MOBILIZING GREEN INVESTMENT IN CZECH REPUBLIC, HUNGARY, POLAND, SLOVAK REPUBLIC, MONTENEGRO AND MOLDOVA

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Editor of the publication: Prof. Gordana Djurovic, PhD.

Research team:

Gordana DJUROVIC (Montenegrin Pan-European Union, Editor), **Šárka SHOUP, Kristína MAJERČÍKOVÁ** (Institute for Politics and Society – IPPS, Prague, Czech Republic), **Katalin CZIPPÁN, Péter OLAJOS, Imre RIMÓCZI, Daniel SZIVA,** (Union of the Robert Schuman Institute for Developing Democracy in the Central-Eastern Europe, RSI, Budapest, Hungary), **Ewa DRYJAŃSKA Andrzej KASSENBERG, Wojciech SZYMALSKI, Ewa ŚWIERKULA** (Institute for Sustainable Development Foundation, ISD Foundation, Warsaw, Poland), **Karol MORVAY, Martin HUDCOVSKÝ and Roman KLIMKO,** (Faculty of National Economy, University of Economics in Bratislava, MESA10, Bratislava), **Milica MUHADINOVIĆ, Nina PERUNOVIĆ, Teodora LADJIĆ, Djordjije DJUROVIĆ, Petar RAIČEVIĆ,** (Montenegrin Pan-European Union), **Iordanca-Rodica IORDANOV, Natalia GURANDA, Irina PUNGA** (EcoContact – Aarhus Center for Information and Consultation, Chisinau, Moldova),

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CONTENT

I. INTRODUCTION 5

1. Objectives and importance of the EU environment and climate policy for the Member states and the Candidate countries 6

2. About the project 7

II. MOBILIZING GREEN INVESTMENT: LESSONS FROM THE VISEGRAD GROUP FOR MONTENEGRO AND MOLDOVA 9

..... 9

1. CZECH REPUBLIC: Mobilizing of Green Investment in the Context of EU Environment and Climate Policy 10

1. Introduction 10

2. Country context 11

3. Institutional and financial mechanisms 12

4. Case Study: Energy Efficiency Renovation of Public Buildings 14

5. Challenges and Barriers to Mobilising Environmentally Classified Investment 16

6. Lessons Learned and Best Practices 18

7. Policy Implications and Recommendations for Montenegro and Moldova 20

8. Conclusions 22

2. HUNGARY: Mobilising Green Investment in the Context of EU Environment and Climate Policy 25

1. Introduction 25

2. Country context 26

3. Green financing in Hungary: institutional framework, market structure, and structural constraints 28

3.1. Institutional framework of green financing 28

3.2. Market structure and key actors 28

3.3. Financing Characteristics and ESG Integration 29

3.4. Structural constraints and asymmetries 29

3.5. Synthesis 30

4. Case study: Hungarian Solar Market - How Hungary became the world's solar energy leader 30

4.1 The boom in large solar power plants 31

4.2. Houshold-scale small power plants (HMKE), metering schemes 31

4.3. Medium and Large-scale solar power plants 32

4.4. Growth of the Hungarian solar market and financing needs 34

4.5. The main pillars of financing in Hungary 34

4.6. Trends that will shape financing in the coming years 35

4.7. Future challenges and opportunities 35

4.8. Regional comparison 36

5. Case Study: The Pljevlja Energy Transition – Transferable Lessons from Hungary's Mátra Power Plant 38

5.1. Introduction 38

5.2. Mátra Power Plant of Hungary and Thermal Power Plant Pljevlja of Montenegro 38

5.3. Stronger Local NGO Network 40

5.4. EU Emissions Trading System (ETS) and TPP Pljevlja Future Quotas to Finance a People-Centred Just Transition 41

5.5. Quid Pro Quo Arrangement 42

5.6. Challenges and Barriers 44

6. Lessons Learned and Best Practices 45

7. Policy implications and recommendations for Montenegro and Moldova 46

8. Conclusions 47

3. POLAND: Mobilisation of Green Investment in the Context of EU Environment and Climate Policy 49

1. Introduction 49

2. Country context 50

2.1. Energy transition 50

2.2. Air Quality (Smog) 51
2.3. Biodiversity 51
2.4. Climate 52
2.4. Green Economy 53
3. Institutional and financial mechanisms for green investments 53
3.1. Institutional framework for green investments in Poland 53
3.2. European Union funds and Polish green investments institutions 54
3.3. Main environmental funding 55
3.4. Other type of offered funding on energy transition include nowadays 55
3.5. Others programs 56
3.6. Other sources of financing to environmental protection 57
3.7. Thermomodernisation Surplus 57
3.8. Green bonds 57
3.9. Role of local authorities 57
4. The Commune of Potęgowo – from Post-communist Collective Farm and Unemployement to Renewable Pioneership 58
5. Challenges and Barriers to Mobilizing Green Investments in Poland 61
5.1. Introduction 61
5.2. Regulatory inconsistency and policy instability 61
5.3. Limited preparedness of enterprises and institutions 61
5.4. ESG data gaps and market risks 62
5.5. Social dimension and the role of citizens 62
5.6. Conclusions 62
6. Recommendations for Montenegro and Moldova 62
2. SLOVAK REPUBLIC: Mobilisation of Green Investment in the Context of EU Environment and Climate Policy 73
1. Introduction 73
2. Country context 74
3. Institutional and financial mechanisms 78
4. Case Study: Energy Efficiency Renovation of Residential Buildings 79
5. Challenges and Barriers to Mobilizing Environmentally Classified Investment 81
6. Lessons Learned and Best Practices 83
7. Policy Implications and Recommendations for Montenegro and Moldova 86
8. Conclusions 87
III. MOBILISATION OF GREEN INVESTMENT OF MONTENEGRO IN THE CONTEXT OF THE EUROPEAN INTEGRATION PROCESS 90
1. Country Context and Strategic Framework for Mobilisation of Green Investment 92
1.1. National policy frameworks supporting green investment 92
1.2. Outline of Montenegro's Economic Structure and Environmental Challenges 97
1.3. Key Sectors Targeted for Green Finance in Montenegro 100
2. Institutional and Financial Mechanisms for green investments 105
2.1. Legal framework for green revenues in the public sector of Montenegro 105
2.2. Legal framework for mobilisation of a green investment in Montenegro 112
2.3. Role of government institutions and ministries in shaping green investment policies 114
2.4. Green banking initiatives, green bonds and sustainable finance frameworks 115
3. Challenges and Barriers 119
4. Analysis of the green financing in the state budget of Montenegro in 2023 budget year 121
4.1. Methodological framework 121
4.2. Climate-relevant expenditure in the capital budget 122
4.3. Climate-relevant current expenditure across selected institutions 123
4.4. Capital investments of state-owned energy enterprises and IDF lending 125
4.5. Sectoral structure and sources of financing in 2023 126
4.6. Summary of findings for 2023 128
5. EU membership perspectives and mobilisation of green investment 128
IV. MOBILISATION OF GREEN INVESTMENT OF MOLDOVA IN THE CONTEXT OF THE EUROPEAN INTEGRATION PROCESS 136
1. Country Context 138
2. Institutional and Financial Mechanisms for green investments 145

2.1. Legal and Institutional Framework 145
2.2. Sustainable Finance Frameworks and Green Banking Initiatives 152
2.3. Green Bonds and Climate Finance Opportunities 154
3. Challenges and Barriers 154
4. EU membership perspectives and mobilisation of green investment 156
5. Policy recommendations 157
..... 161
V. CONCLUSIONS AND RECOMMENDATIONS 161

List of Figures

Figure 1. Czech annual expenditure on environmental protection, 2016-2024. 13
Figure 2. Share of renewable energy in final energy consumption in Czechia, compared to EU average, 2005-2023. 15
Figure 3. Electiricty consumption in Hungary in 2025 27
Figure 4. Installed capacity of household-scale small PV power plants (MW) in Hungary 32
Figure 5. Installed capacity of medium and large solar panels ((50kW≤)in Hungary 33
Figure 6. Share of electricity generation from solar (%) in Cyehia, Hungary and Poland in June 2025 (recorded highest-ever solar power contribution) 36
Figure 7. Share of renewable energy sources in electricity consumption in Poland through 2030 (green line: WAM scenario; blue line: WEM scenario) 51
Figure 8. Net GHG Emissions in Slovakia and EU-27 excluding LULUCF (index 2005 = 100) 75
Figure 9. Share of Renewable Fuels in Gross Final Consumption of Energy from Renewables in Slovakia (in %) 76
Figure 10. EU Structural and Investment Funds (2014–2020 Programming Period) as a Share of General Government GFCF in Slovakia, 2014–2023 (%) 77
Figure 11. Share of the RRF's Estimated Expenditure Contributing to Each Policy Pillar in Slovakia (%) 82
Figure 12. Zero-emission Passenger Cars in 2024 (% of new registered vehicles) 83
Figure 13. Montenegro Green Finance Pipeline by Sector (Est. €1.25B Total) 104
Figure 14. Investment structure by sector in 2023 127

List of Tables

Table 1. Solar energy financing models actually used in Hungary 37
Table 2. List of EU funds financing renewable investments in Potęgowo 60
Table 3. Energy transformation and anti-smog programs (building, prosumers, transport) 69
Table 4. Energy transformation (rural areas, biogas and biomethane) 70
Table 5. Energy transition (large facilities – storage, energy networks, BESS and capacity market) 71
Table 6. Environment and Climate-Related Revenues in Montenegro's Budget 106
Table 7. Estimated budget revenues based on environmental and climate fees 111
Table 8. Capital Budget 2023 – Capital Projects Directorate and Transport Directorate, with weights 123
Table 9. Selected institutions and climate-relevant current expenditure of Montenegro, 2023 (€) 124
Table 10. Climate-relevant capital investments of state-owned energy enterprises and IDF lending, 2023 (€) 125
Table 11. Climate-relevant expenditure in Montenegro by sectors and sources of financing, 2023 (€ million) 127

I. INTRODUCTION

Introduction

1. Objectives and importance of the EU environment and climate policy for the Member states and the Candidate countries

The environment and climate policy of the European Union is one of the most comprehensive and ambitious policy frameworks in the world. It aims to protect natural ecosystems, improve human health, and combat climate change through coordinated action across Europe and beyond. Over time, it has evolved from basic environmental protection measures into a central pillar of sustainable development and economic transformation.

A key milestone in this evolution is **the European Green Deal**, which sets the goal of making Europe the first climate-neutral continent by 2050 in line with the Paris Agreement. This strategy integrates environmental concerns into all sectors, including energy, transport, agriculture, and industry.

In addition, the EU seeks to **protect natural resources** by preserving biodiversity, forests, water, and soil, while promoting a circular economy that minimizes waste and maximizes resource efficiency. Another key objective is **reducing pollution** across air, water, and land to ensure a healthier environment for citizens. These policies are also designed to **support sustainable economic growth** by encouraging innovation, renewable energy, and environmentally friendly industries.

For EU Member States, these policies are highly important because they establish a unified legal and regulatory framework that ensures all countries work toward common environmental goals. This coordinated approach helps prevent cross-border environmental problems and promotes solidarity among states. EU policies also provide financial support and funding mechanisms that assist Member States in implementing green transitions, improving infrastructure, and developing clean technologies. Moreover, they contribute significantly to improving public health, enhancing quality of life, and strengthening economic competitiveness through innovation in sustainable sectors.

For EU Candidate Countries such as Montenegro and Republic of Modova (herein referred to Moldova), the importance of EU environmental and climate policy lies primarily in the process of alignment with the EU acquis communautaireas part of their accession journey. These countries are required to transpose and implement the EU environmental acquis, which drives major legal, institutional, and economic reforms. This alignment helps them modernize their environmental governance, improve pollution control, and promotes the integration of sustainable development principles. At the same time, Candidate Countries benefit from EU financial and technical assistance, which supports infrastructure development and capacity building. Although the approximation process can be challenging due to significant investment needs and administrative requirements, it ultimately prepares these countries to assume the obligations of EU membership while improving environmental protection, public health, and long-term economic resilience.

Green investment and its mobilisation play a crucial role in achieving environmental sustainability and climate goals, particularly within the framework of the European Union. Green investment refers to financial flows directed toward projects that support environmental protection, renewable energy, energy efficiency, sustainable transport, and climate resilience. Its

importance lies in enabling the transition to a low-carbon economy, as outlined in strategies such as the European Green Deal. Without substantial investment, the shift toward cleaner technologies and sustainable infrastructure would not be possible at the scale and speed required to meet targets under the Paris Agreement.

The mobilisation of green investment is equally important, as it focuses on attracting and directing both public and private financial resources toward sustainable projects. Governments and institutions play a key role by creating regulatory frameworks, incentives, and financial instruments that encourage investors to support green initiatives. Mechanisms such as green bonds, climate funds, and public-private partnerships help reduce risks and increase investor confidence. In the EU context, mobilisation ensures that not only public funds but also private capital contribute to environmental objectives, significantly increasing the total available resources.

For both EU Member States and Candidate Countries, green investment mobilisation supports economic modernization and sustainable growth. It promotes innovation, job creation in green sectors, and improved energy security, while also reducing environmental degradation and health costs associated with pollution. In Candidate Countries in particular, mobilising green investment is essential for aligning with EU standards, upgrading infrastructure, and accelerating the transition toward sustainable development. Overall, green investment and its effective mobilisation are fundamental drivers of long-term economic resilience and environmental protection.

2. About the project

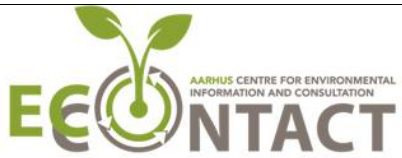
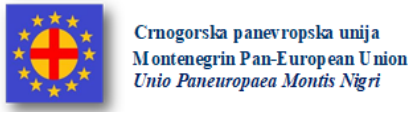
The Project: „Mobilizing green investment: Visegrad Group - Montenegro - Moldova ““ (01/02/2026 – 30/10/2026) is supported by the International Visegrad Fund, an international donor organization established in 2000 by the governments of the Visegrad Group countries—Czechia, Hungary, Poland and Slovakia, in order to promote regional cooperation in the Visegrad region (V4) as well as between the V4 region and other countries, especially in the Western Balkan and Eastern Partnership regions.

The project focuses on sharing experiences, transferring knowledge, and recommending further models of green investment mobilisation from the Visegrad group countries (Czechia, Hungary, Poland and Slovakia) to Montenegro and Moldova.

The project products (e-book) and events (conference, workshop, and lectures) address differences in mobilisation green investment strategies with recommendations based on:

- the lessons learned from the Visegrad group regarding the investment policy focused on incentives to green investments, and
- estimation of the current level of harmonisation with the EU environmental and climate policy in Montenegro and Moldova (preparation for the negotiating chapter 27. Environmental and Climate, and environment for green investment mobilisation).

