constant Elasticity of Substitution (CES) utility function for households) based on USDA data.[126] The application of these elasticities implicitly adjusts the estimated incidence effects for household behavioral responses to higher electricity/non-energy prices as a result of climate mitigation policy (accounting for substitution to/away from given consumption items, but not substitution across specific consumption items).

In simulating the revenue recycling option considered in this analysis (new targeted cash transfer), the total amount of additional (relative to BAU) MFMod-generated revenues of 2 percent of GDP in 2050 (adjusted by the proportion chosen to be recycled: 50 percent) raised under the "CBAM + Baseline Carbon Pricing" was used as a proxy for the gross (monetary) household gain from revenue recycling. For the modeling of new, targeted cash transfers, recycled revenues were divided by the population of the targeted deciles (e.g., first six deciles for targeting of the bottom 60 percent of the distribution, assuming no leakage or under-coverage) and, subsequently, expressed in percent of decile-specific household per-capita consumption. Since this revenue recycling mode resembles a lump-sum, per-capita transfer to the working population, gains are likely to be, by default, progressively distributed. This is because said transfers tend to represent a larger proportion of poorer households' total consumption.

The analysis described above is subject to several shortcomings. First, in projecting the distributional analysis forward to year 2030, the fossil fuel intensities (as given by the input-output matrices) and decile-specific household budget shares are assumed to remain constant. This means that the use of input-output matrices likely overstates consumer price changes for non-energy goods/services, since the energy intensity of production would likely decrease due to the decarbonization process implicit in the "CBAM + Baseline Carbon Pricing" Scenario. Second, some of the incidence of carbon taxation could be passed backwards into lower producer prices, assuming upward-sloping supply curves in the medium-to-long run.

[124] The North Macedonia analysis within CPAT's Distribution Module relies on the IOT for the "Rest of Europe" (XER) region in the GTAP-10 database. This implicitly assumes that North Macedonia's energy intensity is comparable to the average energy intensity of the XER region (or, equivalently, that the XER regional IOT is representative of North Macedonia's economy).
See also Aguiar et al. (2019) and: https://www.gtap.agecon.purdue.edu/databases/v10/index.aspx

[125] These cover the following five fossil fuels: coal ("coa"), electricity ("ely"), oil ("oil"), natural gas ("gas", "gdt") and petroleum products ("p_c").

[126] See: https://data.ers.usda.gov/reports.aspx?ID=17825

If this results in lower capital returns, some of the incidence could be borne by capital owners or even workers (e.g., in the form of lower wages). See also additional commentary in Parry, Mylonas and Vernon (2019) and Shang (2023).

Annex V. Key assumptions for estimating CBAM Costs

CBAM compliance cost exposure in this analysis is estimated as follows:

$$CBAM\ cost_{i,g} = X_{i,g} \times EE_i \times Adj_i \times (CP_{EU} - CP_{i,g})$$

Where,

CBAM $cost_{i,g}$ is the indicative costs of imports of CBAM product *i* from country *g*.

$X_{i,g}$ is the amount of CBAM product i exported from country g to the EU, based on historical UN Comtrade data.

EE_i is the indicative embedded emissions of CBAM product i based on default values published by the European Commission.

[127] Electricity Emission factors based on IEA estimates.

Adj_i is the adjustment factor representing the proposed adjustment to account for the gradual phaseout of free allowance allocation under the EU ETS. It has been estimated at the sector level based on the benchmark-specific free allocation arrangements currently in place and the proposed phaseout schedule. A high and a low estimate is included indicative of the adjustment present in 2026 and 2035 (when free allocation has been completely phased out).

CP_{EU} is the estimated carbon price, based on the EU ETS allowance price. For simplicity this is assumed to be USD 100.

$CP_{i,g}$ is the estimated carbon price in the country of origin for CBAM product *i* from country *g*. For North Macedonia, this is assumed to be 0.

[127] Directorate-General for Taxation and Customs Union. 2023. Default values for the transitional period of the CBAM between 1 October 2023 and 31 December 2025. 22 December 2023. https://taxation-customs.ec.europa.eu/news/commission-publishes-default-values-determining-embedded-emissions-during-cbam-transitional-period-2023-12-22_en