The added value of this project is that it has brought together **project partners** from 6 organizations from V4 and candidate countries Montenegro and Moldova:

	Institute for Politics and Society (IPS), Prague, Czechia
	Union of the Robert Schuman Institute for Developing Democracy in Central-Eastern Europe (RSI), Budapest, Hungary
	Institute for Sustainable Development Foundation, ISD Foundation, Warsaw, Poland
	Macro-Economic and Social Analyses 10 (MESA10), Bratislava, Slovakia
	EcoContact – Aarhus Center for Information and Consultation, Chisinau, Moldova
	Montenegrin Pan-European Union (MPEU), Podgorica, Montenegro, as the Grantee – partner coordination organization.

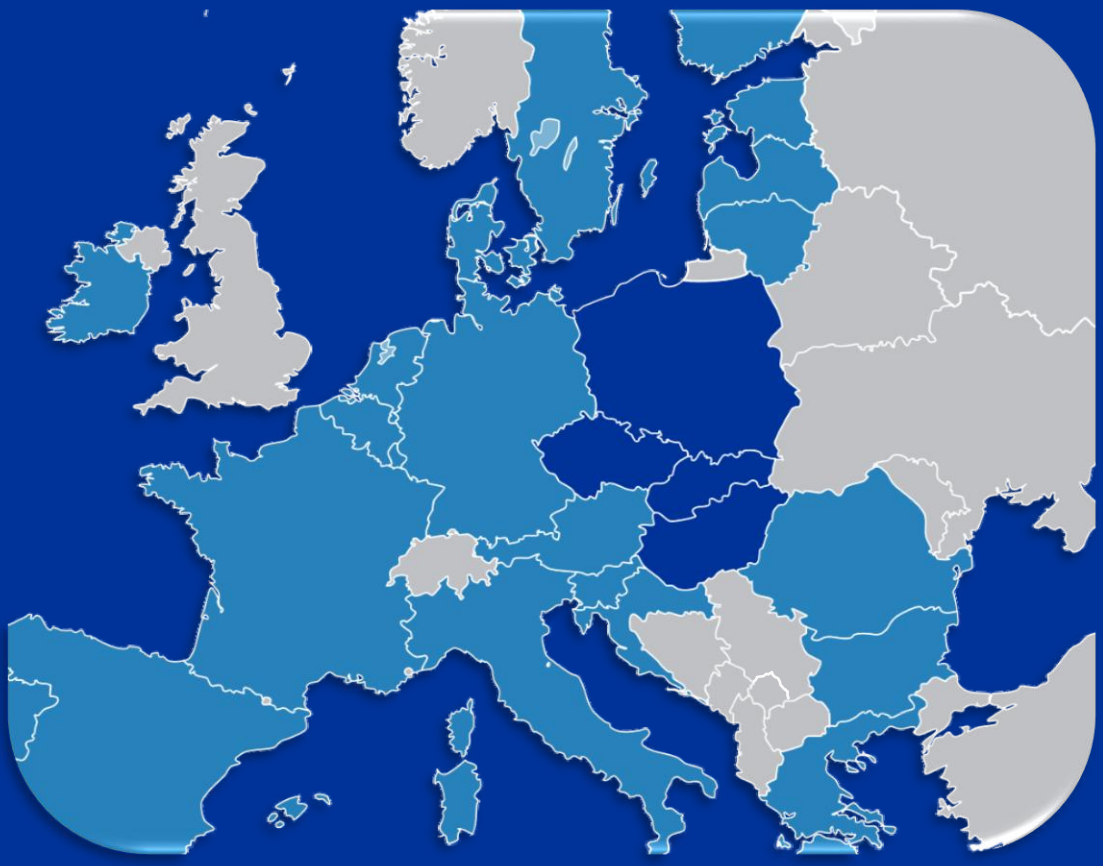
This book titled *Mobilizing Green Investment in Czech Republic, Hungary, Poland, Slovak Republic, Montenegro and Moldova* is one of the key results of the Project. The conducted research is devoted to the analysis of policy frameworks, financial mechanisms, institutional arrangements, and practical experiences related to the mobilisation of green investment in the participating countries. It aims to identify successful approaches, transferable lessons, and policy recommendations that can support Montenegro and Moldova in accelerating their green transition and advancing their alignment with EU environmental and climate objectives.

The project has regional relevance since its focus is on strengthening cooperation and knowledge exchange between EU Member States and Candidate Countries facing similar environmental and climate challenges. By promoting the transfer of experience from the Visegrad Group and encouraging dialogue among policymakers, experts, academia, civil society, and the private sector, the project contributes to the mobilisation of green investment, sustainable economic development, and the broader process of European integration in Montenegro and Moldova.

Gordana DJUROVIC

Podgorica, June 2026

II. MOBILIZING GREEN INVESTMENT: LESSONS FROM THE VISEGRAD GROUP FOR MONTENEGRO AND MOLDOVA



1. CZECH REPUBLIC: Mobilizing of Green Investment in the Context of EU Environment and Climate Policy

Šárka SHOUP[1]

Kristína MAJERČÍKOVÁ[1]

Abstract

This chapter analyses the mobilisation of environmentally classified investment in the Czech Republic within the broader framework of European Union environmental and climate policy. The analysis focuses on institutional arrangements, financing mechanisms and implementation practices that shape how such investments are designed and delivered in practice. Rather than evaluating environmental policy targets themselves, the chapter examines operational investment frameworks, including programme architecture, blended financing structures, administrative capacity and evaluation systems.

The Czech Republic represents a relevant case due to its industrial economic structure and extensive experience with programme-based environmental and infrastructure investment supported by European and national funding instruments. Particular attention is devoted to sectors where regulatory requirements, economic efficiency and infrastructure modernisation intersect, especially energy efficiency renovation of public buildings. This segment illustrates how environmentally classified investment can simultaneously address asset lifecycle renewal, operational cost reduction and regulatory compliance.

The chapter identifies key enabling factors for investment mobilisation, including standardised programme design, predictable regulatory frameworks, measurable performance indicators and the use of blended finance instruments combining grants, loans and guarantees. At the same time, it highlights structural barriers such as administrative complexity, financing risks and uneven municipal implementation capacity. Finally, the chapter discusses transferable lessons for enlargement and candidate countries, particularly Montenegro and Moldova.

Keywords*: green investment; energy efficiency; public buildings; blended finance; Czech Republic*

1. Introduction

This chapter examines the mobilisation of environmentally classified investment in the Czech Republic from an institutional, financial and implementation perspective. The objective is not to evaluate environmental policy goals as such, but to analyse how investment frameworks function in practice — including programme design, financing structures, administrative capacity and measurable outcomes. The Czech case is relevant because it combines a strong industrial economic structure with extensive experience in programme-based infrastructure and efficiency investment supported by European and national instruments.

In this chapter, **environmentally classified investment** refers to public or private capital expenditures that contribute to environmental protection, energy efficiency, climate mitigation, or pollution reduction, typically aligned with European Union environmental policy frameworks and reporting systems such as the EU taxonomy and environmental protection expenditure accounts. (ESMA, 2023)

[1] Institute for Politics and Society (IPS), Prague, Czechia;

The analysis focuses on operational mechanisms rather than normative targets. Particular attention is paid to investment segments where regulatory requirements, modernization needs, and economic efficiency overlap, such as public building renovation and municipal infrastructure upgrades. These segments provide observable implementation experience, measurable performance indicators and transferable governance lessons. The chapter also identifies structural barriers and institutional constraints that influence investment uptake.

The Czech experience is assessed with a view to transferability, especially for enlargement and candidate countries facing similar administrative and financing challenges. The emphasis is placed on programme architecture, risk allocation, evaluation methods and administrative feasibility. This applied perspective allows policy lessons to be derived without assuming identical economic or fiscal conditions across countries.

2. Country context

The Czech Republic is a medium-sized, open, and export-oriented economy with a comparatively high share of manufacturing and energy-intensive production. Industrial sectors — particularly automotive, mechanical engineering, chemical, and related supplier industries — continue to represent a substantial share of gross value added, exports, and regional employment. For an export-oriented industrial economy, investment sequencing must carefully balance environmental requirements with competitiveness, cost stability and industrial resilience. (OECD, 2025). This structural profile has important implications for the scale, sequencing, and economic sensitivity of investments categorized under environmental and climate policy frameworks. In industrial economies, investment requirements linked to environmental regulation and energy transition tend to have broader cost, competitiveness and regional labour market effects than in service-oriented economies, which makes investment prioritisation and timing a central policy concern (OECD 2023).

From an **investment perspective**, the Czech economy combines relatively modern export sectors with a legacy stock of infrastructure and buildings that still offers significant modernization and efficiency potential. This creates a mixed investment environment in which part of environmentally classified investment is associated with technological upgrading and productivity gains, while another part is driven primarily by compliance obligations and regulatory thresholds. Analytical distinction between these two drivers — efficiency-motivated versus compliance-motivated investment — is important for understanding financing behaviour and investor incentives. Projected investment is expected to pick up through 2026, supported by Recovery and Resilience Facility inflows and EU cohesion funds, though export growth may remain subdued in the near term due to trade restrictions in key sectors. (OECD, 2025)

Over the last decade, environmentally and climate-related investment activity in the Czech Republic has increasingly evolved within the framework defined by European Union legislation, reporting systems and funding instruments. According to Eurostat data, **environmental protection expenditure in the Czech Republic represents approximately 2.4–2.7 % of GDP in recent years**, with the largest share allocated to waste management, wastewater infrastructure and energy efficiency measures. (Eurostat, 2024; EEA, 2024). National strategic and sectoral documents have gradually incorporated EU obligations in emissions control, air quality standards, energy efficiency targets, water management and waste policy. In operational terms, a large share of projects classified as environmental or climate-related emerges where EU regulatory requirements intersect with available co-financing instruments. Investment pipelines are therefore often shaped by eligibility frameworks and programme calls rather than by stand-alone strategic capital allocation decisions (European Commission 2023a; European Commission 2023b).

This does not mean that domestic policy has no influence, but rather that the financial feasibility of many projects depends on **blended funding structures**. Where co-financing rates are high and procedures are predictable, project pipelines expand. Where rules are complex or frequently changing, investment activity tends to slow. Empirical studies across EU member states show that regulatory predictability and administrative simplicity are among the strongest determinants of uptake in publicly supported environmental investment programmes (World Bank 2022; OECD 2022).

Key environmental and infrastructure challenges with investment implications in the Czech Republic include modernization of energy and heat infrastructure, air quality improvement in specific industrial regions, upgrading of district heating networks, renovation of an ageing public and residential building stock, renewal of water and wastewater systems, and modernization of waste treatment capacity. In April 2025 the Czech Republic completed significant upgrades to its western pipeline network, ending dependence on Russian oil imports and securing energy supplies through diversified western routes. (Reuters, 2025) Many of these systems were built in earlier investment cycles and now require either replacement or extensive modernization. From a public finance perspective, this creates a convergence between environmental objectives and asset lifecycle management.

Energy sector investment in the Czech Republic is shaped not only by emissions and efficiency objectives but also by security-of-supply and affordability considerations. For an industrial economy with high electricity and heat demand, price stability and system reliability are critical parameters. (IEA, 2024) Because of the Czech Republic's industrial structure and power demand profile, energy transition strategies are evaluated not only on emissions metrics but also on system stability and price predictability. These considerations influence both the sequencing and relative importance of different types of investments.

The updated **National Energy and Climate Plan** explicitly emphasises energy security, long-term supply stability and affordability alongside decarbonisation objectives, with a strong focus on nuclear energy development and renewables expansion as pillars of the transition (Ministry of Industry and Trade of the Czech Republic, 2024). As a result, investment evaluation frameworks tend to combine environmental indicators with system adequacy, cost and resilience metrics (IEA, 2024; MPO, 2024). This multi-criteria assessment approach directly affects which projects are prioritised and how support instruments are structured.

Sectorally, environmentally classified investment most frequently concentrates on energy efficiency improvements in buildings and industrial processes, modernization of heat and power generation assets, selected renewable and lower-emission energy sources, circular economy and waste management systems, and environmental infrastructure projects. In practice, project developers and financiers show a preference for technologically mature solutions with measurable outputs. Technologies with uncertain performance or revenue streams face more constrained financing conditions unless supported by guarantees or higher subsidy intensity (EIB 2023).

Another relevant contextual factor is **the ownership structure of infrastructure and buildings**. A large share of relevant assets is owned or co-owned by municipalities and public entities. This increases the importance of local administrative capacity, procurement quality and co-financing ability. Differences in municipal capacity partly explain uneven regional uptake of support programmes and variation in project quality.

3. Institutional and financial mechanisms

The institutional architecture in the Czech Republic which supports environmentally classified investment is structured around sectoral governance, programme instruments, and distributed

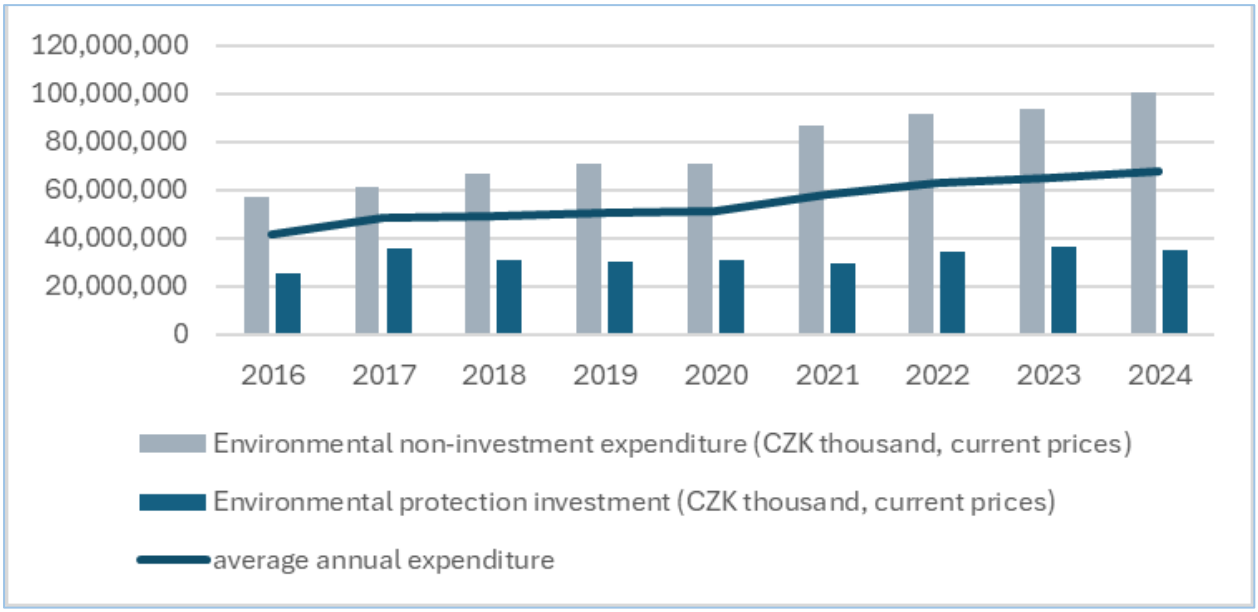
implementation capacity. There is not a centralized green investment authority. Instead, fiduciary responsibilities are allocated across multiple ministries and public funds, requiring strong horizontal coordination and shared implementation capacity to avoid fragmentation in programme delivery. (OECD, 2025)

Financing mechanisms rely on a layered structure combining European funds, national support programmes, and commercial financial instruments. EU cohesion policy resources and modernization-oriented facilities represent major capital sources for efficiency and infrastructure investment. These resources are typically blended with national co-financing and beneficiary contributions. Blended finance structures reduce individual risk exposure and make capital-intensive projects more feasible, especially in the public sector (European Commission 2023b).

National programmes frequently focus on building renovation, energy savings, heating system upgrades, and environmental infrastructure modernization. These programmes are typically rule-based, with defined eligibility criteria, cost categories, and monitoring obligations. While they reduce financial barriers, they also increase procedural complexity. Application, reporting, and audit requirements can be substantial, which raises transaction costs and can limit participation by smaller entities (World Bank 2022).

Commercial financing plays a complementary but growing role. Financial institutions increasingly integrate environmental and efficiency criteria into lending frameworks and offer sustainability-linked or efficiency-linked credit products. However, purely market-driven environmentally classified investment remains more limited in volume compared to publicly co-financed investment. Financing availability depends on macroeconomic conditions, interest rates, project risk, and regulatory predictability (OECD 2022). In 2024, the EIB supported environmentally classified commercial investment in Czechia by lending €350 million to Ceskoslovenska Obchodni Banka (CSOB) to support energy efficiency and green-investment in SMEs and Mid-Caps (EIB 2024).

Figure 1. Czech annual expenditure on environmental protection, 2016-2024.



Source: CZSO (2025). Environmental Protection Expenditure – data and time series.

Institutional Specifics in the Czech Republic

A distinctive feature of the Czech system is that operational support for environmentally classified investment is delivered through **multiple sector-oriented programme instruments and public funds** rather than through a single dedicated green investment vehicle. Ministerial programmes and specialized public funds administer targeted schemes for efficiency, modernization and environmental infrastructure. These bodies primarily function as programme managers and financial intermediaries translating strategic frameworks into operational rules and funding calls. Their effectiveness depends mainly on administrative predictability, procedural clarity and evaluation capacity (European Commission 2023b).

Municipalities and regional authorities play a particularly strong role as project owners and co-financiers. Many efficiency and infrastructure projects originate at the local level. Municipal capacity — technical, financial, and procurement-related — therefore directly influences investment mobilisation outcomes. Guarantee tools, preferential loans, and performance-based contracts are used selectively to complement subsidy frameworks and lower upfront capital requirements. The decentralized model supports flexibility but also produces variation in absorption capacity, reinforcing the need for standardised templates and technical assistance (OECD 2022; EIB 2023).

4. Case Study: Energy Efficiency Renovation of Public Buildings

Energy efficiency renovation of public buildings represents one of the most operationally established and implementation-ready segments of environmentally classified investment in the Czech Republic. Unlike more technology-uncertain or market-dependent categories of environmental investment, **renovation of schools, hospitals and administrative buildings** is based on mature technical solutions, standardized engineering procedures and relatively predictable performance outcomes. This makes the segment particularly suitable for programme-based financing, performance measurement, and comparative evaluation across regions and time periods. For this reason, public building renovation is frequently used in analytical and policy contexts as a reference category for assessing the effectiveness of efficiency-oriented investment instruments (IEA 2023).

A defining feature of this segment is the convergence of several investment rationales that are often separated in other categories. Public building renovation typically combines asset lifecycle renewal, operating cost reduction, service quality improvement and regulatory alignment within a single investment intervention. Many public buildings in the Czech Republic were constructed in earlier development periods and show significant technical and energy performance gaps relative to current standards. Renovation decisions are therefore rarely driven by environmental classification alone; instead, they are usually motivated by a combination of deferred maintenance needs, rising operating costs, and modernization requirements. Energy efficiency frameworks provide an additional structuring and financing layer that makes such projects more financially and administratively feasible. In many municipalities, the discussion around renovation begins not with climate targets but with complaints about outdated heating systems, uncomfortable classrooms or rising utility bills. Energy efficiency becomes part of the solution rather than the starting point. (Český statistický úrad, 2021).

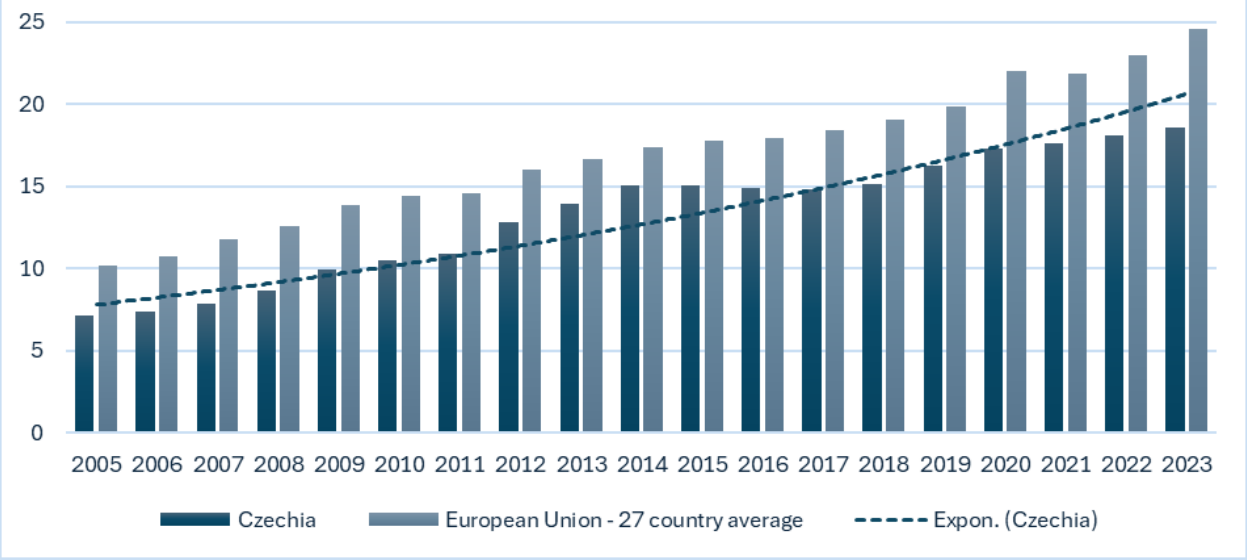
From a technical perspective, **renovation projects** usually involve integrated packages of measures rather than isolated upgrades. Typical interventions include building envelope insulation, façade and roof improvements, window replacement, modernization of heating and distribution systems, installation of automated control and regulation technologies, ventilation system upgrades, and lighting replacement. Increasingly, projects also incorporate digital monitoring and building energy management systems that allow continuous performance tracking and operational optimization. The technical maturity of these measures reduces implementation risk while supporting standardized procurement and evaluation procedures.

The financial architecture of public building renovation projects typically relies on **multi-source funding structures**. European co-financing instruments frequently provide a substantial share of eligible costs, complemented by national programme support and beneficiary co-financing from municipal or institutional budgets. In some cases, commercial loans are used to bridge financing gaps or pre-finance eligible expenditures pending reimbursement. Because project economics are largely based on measurable energy savings and operating cost reductions, financial appraisal can rely on relatively robust baseline data compared to more speculative investment categories (EIB 2023).

An important delivery and financing model within this segment is **energy performance contracting.** Under this approach, a specialized energy service provider designs, finances and implements efficiency upgrades and is repaid through contractually defined shares of verified savings over a multi-year period. This structure shifts part of the technical and performance risk to the contractor and reduces upfront capital requirements for the public owner. Where measurement and verification protocols are clearly defined and independently auditable, performance contracting can strengthen accountability and align incentives between investor and service provider. Czech experience shows that this model is particularly suitable for building portfolios with sufficiently large and predictable energy consumption profiles, such as hospital complexes or school networks (IEA 2023).

At the same time, performance contracting is not universally applicable. Transaction costs, contract complexity, and procurement requirements can be significant, especially for smaller buildings or fragmented property portfolios. Establishing credible baselines, defining adjustment factors and managing long-term contractual relationships require technical and legal expertise. As a result, the model is most effective where project aggregation is possible and where contracting authorities possess sufficient administrative capacity. This highlights the importance of technical assistance and standardized contractual templates in scaling the model beyond large urban centres.

Figure 2. Share of renewable energy in final energy consumption in Czechia, compared to EU average, 2005-2023.



Source: Eurostat. (2026). Share of energy from renewable sources in gross final energy consumption (nrg_ind_ren)

From an outcomes perspective, public building renovation projects produce several **measurable effects that are relevant for policy evaluation**. These include reductions in final energy consumption, lower operating expenditures, improved indoor climate conditions and increased

asset value. Because these indicators can be monitored through metering and energy management systems, post-implementation evaluation is more straightforward than in many other environmentally classified investment categories. The availability of measurable outcomes supports evidence-based programme design and iterative improvement of funding schemes (IEA 2024).

Another relevant dimension concerns **budgetary and fiscal effects**. While renovation projects require upfront capital expenditure, operating savings can partially offset lifecycle costs. In municipal finance contexts, predictable reductions in energy bills can improve medium-term budget planning and free resources for other service priorities. This fiscal dimension is often central in local investment decision-making and contributes to broader acceptance of renovation programmes even where environmental objectives are not the primary political driver.

The segment also demonstrates **the importance of implementation governance**. Successful renovation programmes typically rely on standardized energy audits, clear technical benchmarks, transparent procurement rules, and post-implementation verification. Where programme rules are stable and documentation requirements are predictable, project pipelines tend to be stronger. Conversely, frequent rule changes or inconsistent evaluation criteria can delay project preparation and reduce participation, especially among smaller municipalities (World Bank 2022).

Risk factors in this segment are generally lower than in emerging technology investments but are not negligible. They include construction cost overruns, underperformance relative to projected savings, behavioural rebound effects and maintenance gaps. Mitigation tools include conservative savings estimates, independent verification, performance guarantees and staged implementation. Czech programme practices increasingly incorporate these safeguards, contributing to the segment's reputation as comparatively low-risk within environmentally classified investment portfolios.

From a policy interpretation perspective, the renovation of public buildings is also significant because it illustrates that environmentally classified investment can be framed primarily as economically rational modernization rather than as ideologically-driven transformation. Projects are typically justified on the basis of efficiency, cost control, asset quality and service conditions, with environmental benefits treated as an additional positive outcome. This framing has proven important for maintaining cross-stakeholder support and administrative continuity across changing policy environments (OECD 2022).

For these reasons, energy efficiency renovation of public buildings is widely regarded as a **benchmark category for performance-based, fiscally defensible, and operationally scalable investment**. Its technical maturity, measurable outcomes, and financing flexibility make it a central reference point in discussions about practical pathways for mobilising environmentally classified investment in both member states and enlargement economies.

5. Challenges and Barriers to Mobilising Environmentally Classified Investment

Despite the existence of multiple programme instruments and financing channels, the mobilisation of environmentally classified investment in the Czech Republic continues to face a set of **structural, administrative, and financial barriers**. These barriers do not typically arise from a single constraint but rather from the interaction between regulatory complexity, administrative capacity limits, financing risk, and information asymmetry. The labour market is expected to remain tight, with unemployment projected around 2.7 % in 2025, which suggests that administrative and technical capacity constraints will continue to be a binding factor in smaller municipalities and agencies. (OECD, 2025) Understanding these constraints is essential for realistic programme design and for transferring experience to other national contexts.

One of the most frequently cited constraints is **regulatory and procedural complexity**. Environmentally classified investments are often embedded in multilayer regulatory frameworks that combine European rules, national transposition measures, and programme-specific eligibility conditions. While such frameworks are designed to ensure accountability and comparability, they also increase transaction costs for applicants and financiers. Preparation of documentation, compliance verification, and reporting obligations can require significant technical and administrative resources. Smaller municipalities and institutions may find these requirements disproportionately burdensome relative to project size. Empirical assessments of EU-supported investment programmes repeatedly show that uptake rates are strongly correlated with perceived administrative complexity and procedural predictability (World Bank 2022; European Commission 2023c).

A related barrier concerns **the stability and predictability of programme rules**. Investment decisions in infrastructure and building modernization typically involve multi-year planning horizons. Where eligibility criteria, reporting formats or support intensities change frequently, project preparation becomes riskier and more costly. Even when funding volumes are formally available, uncertainty regarding future programme conditions can delay or discourage project initiation. Czech programme experience indicates that multi-year rule stability is often more important for mobilisation than marginal changes in subsidy rates.

Administrative capacity constraints represent another key limiting factor, particularly at municipal and regional level. A large share of environmentally classified investment projects is implemented by local governments, public institutions, and utilities. These entities vary widely in technical expertise, staffing and project preparation experience. Larger cities and institutions often maintain specialized teams capable of managing complex funding applications and procurement procedures. Smaller municipalities, by contrast, frequently depend on external consultants, which increases preparation costs and can introduce variability in project quality. Capacity constraints can therefore translate directly into uneven geographic distribution of investment uptake (OECD 2022).

Financing-related barriers also play a significant role. Although blended finance structures reduce capital cost, many projects still require upfront co-financing or bridge financing. Access to affordable credit depends on macroeconomic conditions, interest rate levels and borrower creditworthiness. Periods of tighter monetary conditions can therefore slow investment uptake, especially in projects with longer payback periods. Financial institutions may also apply conservative risk assessments to projects involving newer technologies or uncertain savings projections. Without guarantee mechanisms or performance contracts, such projects may struggle to secure financing on acceptable terms (EIB 2023; OECD 2023).

Payback uncertainty represents a specific subset of financing risk. While many efficiency projects generate savings, actual performance can vary due to technical, behavioural or operational factors. Overestimation of savings in early project stages can weaken financial performance and undermine investor confidence. This risk is typically mitigated through conservative assumptions, independent audits and performance guarantees, but these safeguards increase preparation cost and complexity. Programme frameworks that require standardized audit methodologies and verification protocols help reduce uncertainty but also raise entry barriers for smaller applicants.

Information and data limitations form another structural barrier. Environmentally classified investment increasingly relies on performance metrics, classification systems and reporting standards. However, data availability and methodological consistency are not always sufficient. Project developers may face difficulty in establishing credible baselines, especially for older assets with incomplete consumption records. Differences in measurement methodology complicate

cross-project comparison and portfolio evaluation. Where metrics are unclear or subject to frequent revision, investor and applicant confidence declines (European Commission 2023c).

Market structure factors also influence mobilisation. In some segments, supplier markets are concentrated or capacity-constrained, which can lead to price volatility and longer delivery times. Construction and technology supply chains have experienced cost fluctuations in recent years, affecting project budgets and timelines. Smaller projects may be deprioritized by large contractors, while smaller suppliers may lack the balance sheet strength required for performance-based contracts. These market dynamics introduce additional uncertainty into project planning.

Behavioural and organisational factors should also be considered. Public sector investment decisions are often influenced by risk aversion and audit exposure. Decision-makers may prefer conventional procurement and financing models over newer performance-based or blended structures, even where the latter offer lifecycle advantages. Institutional learning and demonstration effects therefore play an important role: successful early projects reduce perceived risk and support wider replication.

Another barrier arises from **fragmentation across policy domains and funding instruments**. Because environmentally classified investment spans energy, environment, infrastructure and regional development policy, responsibilities are distributed across ministries and agencies. Without strong coordination, programme criteria and timelines may diverge, increasing complexity for applicants. Czech practice shows that shared methodological guidance and standardized templates significantly reduce this friction, but coordination requires continuous effort.

From a fiscal policy perspective, there is also **a need to balance support with budgetary prudence**. Subsidy programmes and guarantees create direct or contingent fiscal exposure. Where monitoring and evaluation are weak, there is a risk that support intensity exceeds performance outcomes. This creates political and budgetary sensitivity and can lead to subsequent tightening of rules, which in turn affects predictability. Robust evaluation frameworks are therefore not only a technical requirement but also a fiscal safeguard (OECD 2022).

Taken together, these barriers indicate that mobilisation constraints are rarely purely financial. They are **institutional and procedural** as much as economic. Effective programme design must therefore address administrative simplicity, rule stability, capacity support and evaluation quality alongside funding volume. Czech experience suggests that incremental simplification and standardisation often produce larger mobilisation gains than marginal increases in nominal support rates.

6. Lessons Learned and Best Practices

Practical experience with environmentally classified investment in the Czech Republic over the past decade provides a set of **operational lessons** that are relevant not only at national level but also for comparative and transfer-oriented policy analysis. These lessons do not suggest a single optimal model but rather identify recurring design principles that improve implementation probability, cost-effectiveness and administrative sustainability. A consistent pattern across programmes is that outcomes depend less on headline funding volumes and more on **programme architecture, institutional capacity and evaluation discipline.**

One of the most robust lessons concerns **the value of standardisation**. Investment programmes that rely on standardized technical parameters, audit methodologies and documentation templates consistently show higher participation rates and faster processing times.

Standardisation reduces uncertainty for applicants, evaluators and financiers alike. When technical eligibility criteria and cost categories are clearly defined and stable over time, project preparation becomes more predictable and transaction costs decline. Czech programme practice demonstrates that standardized energy audit formats, model procurement documentation, and unified reporting structures significantly reduce friction in project pipelines. This effect is particularly important for smaller municipalities and public institutions that lack internal technical departments and depend on external preparation support (OECD 2022).

Closely related is **the importance of methodological clarity in evaluation and verification**. Best-performing programmes are those that define how outcomes will be measured and verified. In efficiency-oriented investments, this typically includes baseline determination rules, adjustment factors, and post-implementation measurement protocols. Where evaluation methodologies are ambiguous or frequently revised, disputes and delays increase. Conversely, clear measurement frameworks support performance-based financing models and strengthen credibility among financial institutions. Czech experience with performance-based renovation and energy service contracts shows that reliable verification protocols are a precondition for scaling such instruments beyond pilot scale (IEA 2023).

Another recurring lesson concerns **blended finance structures**. Projects that combine grants, loans, and risk-sharing mechanisms tend to achieve broader uptake than those relying on a single financing instrument. Grants reduce capital barriers and shorten payback periods, while loans and guarantees preserve fiscal discipline and encourage more careful project appraisal. Blended structures also allow public support to leverage private capital rather than fully substitute for it. However, Czech practice also shows that blended finance must be accompanied by clear allocation of risk and transparent accounting of contingent liabilities. Guarantee schemes in particular require disciplined monitoring to avoid hidden fiscal exposure (EIB 2023).

Project aggregation represents another important best practice. Many environmentally classified investments — especially in buildings and municipal infrastructure — are individually too small to attract efficient financing or high-quality contractor attention. Aggregating multiple projects into portfolios increases scale, improves bargaining power and reduces per-unit transaction costs. Aggregation also supports the use of performance-based contracts and standardized procurement. Czech municipal programmes that bundle school or administrative building renovations across a city or region have generally achieved better financing conditions and more consistent implementation quality than fragmented single-building projects (World Bank 2022).

Experience also highlights the importance of sequencing and project readiness. Programmes that invest in early-stage technical preparation — including audits, feasibility studies, and design documentation — tend to achieve higher implementation rates. Technical readiness reduces uncertainty at financing and procurement stages and lowers the risk of later cost overruns. Technical assistance facilities and preparation grants therefore play a disproportionately important role relative to their budget size. Czech and broader EU experience suggests that insufficient project preparation is one of the most common hidden bottlenecks in investment mobilisation (OECD 2023).

Governance design is another area where consistent lessons emerge. Transparent selection criteria and scoring methodologies improve programme credibility and reduce perceived political or administrative risk. Where applicants understand how projects will be evaluated, they can prepare documentation more effectively and align project design with programme objectives. Transparency also supports auditability and reduces ex post disputes. Czech programme administrators increasingly publish methodological guidance and model examples, which has contributed to higher consistency in application quality.

Technology neutrality has also proven to be an important principle in best-performing frameworks. Rather than prescribing specific technologies, effective programmes define performance outcomes — such as energy savings or efficiency thresholds — and allow applicants to choose technical solutions. This reduces the risk of technological lock-in and supports cost-effective innovation. Technology-neutral criteria also make programmes more resilient to market and price changes, since they do not depend on the relative cost position of a single technology class (OECD 2022).

Monitoring and feedback loops represent another best practice dimension. Programmes that systematically collect performance data and conduct ex post evaluation are better positioned to refine eligibility criteria and support levels over time. Czech experience shows that feedback from implemented projects — especially regarding real versus projected savings — is essential for calibrating future programme rounds. Without feedback loops, programmes risk repeating design flaws or misestimating performance parameters.

Institutional learning effects should not be underestimated. Early demonstration projects and pilot programmes play an important role in reducing perceived risk among both public authorities and financial institutions. Once a model — such as energy performance contracting in public buildings — is successfully demonstrated, replication accelerates. Knowledge sharing platforms, methodological guides and peer exchange among municipalities have proven effective in diffusing best practice and reducing entry barriers.

Czech experience suggests that programmes framed around economic functionality, competitiveness and operational reliability, with environmental benefits as verifiable co-benefits, tend to achieve broader, more predictable uptake and avoid backlash tied to perceived regulatory burdens. (OECD, 2025). Projects justified through operational savings, asset quality improvement and service reliability tend to encounter less resistance and stronger cross-stakeholder backing. Environmental benefits remain relevant but function as an additional positive outcome rather than the sole justification. This pragmatic framing contributes to programme continuity across political and administrative cycles.

Taken together, these lessons suggest that the most effective environmentally classified investment frameworks are those that emphasise standardisation, measurability, blended finance, preparation capacity, and technological neutrality. These principles are transferable across national contexts, provided they are adapted to local institutional and fiscal conditions.

7. Policy Implications and Recommendations for Montenegro and Moldova

Experience from the Czech Republic suggests that mobilisation of environmentally classified investment is most effective when policy frameworks are designed around economic functionality, administrative feasibility, and measurable performance rather than around formal classification targets alone. For enlargement and candidate countries such as Montenegro and Moldova, the relevance of this experience lies less in the specific scale of funding instruments and more in **programme architecture and governance design**. Transferability depends on institutional capacity, fiscal space and project preparation ecosystems rather than on direct replication of financial volumes or instrument labels.

A first key implication concerns **investment prioritisation.** Czech practice indicates that programmes achieve more stable and scalable results when they focus initially on investment categories that combine measurable operational benefits with regulatory alignment. Energy efficiency in public buildings, modernization of municipal infrastructure and upgrades of heat and water systems represent examples of such categories. These investments produce observable service and cost improvements while also contributing to environmental performance indicators.Energy efficiency improvements in buildings are widely identified as among the most

cost-effective investment measures for reducing energy demand while delivering measurable operational savings (IEA 2024). For policy design in Montenegro and Moldova, prioritising segments with dual operational and compliance benefits can improve political acceptability and implementation continuity. Investment categories with uncertain revenue models or high technology risk are generally better suited to pilot phases rather than large first-wave programmes (IEA 2024).

A second implication relates to **financing structure.** Czech experience consistently shows that blended finance models — combining grants with loans, guarantees, or performance-based contracts — produce broader mobilisation effects than single-instrument approaches. Grants alone may accelerate uptake but can create fiscal pressure and reduce appraisal discipline if not carefully designed. Loan-only models, on the other hand, may discourage participation where payback periods are long or savings uncertain. Blended structures distribute risk more evenly and allow public support to leverage rather than replace private capital. For Montenegro and Moldova, this implies that early development of guarantee mechanisms and risk-sharing tools can be as important as subsidy envelopes, provided that contingent liabilities are transparently monitored (EIB 2023).

A third transferable lesson concerns **administrative design and procedural simplicity**. Investment frameworks that are technically sophisticated but procedurally complex tend to exclude smaller municipalities and public institutions, which are often central actors in environmental infrastructure and building renovation. Czech programme evolution demonstrates that simplification of documentation requirements, standardized templates and predictable evaluation timelines significantly increase participation. For enlargement contexts, administrative accessibility should be treated as a core design parameter rather than a secondary consideration. Technical assistance facilities and project preparation support often produce higher marginal mobilisation impact than incremental increases in subsidy rates (World Bank 2022).

Institutional capacity building emerges as another critical recommendation. Czech experience shows that project pipelines are strongest where implementing entities possess internal technical and procurement expertise. Where such capacity is weak, programme uptake is uneven and project quality varies. This challenge is also noted in EU enlargement assessments, which highlight the need to strengthen administrative capacity for the management and implementation of EU-funded programmes in candidate countries (European Commission 2023). Montenegro and Moldova may therefore benefit from parallel investment in preparation capacity — including standardized audit methodologies, training programmes and shared technical support platforms. Capacity support should not be limited to central ministries but should extend to municipal and sectoral implementing bodies, since many relevant investments originate at sub-national level.

Programme predictability and rule stability represent another core policy implication. Investment planning horizons in infrastructure and building modernization typically extend across several years. Stable regulatory frameworks and predictable support schemes are widely considered key factors for mobilising long-term infrastructure investment (OECD 2023). Frequent changes in eligibility rules, reporting formats or support intensity weaken investor and applicant confidence. Czech programme experience indicates that stable multi-year frameworks mobilise more capital than frequently revised short cycles, even when nominal support levels are lower. For enlargement countries, committing to predictable programme cycles and transparent rule revision processes can therefore be more important than maximizing initial funding envelopes.

Measurement and verification frameworks also require careful attention. Environmentally classified investment increasingly depends on performance indicators and reporting metrics. Czech practice suggests that measurement systems should be robust but not excessively complex.

Where reporting requirements become too demanding, participation declines and compliance costs rise. A proportionality principle — aligning reporting depth with project size and risk — improves administrative sustainability. Independent verification mechanisms are particularly valuable in performance-based financing models, where credibility of savings estimates underpins repayment structures (IEA 2023).

Technology neutrality represents another transferable best practice. Rather than prescribing specific technologies, programme frameworks function more effectively when they define performance outcomes and allow technical choice. This reduces the risk of locking in suboptimal solutions and makes programmes more resilient to price and innovation dynamics. For Montenegro and Moldova, outcome-based eligibility criteria can support both innovation and cost control while avoiding vendor-specific dependence (OECD 2022).

Czech experience also highlights **the importance of aggregation mechanisms for smaller projects**. Municipal building renovation, local infrastructure upgrades and efficiency projects are often too small individually to attract efficient financing or contractor attention. Portfolio aggregation improves scale and reduces transaction costs. Enlargement countries with fragmented municipal structures may particularly benefit from regional aggregation platforms or standardized portfolio contracting models.

From a fiscal governance perspective, **prudence and transparency** remain central. Subsidy and guarantee instruments create direct or contingent budget exposure. Czech programme evolution demonstrates the value of built-in evaluation cycles, cost-benefit assessment requirements and ex post performance reviews. For Montenegro and Moldova, embedding evaluation and review mechanisms into programme design from the outset can reduce long-term fiscal risk and improve policy credibility. Evaluation should focus not only on disbursement speed but also on measured outcomes and lifecycle cost performance.

Finally, **communication and policy framing** should not be overlooked. Czech experience indicates that environmentally classified investments gain broader and more durable support when presented as efficiency, modernization, and service-quality investments rather than exclusively as environmental obligations. Framing investments around cost savings, asset quality and infrastructure reliability improves cross-stakeholder acceptance and reduces political volatility. Environmental benefits remain important but are more effective politically when presented as co-benefits alongside economic and service outcomes (OECD 2023).

Taken together, these recommendations suggest that successful mobilisation of environmentally classified investment in enlargement contexts depends primarily on **programme design discipline, administrative accessibility, blended finance structures and performance measurability.** The Czech case illustrates that economically grounded, technically standardized, and institutionally supported frameworks are more robust than approaches driven primarily by formal classification targets. Adaptation to local institutional and fiscal conditions remains essential for effective transfer.

8. Conclusions

The Czech experience with environmentally classified investment demonstrates that successful mobilisation depends primarily on **programme design quality, administrative feasibility, and measurable economic performance** rather than on classification frameworks alone.

Investment uptake is strongest where regulatory alignment, operational efficiency and financing leverage coincide, and where programme rules are stable and technically clear. Standardisation, blended finance structures, project aggregation and robust verification methodologies repeatedly emerge as enabling factors.

At the same time, the analysis confirms that **administrative complexity, capacity constraints and financing risk remain significant limiting factors**, particularly at municipal and institutional level. Investment frameworks that underestimate transaction costs or preparation capacity tend to produce uneven results despite adequate nominal funding volumes. Continuous simplification, technical assistance and evaluation feedback loops therefore play a central role in long-term programme effectiveness.

For enlargement contexts, the main transferable lesson is pragmatic rather than structural: environmentally classified investment frameworks function best when embedded in **economically grounded modernization strategies, supported by predictable rules, and linked to verifiable performance outcomes**. Approaches that emphasise efficiency, fiscal prudence, and implementation capacity appear more robust than models driven primarily by formal targets or funding scale. The Czech case thus offers operational lessons in governance and financing design that are adaptable across different institutional environments.

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2. HUNGARY: Mobilising Green Investment in the Context of EU Environment and Climate Policy

Katalin CZIPPÁN[2]

Peter OLAJOS[2]

Imre RIMÓCZI[2]

Dániel SZIVA[2]

Abstract

Hungary's green-transition trajectory illustrates how a structurally fossil-fuel-dependent, import-reliant energy system can mobilise large-scale renewable investment under evolving EU climate and energy frameworks. While the country's overall share of renewable energy remains below the EU average, the electricity sector has undergone a rapid and highly concentrated transformation driven by the unprecedented expansion of solar photovoltaic (PV) capacity. This duality—system-level stagnation alongside sector-specific acceleration—provides a critical lens for analysing Hungary's institutional, financial, and regulatory mechanisms for green investment. The study examines the multi-level structure of Hungary's green-finance ecosystem, including central-bank incentives, state-backed credit schemes, commercial-bank lending practices, and emerging PPA-based financing models. It identifies key structural asymmetries between corporate and household segments, the dominance of capital-intensive PV investments, and the central role of policy-driven instruments in shaping market outcomes. Through a detailed case study of Hungary's solar market, the paper traces the evolution of support schemes, cost dynamics, and investment behaviour that enabled Hungary to become one of the world's fastest-growing solar markets. The analysis highlights lessons for Western Balkan and Eastern Partnership countries—particularly Montenegro and Moldova—regarding regulatory stability, blended financing, grid-integration challenges, and the design of green-investment frameworks aligned with EU Chapter 27 obligations. The findings underscore that accelerated renewable deployment in candidate countries requires coordinated public–private financing, predictable policy environments, and targeted mechanisms to mobilise both utility-scale and decentralised investments.

Keywords*: green financing, solar photovoltaic expansion, Hungarian energy transition, EU climate policy alignment, just transition, Hungary*

1. Introduction

Hungary's energy transition is unfolding within a complex economic and institutional context shaped by high energy import dependency, structural reliance on fossil fuels, and evolving European climate and energy policy frameworks. While the country has achieved moderate macroeconomic convergence over the past decade, its energy system remains exposed to external shocks, particularly due to dependence on imported natural gas and oil, alongside the dominant role of nuclear power in electricity generation. Despite policy commitments at the EU level, the overall share of renewable energy in Hungary's final energy consumption has remained below the European Union average, reflecting persistent structural and regulatory constraints.

[2] Union of the Robert Schuman Institute for Developing Democracy in the Central-Eastern Europe, RSI, Budapest, Hungary;

At the same time, Hungary presents a striking internal duality in its transition pathway. Although progress in renewables has been uneven across sectors, the electricity system has undergone a rapid and highly concentrated transformation— —driven by the expansion of solar energy. Over the past decade, photovoltaic capacity has increased from negligible levels to several gigawatts, fundamentally reshaping the structure of renewable electricity generation and positioning solar power as the central pillar of Hungary's decarbonization efforts. This contrast between a relatively low overall renewable share and an exceptionally dynamic solar sector provides a critical backdrop for analyzing the mobilization of green investment and the financial, institutional, and policy mechanisms that have enabled Hungary's solar market to emerge as a European frontrunner.

2. Country context[3]

Hungary's economic and energy system is characterized by a combination of macroeconomic convergence, high energy intensity, and structural dependence on imported fossil fuels. In the 2010s, Hungary experienced steady but moderate economic growth, although the years following the COVID-19 pandemic were marked by stagnation, high inflation, and increased volatility in investment and external balances. At the same time, the energy system remains vulnerable to external shocks, particularly due to its reliance on imported natural gas and oil, as well as the dominant role of nuclear energy in electricity generation (**European Commission, 2023**).

The structure of Hungary's energy mix reflects both historical legacies and recent policy developments. Nuclear energy continues to play a central role in electricity production, complemented by fossil fuels, while the overall share of renewable energy remains comparatively low within the European Union (**European Commission**). Despite progress in recent years, Hungary remains among the Member States with relatively limited progress in increasing the share of renewables, highlighting persistent structural and regulatory challenges in the energy transition (**European Commission, 2023**). The share of renewable energy in gross final energy consumption reached 17.1% in 2023, remaining below the EU average **(Eurostat, 2026).**

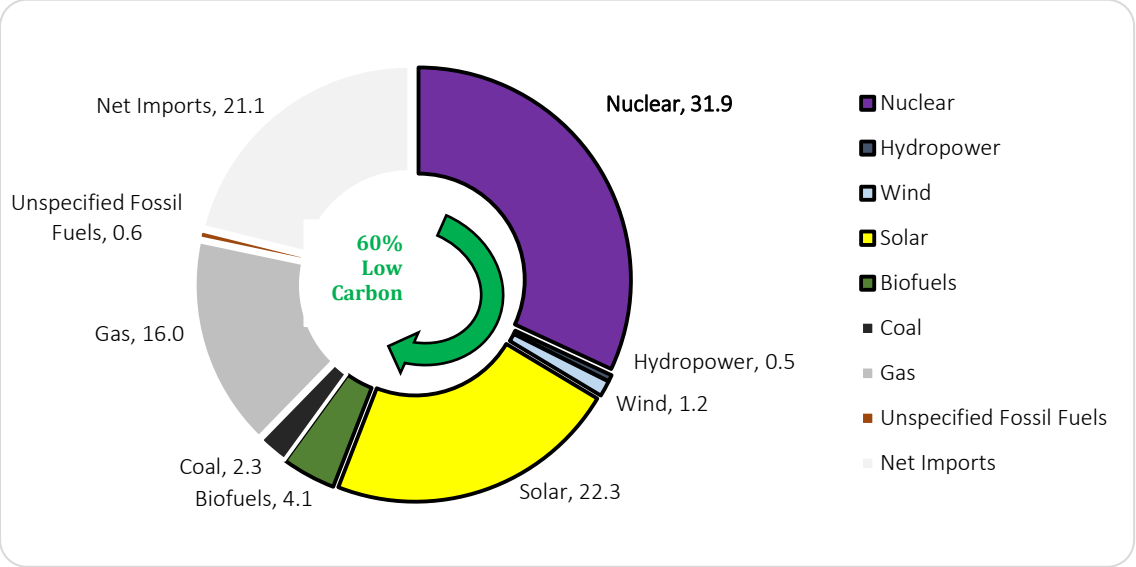
Developments in renewable energy deployment over the past two decades have been uneven. The share of renewable energy in gross final energy consumption increased from 6.9% in 2005 to 16.2% in 2013, followed by a period of stagnation and partial decline, with the share falling back and then recovering to approximately 13.7% by 2019. Although a renewed upward trend has been observed since 2020, with the share rising to 17.1% by 2023 (Eurostat, 2026), the overall trajectory suggests a discontinuous transition, where early gains were not sustained by stable policy and investment frameworks. This non-linear development indicates that Hungary's renewable energy transition has been characterized by policy- and investment-driven fluctuations rather than a stable, long-term growth trajectory.

At the same time, recent developments in the electricity sector reveal a more dynamic transformation driven primarily by solar energy. Hungary has experienced a rapid expansion of photovoltaic (PV) capacity over the past decade, resulting in a significant increase in the contribution of solar power to electricity generation. Installed PV capacity increased from negligible levels in the early 2010s to several gigawatts by the mid-2020s, fundamentally reshaping the structure of renewable electricity generation. This growth has been sufficiently pronounced to reshape the internal structure of renewable energy production, leading to a system in which renewable electricity generation is increasingly concentrated in solar power. As a result, Hungary can be characterized as a case of a solar-driven renewable transition (**Ember, 2024**).

[3] Authored by **Katalin Czippán and Dániel Sziva**.

This makes solar energy not only a rapidly growing segment but the central pillar of Hungary's renewable energy transition.

Figure 3. Electiricty consumption in Hungary in 2025



Souce: https://lowcarbonpower.org/region/Hungary

This duality—a relatively low overall share of renewable energy combined with rapid growth in solar electricity—highlights a key structural characteristic of the Hungarian energy transition. While the electricity sector shows signs of accelerated decarbonization through PV deployment, other sectors, particularly heating and transportation, lag behind, limiting the overall share of renewables in final energy consumption (**European Commission, 2023)**. This sectoral imbalance suggests that progress in decarbonization is uneven across the energy system. This imbalance points to broader systemic challenges, including infrastructure constraints, regulatory uncertainty, and the uneven distribution of policy support across sectors.

In addition, energy policy developments in Hungary have been shaped by a combination of market interventions and social considerations, most notably through administratively regulated household energy prices. While such measures have contributed to short-term affordability and political stability, they have also distorted price signals and reduced incentives for energy efficiency improvements and renewable energy investments in certain segments of the economy. In contrast, corporate energy consumers have been more exposed to market-based pricing, particularly during the energy crisis, which has contributed to stronger investment incentives in renewable energy solutions, including PV installations and long-term power purchase agreements.

From a broader policy perspective, Hungary's energy transition must be understood within the evolving European and global context. Energy security concerns, supply chain disruptions, and increasing geopolitical tensions have elevated energy policy to a central strategic domain in recent years. Governments across Europe, including Hungary, are navigating competing priorities— , affordability, competitiveness, and decarbonization—while also adapting to shifting regulatory frameworks and investment conditions.

Overall, Hungary's country context can be characterized by a combination of structural constraints and emerging transformation dynamics. While the country faces persistent challenges in increasing the overall share of renewable energy and reducing external dependencies, the rapid expansion of solar capacity demonstrates the potential for accelerated change under favorable policy and market conditions. This combination of lagging systemic indicators and sector-specific

breakthroughs provides a critical backdrop for understanding the mobilization of green investment in Hungary, particularly in the solar energy (PV) sector.

3. Green financing in Hungary: institutional framework, market structure, and structural constraints[4]

3.1. Institutional framework of green financing

The Hungarian green financing system is characterized by a **multi-level, policy-driven institutional structure**, in which central bank regulation, state-backed financial instruments, and commercial banking practices jointly shape the availability and allocation of green capital.
At the regulatory level, the Hungarian National Bank (MNB) plays a central role through its **green capital requirement discount program**, which incentivizes financial institutions to increase lending for energy-efficient housing and sustainable investments. The program allows banks to apply preferential capital treatment to qualifying green loans **(MNB, 2026)**, thereby indirectly supporting the expansion of green financing. This mechanism is particularly relevant for renewable energy investments, including photovoltaic (PV) projects, which require significant upfront capital.

Complementing this regulatory framework, targeted public financing instruments are implemented through institutions such as EXIMBANK (Hungarian Export–Import Bank) and KAVOSZ (National Association of Enterprises). EXIM's green investment financing schemes provide support for firms undertaking renewable energy, energy efficiency, and environmentally sustainable investment projects **(EXIM, 2026)**, while the Széchenyi Card Program[5] offers subsidized loans with approximately 3% net interest rates. These instruments are particularly relevant for financing capital-intensive renewable energy projects, including photovoltaic (PV) investments, which have driven recent market expansion.

This institutional setup reflects a broader international pattern, where **public policy instruments play a crucial role in mobilizing private green investment**, particularly by reducing financing costs and investment risks (**IEA, 2026**).

3.2. Market structure and key actors

There are a total of 51 credit institutions operating in the Hungarian banking system, of which 19 are commercial banks. The largest commercial banks with a nationwide network include OTP Bank, MBH Bank, K&H Bank, Erste Bank, UniCredit Bank, Raiffeisen Bank, CIB Bank, Gránit Bank, MagNet Bank.

The Hungarian green finance market has expanded rapidly in recent years, reaching a total volume of approximately **HUF 1,300 billion by 2024**, according to central bank data. However, this growth is **highly concentrated**, with more than four-fifths of green lending allocated to the **corporate and municipal sectors** (K&H, 2025).

Within this market, commercial banks play a dominant intermediary role. According to **OTP**'s 2025 sustainability report, the bank has a green loan portfolio of **EUR 1.43 billion**. (OTP, 2025). The K&H Bank has emerged as a key actor, holding **over 20% market share** in both corporate and retail green lending. The bank's green loan portfolio exceeded **EUR 1 billion**, with corporate green lending reaching approximately HUF 128 billion (K&H, 2025).

[4] Authored by: **Katalin Czippán and Dániel Sziva.**
[5] This is entirely a Hungarian SME support scheme, operated by KAVOSZ with Hungarian state interest-rate subsidies, MFB (Hungarian Development Bank) involvement, Commercial bank participation.

Sectoral dynamics show that growth in green financing is primarily driven by:

- **renewable energy investments**, where outstanding loan volumes increased substantially (e.g., from ~HUF 297.8 billion to ~HUF 433.9 billion within one year),
- **real estate financing**, which expanded even more rapidly, with volumes more than tripling over the same period (K&H, 2025).

Within the renewable energy segment, photovoltaic (PV) projects represent the dominant investment category, reflecting both strong policy support and increasing market demand.

This pattern suggests that green finance in Hungary is concentrated in specific sectors, with a particular emphasis on capital-intensive photovoltaic investments that are compatible with bank-based financing models.

3.3. Financing Characteristics and ESG Integration

Green financing in Hungary is predominantly **bank-based**, relying on loans and leasing arrangements rather than capital market instruments. Financing structures often include:

- project loans for renewable energy investments,
- subsidized credit lines linked to public programs,
- and leasing solutions with typical parameters such as **a 20–40% equity contribution and a 60–96-month maturity**.

These financing structures are particularly well-suited to large-scale PV projects, where predictable cash flows and asset-based collateralization align well with traditional banking risk assessment frameworks.

In addition, financial institutions are increasingly integrating **ESG criteria** into their lending practices, aligning portfolios with both EU Taxonomy requirements and domestic regulatory frameworks. A significant share of green loans is structured to comply with the requirements of the MNB's green capital program, further reinforcing the alignment between regulatory and market-based mechanisms (K&H, 2025).

At the same time, a notable characteristic of the Hungarian system is the **limited transparency of financing conditions**, as detailed pricing and risk parameters are often not publicly available due to banking confidentiality. This reduces comparability across institutions and may constrain market development.

3.4. Structural constraints and asymmetries

Despite rapid expansion, the Hungarian green financing system exhibits significant **structural asymmetries**, most notably between the corporate and household segments.

While corporate and municipal green lending expanded by approximately **56.7% annually**, the retail segment grew at a slower pace (around **26%**), reaching HUF 242 billion (K&H, 2025). This divergence reflects differences in both **economic incentives and policy support structures**.

This asymmetry is particularly evident in the solar energy sector, where large-scale photovoltaic investments dominate the market, while household-level PV adoption remains comparatively limited.

In particular, the available evidence suggests that **bank-based financial incentives alone are insufficient to stimulate household-level green investments**. In the absence of easily accessible, non-repayable subsidies, interest rate reductions provided by financial institutions do

not generate sufficiently strong demand for energy-efficient renovations or green housing investments (K&H, 2025).

This finding is consistent with broader international evidence, which highlights the existence of a **"policy gap" in green investment mobilization**, where private financing mechanisms require complementary public support to achieve large-scale adoption (**IEA, 2026**).

As a result, the Hungarian green finance system can be characterized as:

- institutionally robust but socially uneven,
- strongly oriented toward large-scale, investment-intensive projects,
- and less effective in mobilising decentralized, household-level sustainability transitions.

This structural configuration further reinforces the dominance of utility-scale PV investments over distributed, household-level solar adoption.

3.5. Synthesis

Overall, the Hungarian green financing landscape in 2026 represents a **policy-driven, bank-dominated system**, in which regulatory incentives and public programs play a central role in shaping investment flows.

Three key characteristics can be identified:

1. **Strong institutional embedding**, with green finance closely linked to regulatory incentives and public funding programs.
2. **Sectoral concentration**, with photovoltaic investments and real estate serving as the primary drivers of growth.
3. **Structural asymmetry**, with limited participation from the household sector due to insufficient direct incentives.

These features suggest that while Hungary has successfully mobilized green investment in photovoltaic and other capital-intensive sectors, the broader transition remains **uneven and dependent on continued policy support**, a pattern that aligns with global observations on the importance of coordinated public and private financing mechanisms (**IEA, 2026**).

4. Case study: Hungarian Solar Market - How Hungary became the world's solar energy leader[6]

Directive 2001/77/EC of the European Union was the first major EU renewable energy directive. It required Member States to establish support schemes for renewable energy. Member States were free to choose among feed-in tariffs (FIT7), green certificates (8), tax credits, and investment subsidies. Upon joining the EU in 2004, Hungary decided to adopt the feed-in tariff (FIT) system as its primary mechanism. (RES 2011).

[6] Authored by **Péter Olajos**.

[7] FIT (Feed-in Tariff) is a type of renewable-energy support scheme in which renewable electricity producers are guaranteed a fixed purchase price (a regulated tariff) for each kWh they generate, typically for a long, predefined period (e.g., 10–20 years), and the grid operator or off-taker is usually obligated to purchase the electricity at that tariff.

[8] The Green Certificate (Renewable Energy Certificate) is a market-based support scheme for renewable electricity under which, for each unit of renewable electricity generated (typically 1 MWh), the producer receives a certificate. Electricity suppliers (or large consumers) are required to purchase and surrender a certain number of certificates to meet a renewables obligation or quota. Certificates are tradable, so their price is determined by supply and demand—creating an additional revenue stream on top of electricity sales.

The Hungarian FIT system has undergone several changes over the years and has been known by various names. The predecessor regulation was KÁP (2003–2007), followed by KÁT (meaning: Mandatory Feed-in Tariff) (2008–2011), which gradually gave way to the METÁR (Renewable Energy Support System), which remains in effect today. Some of the power plants that joined earlier still generate electricity under the terms negotiated during the KÁT period. The novelty of the new METÁR compared to the previous KÁT system was that, for new power plants, mandatory purchase was replaced by free-market sales, and the fixed purchase price was replaced by a premium added to the market sales price. (KÁP/KÁP 2003–2011) (METÁR 2012)

4.1 The boom in large solar power plants

In 2011, the European Commission required all EU member states to prepare a Renewable Energy Action Plan for the period 2010–2020. Hungary committed to a 14.65% share of renewable energy by 2020, which is higher than the EU's mandatory target of 13% for gross final energy consumption. At the time the plan was drafted in 2010, there were a total of 2 MW of solar panels in the country, which the government intended to increase to 15 MW by 2015, with a planned installed PV capacity of 63 MW by 2020. This would have represented a more than 30-fold increase. The prevailing policy stance in the energy sector at the time was that the Hungarian electricity system could not withstand or integrate a faster pace or a higher share of solar power. Moreover, this plan was developed with the broad involvement of solar energy associations and industry representatives and thus reflected the position of these interest groups. (NREAP 2011)
Today, it is almost laughable—but Hungary's actual PV capacity had jumped to over ~2,000 MW by the end of 2020.

What was the reason for this, and what factors played a role in the growth becoming 1,000-fold rather than 30-fold during this 10 years period? Well, in 2011, policymakers and industry experts based their assumptions on the following:

- PV investment costs were still very high (2,500–3,000 EUR/kW).[9]
- The feed-in tariff system (KÁT) at the time was optimized not for PV or other renewables, but for natural gas-based cogeneration.
- Grid integration was considered a limiting factor.
- Technological progress was underestimated.

In reality, between 2014 and 2020:

- the price of PV fell by 70–80%, which reshaped business models;
- the METÁR/KÁT regulatory transition opened up new perspectives and introduced new business models for investors in solar power plants;
- household-scale (under 50 kW) solar systems, the net metering applied there, and rising residential electricity prices resulted in a boom starting in 2014, which completely reshaped the landscape.

4.2. Houshold-scale small power plants (HMKE), metering schemes

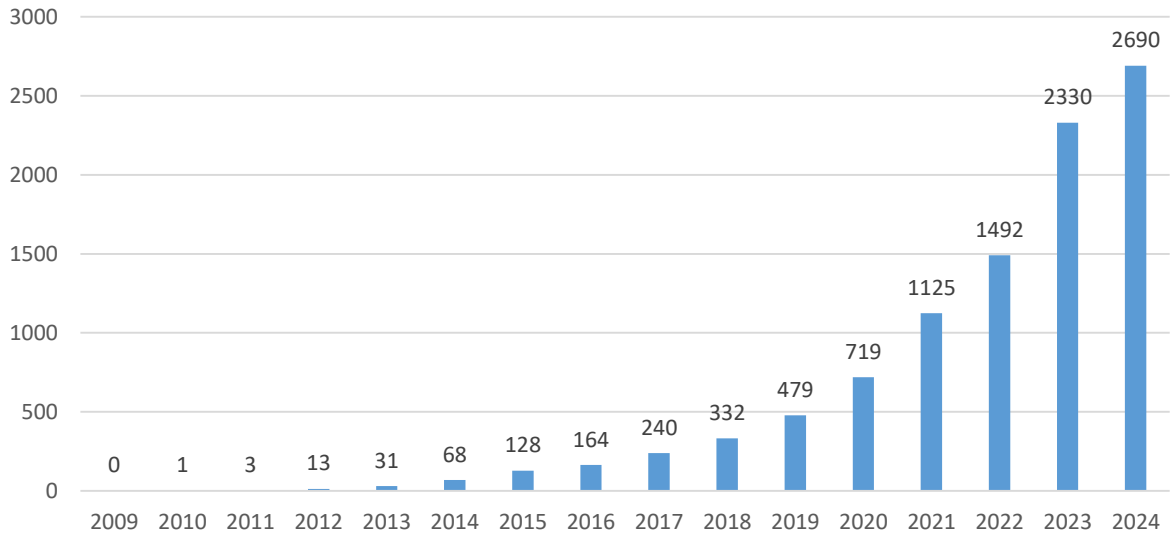
Between 2010 and 2012, Hungary had some of the highest residential gas and electricity prices in the EU. According to the government's narrative, foreign-owned energy providers were making "excess profits." Consequently, the government introduced so-called **'utility bill reduction**', which were partly a political response to this situation. The 2013 measure not only reduced but also froze prices. This resulted in residential prices remaining unchanged for 9 years (!) (2013–2022). The decline in profit forced the foreign owners to withdraw and sell their business shares to the state-owned companies. It definitely helped the government at that time win the 2014 general election, as 'utility bill reduction' was the main campaign issue.

[9] By 2023, the price of solar panels manufactured in China had fallen to 0.173 USD/Watt, which is approximately 160 EUR/kW.

Net metering has been in effect since January 1, 2008, but few people made use of it until 2014. This settlement allowed households with small-scale power plants (under 50 kW) to offset the amount of energy they consumed from the grid against the energy they fed into the grid on an annual basis. Based on the difference, they either paid or received money. This made the installation of solar systems economically viable in the 2010s, resulting in a quick return on investment.

Although there is no doubt that this system has greatly increased PV investment in this household segment, the power system operator and electricity traders considered this settlement disadvantageous for themselves. Due to their lobbying, starting in 2024, new market entrants be subject to **'gross metering'**, while the old 'net metering system' will be phased out gradually after a transition period. Gross settlement means that the owner of a residential solar panel system sells the electricity fed into the grid at a separate price and purchases the energy drawn from the grid at a separate—significantly higher—price; in other words, the two quantities can no longer be offset against each other (settled).

Figure 4. Installed capacity of household-scale small PV power plants (MW) in Hungary



Source: Hungarian Energ and Public Utility Regulatory Authority, Data on Hungarian Electircity System 2024, p. 59; https://mekh.hu/download/0/95/b1000/MEKH_statisztikai_kiadvany_VILLAMOSENERGIA_2024_A4_10.pdf

Previous metering schemes clearly demonstrate the public's enormous demand for the installation of household-scale PV systems, which may also have had political implications. Under the two-year program with a budget of over 700 billion HUF (1.75 billion euros), subsidies for the installation of solar panel systems were available starting January 1, 2021, for households raising at least one child, with a non-repayable grant of 3 million HUF (7,500 euros) available. This program alone accounted for 233,000 grants. Thanks in part to the incentive effect of such and similar EU-funded programs, more than 300,000 households in Hungary now have small-scale solar panel systems installed on their roofs.

4.3. Medium and Large-scale solar power plants

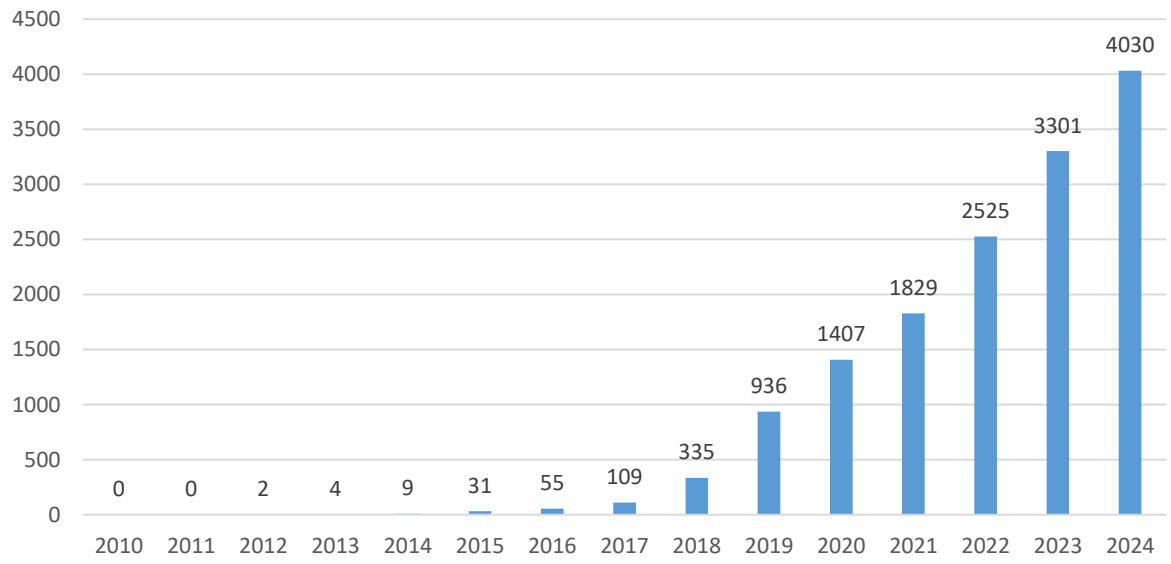
Commercial-scale PV installations larger than 50 kW—typically exceeding 0.5 MW—have seen even more dramatic growth than the household segment. The 2013 'utility bill reduction' applied exclusively to residential consumers: households, condominiums and certain social institutions. Businesses—even the smallest ones (SMEs)—purchased electricity at market rates.

After the utility bill reduction, residential prices were administratively frozen; retailers and service providers could not pass on their costs in the residential segment, so they applied higher prices in the corporate segment to compensate for the loss of revenue. Hungarian corporate electricity prices remained above the EU average between 2014 and 2019. This was one of the reasons why the competitiveness of Hungarian industry declined in all energy-intensive sectors.

From 2014, new PV investments had to face, on the one hand, the gradual introduction of a new support schemes (METÁR), which pushed them towards market-based energy sales; on the other hand, the rise in corporate electricity prices, disrupting the previously prevailing business logic, forced PV investors to abandon the KÁT and METÁR schemes (predictable revenue) and start thinking in terms of cPPAs[10] in the hope of better returns.

In other words, the cost of solar power generation fell sharply. PV investment costs dropped by 80–90% between 2010 and 2020, making solar power cheaper than fossil fuels and enabling it to be locked in at a stable price over the long term. As a result, cPPAs have become a form of price insurance for companies. Many companies, utilities, and municipalities have installed their own solar power plants on or next to their facilities and buildings to reduce their own energy consumption.

Figure 5. Installed capacity of medium and large solar panels ((50kW≤)in Hungary



Source: Hungarian Energ and Public Utility Regulatory Authority, Data on Hungarian Electircity System 2024, p. 59; https://mekh.hu/download/0/95/b1000/MEKH_statisztikai_kiadvany_VILLAMOSENERGIA_2024_A4_10.pdf

A similar reaction occurred following the 2022 energy crisis (the sudden surge in energy market prices caused by the outbreak of the Russia-Ukraine war in February 2022), which also accelerated the cPPA market. Following the extreme volatility in gas and electricity prices, companies realized that the spot market is unpredictable, long-term contracts provide stability, and the cost of PV generation is much lower than the market price during the crisis. As a result, a record number of cPPAs were signed in Europe and Hungary between 2022 and 2025.

[10] Corporate Power Purchase Agreement: a long-term corporate electricity purchase agreement under which a company commits to purchasing all or part of its electricity from a renewable energy producer.

4.4. Growth of the Hungarian solar market and financing needs

According to the latest National Energy and Climate Plan (NECP) to be submitted to the EU, the Hungarian government aims to integrate 12,000 MW of solar power capacity into the domestic electricity grid by 2030. (NECP-2024)

However, there is no information on the extent to which this expansion is intended to be achieved through ground-mounted solar power plants versus residential and commercial applications (HMKE + industrial + utility-scale combined), which implies that an additional 4 GW will be built on top of the currently installed capacity (7.8 GW – March 2026). Based on NEKT's logic, the investment requirement for the 4 GW of PV capacity is approximately 2–4.5 billion euros.

4.5. The main pillars of financing in Hungary

1) Government and EU incentives

- In the early years, the METÁR and KÁT supporting schemes ensured predictable revenue.
- Following the gradual phase-out of these support schemes, the market increasingly shifted toward **market-based** financing.

2) Bank project financing

- Hungarian banks (e.g., Erste Bank, OTP, K&H) are playing an increasingly significant role in financing PV projects.
- Financing terms have changed significantly in recent years:
  - previously low inflation and low electricity prices → favorable loan structures
  - 2021–2023: energy crisis, inflation, uncertain regulation → tightening conditions
- Larger projects now typically receive **PPA-based** financing (long-term power purchase agreement).

3) Innovative financing structures

- **Junior-senior loan packages**, mezzanine financing, and flexible releveraging mechanisms have emerged in the domestic market.
- Example: In 2024, GoldenPeaks Capital secured **a senior and junior financing package** for a 64.5 MWp Hungarian PV portfolio, with the participation of Erste Group and Erste Bank. (goldenpeakscapital-energy.com).

4) Capital market sources and private investors

- Larger players (e.g., SolServices, GPC) are increasingly involving:
  - international fund managers
  - infrastructure funds
  - foreign banks
- The Hungarian market is attractive to investors because it is growing rapidly, and the spread of PPAs provides more predictable revenue.

How is the financing of a typical Hungarian PV project structured today?

The most common model in today's Hungarian market is:

1. **Equity** for the development phase (permits, grid connection).
2. **A long-term PPA** with a company → this provides revenue security.
3. **Senior bank loan** covering 60–80% of the investment.
4. **Junior or mezzanine financing** to increase leverage (for larger portfolios).

This structure makes it possible for the Hungarian market to be **financed without subsidies** today.

4.6. Trends that will shape financing in the coming years

1) The continued rise of PPAs
- Banks now finance large projects almost exclusively through long-term PPAs.
- Corporate PPAs are also spreading rapidly in Hungary.

2) Grid constraints → new types of investments
- Energy storage (batteries)
- Smart grid developments
- Financing these attracts additional bank and EU funding.

3) Stabilization of the regulatory environment
- Following the uncertainty of 2022–2023, investors are becoming more active again.
- More predictable permitting and grid rules improve financeability.

4.7. Future challenges and opportunities

The impact of the dynamic expansion of household-scale solar power plants in recent years—attributable to favorable regulations—is also reflected in the figures. Overall, there is currently 7.8 GW of solar power capacity in the grid (and this figure is growing rapidly), but electricity generation is difficult to predict, even over extremely variable short (minute-by-minute) timeframes; therefore, traditional, weather-independent generators (mainly gas) must (or should) be kept in operation alongside them. The government has decided to support large-scale energy storage systems, which it is financing with EU funds (RePowerEU, RRF), but it has also announced a call for proposals for energy storage equipment for businesses and households (see: the program named after Ányos Jedlik). The emergence of AI could lead to significant advancements in the solar energy sector, particularly in production forecasting, optimization, and storage.

In addition to electricity storage systems, the industry is also calling for a drastic increase in the share of wind energy, which has been rendered unfeasible by administrative measures for political reasons in the last 15 years. According to the European Commission's recommendation, wind energy capacity should reach at least 50% of solar energy capacity in order to play a good complementary balancing role in the electricity system. In 2023, this figure in Hungary was only 4.8% instead of 50%, and even with the planned 1,000 MW of wind power, it is projected to reach only 8.3% by 2030.

The Hungarian electricity grid requires continuous development to avoid major blackouts like the one that occurred on the Iberian Peninsula in April 2025.[11]

In addition to the solar panels currently installed on 300,000 Hungarian homes mainly single-family houses, it would be desirable to expand toward apartment buildings, condominiums and other community energy solutions. The EU is also very ambitious in this regard. Currently, this is being tested in Hungary through several pilot programs; hopefully, with the addition of appropriate funding, progress in this area will soon be evident.

Another opportunity to watch for in the future is the spread of micro-scale, i.e., plug-in PV systems that can be installed on balconies. The EU actively supports balcony PV. Currently, in most EU countries, low-power systems (typically ≤800 W) can be installed without a permit, requiring only a notification. Such an 800W solar panel could theoretically reduce the annual energy

[11] The major blackout in Spain occurred on April 28, 2025, when a serious system failure left all of Spain and Portugal without power for several hours. It was one of the most severe power outages in Europe in recent decades.

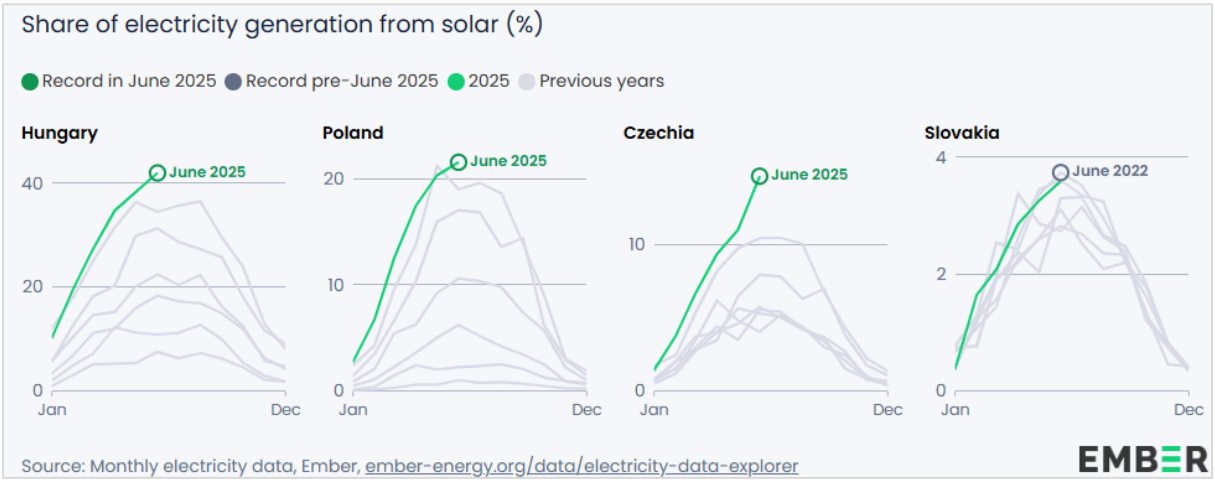
consumption of an average Hungarian household by 35–40%, though in reality the reduction would be closer to 20–35%. If half of all Hungarian households were to install balcony PV systems of this size, this alone would result in 1.68 GW of installed PV capacity in the country. The price of such an 800W set in Austria is 400 EUR, and it pays for itself within one year.

4.8. Regional comparison

As of early March 2026, Hungary's installed PV capacity has reached over 7.8 GW (7,831 MW), exceeding its 2030 targets six years ahead of schedule. This capacity, comprising over 300,000 small residential systems and hundreds of large industrial solar farms, enabled solar power to generate nearly 25% of the country's electricity in 2024—more than any other nation, according to data compiled by the research group Ember. Hungary surpassed Chile to claim the top spot.

The growth seen over the past few years has already translated into record-breaking output in 2025. In June 2025, solar power supplied a remarkable 42% of Hungary's electricity, setting a new monthly record. Look at these results in a regional comparison. Poland's upward trajectory continued, with solar contributing a record 22% of the country's electricity generation, while cumulative installed capacity reached 23 GW. Czechia also experienced a significant surge, surpassing its previous generation records, with solar covering 10.5% of electricity generation in June 2024 and rising to 14.7% by June 2025, underscoring the rapid expansion of solar across the Visegrad region.[12]

Figure 6. Share of electricity generation from solar (%) in Cyehia, Hungary and Poland in June 2025 (recorded highest-ever solar power contribution)



Source: Ember. (2025). *Turning to the sun: Solar rise in Central Europe,* https://ember-energy.org/data/electricity-data-explorer/

The outgoing Orban-government, which have been in power continuously between 2010-2026, have used government measures (e.g. utility bill reductions) to distort electricity prices in such a way that households pay one of the lowest prices in Europe, while businesses pay one of the highest. This is very detrimental to corporate competitiveness, but it was politically advantageous for the government. Major electricity-consuming companies thus became directly interested in PV installations even with low subsidy levels, while households, due to low electricity prices, required relatively high (sometimes 100%) subsidies to install solar panels on their rooftops.

The explosive growth experienced in the Hungarian solar market over the past decade was made possible by an increasingly complex, multi-pronged financing model: a combination of

[12] https://ember-energy.org/latest-insights/turning-to-the-sun-solar-rise-in-central-europe/

government incentives, bank project financing, capital market sources, and new types of PPA-based (Power Purchase Agreement) structures.

Table 1. Solar energy financing models actually used in Hungary

Financing model	Hungarian practice	Essence	Typical participants
Government subsidies (KÁT, METÁR, EU funds)	✓	Fixed purchase price or investment subsidy	Government, EU, small and medium-sized developers
Bank project financing (traditional)	✓	Long-term loan based on the project's cash flow	OTP, Erste, K&H, UniCredit
PPA-based financing (corporate PPA)	✓	Long-term power purchase agreement with a company	Industrial companies, energy providers
Junior–senior loan structures	✓	Two-tier loan: senior (bank), junior (fund manager)	Erste, Schelcher Prince, infrastructure funds
Mezzanine financing	✓	Flexible source between equity and debt	Private equity funds, investors
Capital market sources (funds, investors)	✓	Entry of investment funds and infrastructure funds	GPC, SolServices, international funds
Equity	✓	Developer or investor's own funds	Domestic and foreign developers
ESG-based financing	✓	Loans tied to sustainability goals	Banks, companies
Financing combined with energy storage (PV + battery)	**– / partially**	Joint financing of PV + storage	Banks, EU programs
Note: ✓*= proven to have been used; – = exists in theory, but no known Hungarian examples*			

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5. Case Study: The Pljevlja Energy Transition – Transferable Lessons from Hungary's Mátra Power Plant[13]

5.1. Introduction

Moving beyond coal is especially difficult for regions that depend on it, since the transition spans technological, economic, social, and governance issues (Bujdosó et al., 2022). The EU's 2050 climate-neutrality goal has increased pressure on member and candidate countries to retire coal power in ways that remain fair to affected workers and communities.

Coal-reliant countries in Central and Eastern Europe face particular transition hurdles because lignite and hard coal have long supported electricity, heating, and industry. In the newer EU Member States, persistent dependence on fossil fuel imports and outdated energy systems remains a significant challenge (Santa et al., 2025). Many of these regions still depend heavily on coal jobs, have limited economic alternatives, aging infrastructure, and lower incomes than Western Europe (Galgóczi, 2019).

The Western Balkans, including Montenegro, face tougher coal-transition barriers because of deeper coal dependence, weaker institutions, lower development levels, and the added demands of EU accession (Fejzić et al., 2024). EU-accession obligations place additional administrative burdens on candidate countries" (Djurović, 2022). Their coal plants are typically older, less efficient, and more polluting, often lacking basic emissions controls (Osmani, 2025). Montenegro's Thermal Power Plant (TPP) Pljevlja, operating since 1982, reflects these issues, burning lignite with high ash and sulphur that drives major particulate and SO_2/NO_x emissions (Stefanovic et al., 2019). As we look for comparable subjects to include as case studies and starting point of policy innovation, the Mátra Power Plant in Hungary provides a relevant case study because its ongoing transformation embodies all the analytical aspects required by the concept paper: it represents a large-scale green investment project with a clearly identifiable financing structure (national funds, EU instruments, and corporate investment), and it delivers measurable impacts in terms of emissions reduction, job preservation and restructuring, and the creation of new innovation-driven activities on a formerly coal-dependent industrial site.

5.2. Mátra Power Plant of Hungary and Thermal Power Plant Pljevlja of Montenegro

According to Hungary's National Energy and Climate Plan (Government of Hungary, 2024)., the transformation of the Mátra Power Plant and the broader phase-out of coal and lignite play a central role in the country's decarbonisation strategy, requiring both technological modernisation and a socially responsible just transition in the affected regions.

Coal, primarily lignite, has experienced a dramatic decline in Hungary's energy system over recent decades. Domestic coal and lignite extraction fell from 176.8 PJ in 1990 to only 32.4 PJ in 2021, covering just 56% of national demand and leaving the country dependent on imports for the

[13] Authored by **Imre Rimóczi.**

remaining share. The share of coal and lignite in gross inland energy consumption dropped from 21% in 1990 to approximately 5% in 2021. In electricity generation, coal's contribution decreased from 18% in 2016 to 8% in recent years, while in district heating it fell from 5% to 2%. Overall, the use of coal-based products in final energy consumption is projected to decline by 33.6% between 2019 and 2030, reducing its share to only 0.8% by 2030. Despite this long-term marginalisation, coal remains a strategically important domestic resource.

The Mátra Power Plant remains Hungary's last major lignite-fired facility and one of the most critical yet challenging elements of the country's energy transition. With an installed capacity of approximately 950 MW, it has historically accounted for around 17% of national electricity generation capacity and was responsible for 3.2 million tonnes of CO_2 equivalent emissions in 2021 — representing 33% of the entire energy production sector's emissions and roughly 5% of Hungary's total greenhouse gas emissions. The Hungarian National Energy and Climate Plan identifies the transformation of the Mátra Power Plant as one of the country's most important decarbonisation tasks. It calls for the complete phase-out of coal and lignite combustion from domestic electricity generation by 2029 at the latest, once replacement capacities become operational. To ensure security of supply during the transition, the development of new combined-cycle gas turbine (CCGT) capacity of up to 1.65 GW is planned at the Mátra and Tisza sites (MVM Mátra Energia Zrt., 2025). (Additional low-carbon measures include the construction of up to 200 MW of new solar photovoltaic capacity on recultivated mining areas supported the dynamic PV government policy (Olajos, 2026), expanded biomass and refuse-derived fuel (RDF) utilisation, and the deployment of industrial-scale energy storage. **The plant's transformation also addresses the socio-economic dimension: it affects a region where lignite-based heating still serves a significant number of households,** while the large site offers opportunities for multi-purpose redevelopment, including expansion of the existing industrial park, logistics functions, tourism, and nature conservation. Financing remains a key challenge (Czippán & Sziva, 2026). Many projects depend on EU instruments such as the Just Transition Fund and the Recovery and Resilience Facility, but Hungary's access to EU funds is currently (April 2026) frozen. If this persists, national and private financing will be needed to sustain renewable expansion and industrial diversification.

Despite these uncertainties, by combining biomass, solar, gas, and emerging technologies, the plant has maintained energy capacity, preserved jobs, and laid the groundwork for a long-term shift toward a low-carbon regional economy (Heves Megye Önkormányzata, 2022).

TPP Pljevlja also occupies central position in Montenegro's energy system, supplying a large share of domestic electricity and providing the country's main non-hydro baseload source. With 225 MW of capacity, it has historically delivered 40–60% of national generation, and the National Energy and Climate Plan of Montenegro (Government of Montenegro, 2023, National Energy and Climate Plan [NECP]) identifies it as the only fully reliable dispatchable plant. Its role becomes especially important in dry years, when hydro output drops, and during periods of low solar and wind production, helping stabilise the system and limit import dependence. In wet years, the plant complements strong hydro generation and supports Montenegro's net-export position. Current plans foresee Pljevlja maintaining this backup function until around 2040, though with declining operating hours—capped at 4 500 annually from 2030 in the WAM scenario—as new renewable and flexible capacity comes online.

TPP Pljevlja is Montenegro's only lignite plant and its largest source of energy-related CO_2 emissions. The facility struggles with several structural issues that closely resemble those faced at Hungary's Mátra plant. These include persistent non-compliance with SO_2, NO_x, and dust limits, strong regional dependence on coal-related jobs and revenues, and the tension between maintaining energy security and advancing decarbonisation. The NECP also stresses the need for major investments—both in emissions-control upgrades and in new renewable and flexible

capacity—alongside a dedicated just-transition programme for the Pljevlja region. Like Mátra PP, the plant's future hinges on EU-aligned policy tools, carbon-pricing revenues, and external financing to make the transition viable.

This case study does not primarily aim to provide technical advisory input; rather, it seeks to contribute to Montenegro's progress under EU Chapter 27 (European Commission, n.d.) by strengthening innovative, effective, transparent and accountable environmental administration inspired by the UN Sustainable Development Goals, particularly SDG 16 on institutional capacity and good governance with the following recommendations.

5.3. Stronger Local NGO Network

The ongoing just transition dialogue in Montenegro places a special focus on Pljevlja, emphasizing that a successful transition must be community-centred, built on "continuous and open dialogue," and aligned with national and local priorities such as replacing coal with renewables, ecological reconstruction of the Pljevlja Thermal Power Plant, district heating, innovation, and the creation of green jobs (UNDP, 2024). To move from concept to concrete realization, UNDP and Montenegro's state-owned utility EPCG signed a financial agreement in Podgorica to advance Montenegro's green transition, an arrangement that "pav[es] the way for the concrete implementation of green transition initiatives" through the establishment of a Green Jobs Training Center and long-term cooperation frameworks, while also underscoring that the Pljevlja Coal Mine remains a key actor and primary beneficiary in the just transition process (UNDP, 2026).

Studying the Mátra Power Plant's just transition in parallel is particularly adequate because it represents one of the most advanced and structured coal-phase-out processes in Central and Eastern Europe, showing how high-level transition concepts—such as community-centred planning, workforce reskilling, and low-carbon replacement investments—are being translated into real implementation on the ground, which is why regular peer-review visits to Visonta, Hungary would provide essential, practice-based insights for strengthening transition governance across the region.

It is recommended that **regular peer-review visits** be undertaken to Mátra PP in order to systematically observe and assess the progress made under the regional self-government's Just Transition Plan (Heves Megye Önkormányzata, 2022)., which encompasses the phased withdrawal from lignite mining and coal-based power generation, the retraining and upskilling of workers, the diversification of the regional economy, the restoration of mined-out areas, the reduction of energy poverty, the strengthening of local SMEs and innovation capacity, and the replacement of household lignite heating with clean alternatives — worth seeing what has been achieved.

As the most important aspect the strengthening the role of local NGOs is essential for ensuring a credible and socially grounded transition at Pljevlja, and the experience of Hungary's Mátra region offers a useful reference point. In Northern Hungary, the coal-phase-out process was shaped by broad stakeholder participation, involving local communities, civil society organisations, energy-policy actors, and decision-makers. This inclusive governance model helped build legitimacy for transition decisions, surface concerns about employment and regional development, and mediate between advocates of rapid coal exit and those favouring a more gradual approach (Bujdosó et al., 2022).

Local NGOs in Montenegro hold insights into community needs, environmental impacts, and alternative development pathways that technical ministries cannot generate alone. Early and structured engagement—particularly from groups representing women, youth, minorities, and especially **NGOs for health and disease groups** — would strengthen Montenegro's negotiating

position in Brussels. Establishing **a dedicated regional NGO Platform in 2026**, supported by targeted funding and **guaranteed representation on transition steering committees**, would institutionalise this role and help ensure that decisions about Pljevlja's future reflect local priorities. Such a platform would also support more constructive, evidence-based dialogue on energy security, reducing the likelihood of conflictual public hearings and enabling NGOs to act as co-creators of policy rather than external critics. A strong, well-organised NGO network can act as a stabilising **reservoir of expertise**, ensuring continuity and informed decision-making even when political shifts disrupt markets or weaken state institutions highlighted Beke et al. (2024).

This approach mirrors the most successful elements of the Mátra transition, where broad stakeholder platforms improved policy quality and social acceptance. It also aligns with EU expectations under the Just Transition Mechanism and with the Visegrad+ project's emphasis on knowledge transfer and inclusive governance. Recent analyses reinforce this direction: Beke et al. (2024) highlight participatory governance as a core strength of Hungary's transition model, while Djurović (2024) stresses that meaningful civil-society involvement is essential for enlargement countries seeking to strengthen Chapter 27 readiness and overall EU accession credibility.

5.4. EU Emissions Trading System (ETS) and TPP Pljevlja Future Quotas to Finance a People-Centred Just Transition

In the following sections, we propose **two additional mechanisms for green-investment financing** in the Pljevlja region, complementing the existing instruments already available for Montenegro—namely IPA III national programmes (energy, environment, social transition), IPA III regional programmes (Western Balkans Green Agenda and Energy Community support), EIB loans blended with IPA grants, and the ongoing UNDP–EU joint programmes active in Pljevlja. Building on these established sources, we recommend exploring two further options instead of donations (NECP, p. 125): first, the creation of a shadow ETS mechanism for/by the Pljevlja Thermal Power Plant to generate predictable, transition-earmarked revenues; and second, a structured invitation scheme for EU Member State ETS quota buyers to co-finance decarbonisation and community-level transition projects in Pljevlja.

Hungary's Modernisation Fund investments—financed entirely from EU ETS revenues—play a strategic role in advancing a fair and regionally balanced Just Transition by modernising district-heating systems, improving energy efficiency, and supporting the emergence of local renewable-energy communities. These interventions directly reduce fossil-fuel dependence in municipalities with ageing energy infrastructure, lower household energy burdens for vulnerable populations, and create new local economic opportunities in installation, maintenance, and cooperative energy management. By combining decarbonisation with affordability and community-level value creation, the ETS-financed programmes help ensure that Hungary's shift toward climate neutrality strengthens social resilience rather than deepening regional disparities. (European Commission, 2024).

Montenegro can draw on these experiences as it prepares its own transition framework. The NECP foresees the development of a Just Transition Plan for the Pljevlja coal region, which will define investment priorities, land-repurposing strategies, job-creation measures, and reskilling programmes for the 2027–2035 period. This plan is intended to guide infrastructure upgrades, support new economic activities, and mitigate the social impacts of lignite phase-out while ensuring long-term regional cohesion (NECP, 123-125).

In this context, the Pljevlja Coal Mine (Rudnik Uglja Pljevlja, RUP) proposed establishing a dedicated European Union Just Transition Fund for Montenegro based on European resources, arguing that such a mechanism would enable the country to manage the transition in a planned, efficient, and socially responsible manner (Europe Says, 2026). Besides, there is a strong strategic

rationale for integrating ETS-style local revenue-recycling mechanisms inside the JSF of Montenegro or that of Pljevlja into the transition process, with the technical design challenges being fully manageable through independent composition measurements of the type outlined by Stefanović et al. (2019). TPP Pljevlja is Montenegro's largest CO_2 emitter and will fall fully under the EU ETS upon accession—or earlier under Energy Community rules. Montenegro can prepare by designing a **pre-accession "shadow ETS" mechanism** not only from European but also its own resources that anticipates future auction revenues and channels them into local transition measures. Such a mechanism could be funded through expected ETS revenues attributable to Pljevlja, voluntary or mandatory contributions from Elektroprivreda Crne Gore, the operator of TPP Pljevlja based on current carbon-pricing signals, and the national budget.

Integrating the shadow local ETS mechanism into the Climate Change Adaptation Plan for the Period 2025–2035 with an Action Plan for the Period 2025–2027 strengthens Pljevlja's Just Transition by creating a local price signal that encourages cleaner industrial practices, reduces pollution, and supports investment in low-carbon technologies.

A core principle should be that 60–70% of Pljevlja-related ETS revenues are **reinvested directly at the local level**—supporting households, community projects, and the district heating system. Visible, practical benefits such as lower energy bills, warmer homes, and new income opportunities would make the **transition socially acceptable and politically durable**, while **strengthening Montenegro's credibility with the European Commission**. Treating future ETS revenues not as a compliance burden but as a strategic asset would help anchor a people-centred just transition.

5.5. Quid Pro Quo Arrangement

Gas-fired capacity at the Mátra Power Plant site includes two existing 30 MW open-cycle gas turbines (GT1 and GT2), commissioned in 2007 and used primarily for balancing and reserve functions (Global Energy Monitor, 2024). These units operate alongside the lignite blocks that Hungary plans to retire by 2029, as confirmed in national energy strategy documents and MVM's transition plans (Government of Hungary, 2024). The centrepiece of the site's transformation is a new 500–650 MW combined-cycle gas turbine (CCGT) unit, designed as a high-efficiency, flexible replacement for lignite and capable of generating up to 4 TWh annually (MVM Mátra Energia Zrt., 2025). According to the updated National Energy and Climate Plan, the new CCGT is intended to support system flexibility and integrate Hungary's rapidly growing solar fleet (European Commission, 2023). Together, the existing gas turbines and the forthcoming CCGT mark the shift of the Mátra site from a lignite-based baseload plant toward a gas- and hydrogen-ready flexible generation.

From this aspect, Montenegro's National Energy and Climate Plan **envisages the introduction of natural gas into the national energy mix** as a transitional energy source, too. This is supported by the existing Concession Contracts for the Production of Hydrocarbons Offshore of Montenegro and the Master Plan for Gasification of Montenegro, although the development of a dedicated new gas-fired power station is not currently foreseen (NECP, pp. 38–39).

Thermal Power Plant Pljevlja has reached a major environmental milestone with the successful launch of trial operations of its newly installed flue-gas desulphurisation (FGD) system, the first of its kind in Montenegro. According to EPCG, the FGD unit—central to the plant's ecological reconstruction—has already delivered dramatic reductions in sulphur-dioxide emissions, with SO_2 concentrations falling to around 61 mg/m^3 compared with 4,544 mg/m^3 in March 2025 and 3,249 mg/m^3 after earlier boiler and chimney upgrades. EPCG reports that the system is performing above design expectations, with further optimisation planned to ensure long-term compliance with EU industrial-emissions standards. (Serbia Energy, 2026, February 9). This

achievement aligns with the broader reconstruction plan outlined in the NECP, which planned short-term interventions to the installation of FGD and selective catalytic reduction (SCR) systems for denitrification, the modernisation of electrostatic precipitators, the construction of a wastewater-treatment plant, and the reconstruction of the internal by-product transport system. In addition, a new heating station will be integrated into the district-heating network. Together, these measures are designed to secure substantial reductions in SO_2 and NO_x emissions while delivering modest improvements in overall energy efficiency (NECP, pp. 120–121). These achievements provide Montenegro with the **necessary space to begin formulating the long-range transition strategies, including plans such as the one outlined below**.

The **timely construction of a new gas-fired power plant is of critical importance** for Montenegro's energy security during the transitional period, as it would provide the necessary dispatchable backup capacity to complement growing renewable generation and ensure system stability. However, the substantial investment costs involved clearly exceed the current budget capacity of Montenegro in the pre-accession phase.

Beyond the Environmental Reconstruction Project, which allows the Pljevlja Thermal Power Plant to remain operational in the short term, the National Energy and Climate Plan outlines the development of new renewable energy capacities. At the same time, it also considers **the potential use of natural gas as a transitional fuel to facilitate a smooth and socially acceptable shift away from lignite** (NECP 39, 58, 82, 95).

Possible sources for financing new investments in the Pljevlja region include Montenegro's national budget, EU Member States and EU institutions, UN agencies, and non-EU partner countries, with the understanding that EU pre-accession and post-accession subsidies are specifically designed to support candidate and member states. In this context, it is important to note that the state-owned utility EPCG and Abu Dhabi Future Energy Company (Masdar) from the United Arab Emirates have already established a 50/50 joint venture for large-scale renewable energy development in Montenegro (Balkan Green Energy News, 2026). As this is not a Montenegro–EU Member State partnership but a Montenegro–UAE joint venture, the project is positioned to benefit from existing and future EU subsidy schemes available to candidate-country investments. Current investment patterns indicate that **it is high time to develop additional in-Europe financing channels** that can strengthen European economic cooperation, support large-scale investments in candidate countries, and **ensure that present and future EU subsidies continue to circulate within the integrated EU–candidate-country economic space.**

To relieve the Montenegrin Eco Fund from the financial burden of constructing a gas-fired power plant and to allow it to focus on environmentally priority projects (NECP, pp. 70, 115–116), it is recommended that foreign companies be permitted to build and operate a gas power station on a fully commercial basis—in exchange for the obligation outlined below—thereby enabling direct foreign investment financed entirely by foreign capital.

A promising quid pro quo arrangement could be explored to accelerate TPP Pljevlja's transition while securing reliable dispatchable capacity during the decarbonisation phase. An EU member state company could finance and construct a new gas-fired power plant (not necessarily located in Pljevlja itself, but in a technically and infrastructurally more suitable site in Montenegro) **in exchange for the right to purchase a portion of Montenegro's future ETS allowances by other companies in the EU Member state** instead of donations. The revenues generated from these quota sales would be channelled into Montenegro's ETS-related investments already in the pre-accession phase, with a substantial share — preferably at least 60–70 % — dedicated specifically to green investments and just transition measures in the Pljevlja region. These revenues could in turn be used to finance green investments directly at TPP Pljevlja itself, such as further biomass and RDF co-firing infrastructure, on-site solar development, efficiency upgrades

of auxiliary systems, or environmental compliance retrofits. **The overall balance of investments and expenditures connected to the TPP Pljevlja transition can ultimately only be achieved at the national level;** this is precisely why the proposed quid pro quo mechanism is necessary. This arrangement would provide Montenegro with additional funding for its local investment fund, accelerate the phase-out of lignite, and **deliver tangible socio-economic benefits to the most affected local communities.** At the same time, **it would allow the participating EU member state to meet its own ETS compliance needs in a cost-effective manner.** Any such arrangement must, of course, fully comply with all applicable EU rules, including the ETS Directive, state aid regulations, competition law, and environmental impact assessment requirements.

5.6. Challenges and Barriers

Despite notable progress, the Mátra transition faces several structural challenges that are highly relevant for Montenegro. **Limited administrative and technical capacity at the regional level**, together with **market risks related to biomass supply chains** and the **economic viability** of new technologies, have created implementation bottlenecks.

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(Section 5)

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6. Lessons Learned and Best Practices

- **Technology cost trajectories are regularly underestimated**: in Hungary, the 70–80% drop in PV prices over the past 15 years has completely overturned the previously cautious plans. Lesson: targets and grid preparedness must also be scaled for an "accelerating" scenario.
- **The design of the support scheme is more important than the level of support**: stable, understandable, and bankable regulations (previously KÁT/FIT, later premium and market-based METÁR) enabled rapid market development.
- **Incentives differ between the residential and commercial segments**: in the Hungarian example, higher prices and risk for corporate customers (after 2022) pushed companies toward PV + long-term contracts (cPPAs); for residential customers, metering/billing and later targeted support were decisive.
- **The grid is the bottleneck**: with a high PV penetration rate, system risk increases without storage, smart grids, and forecasting/optimization (the risk of blackouts is also mentioned).
- **Predictability attracts capital**: bank project financing and capital market resources will come if licensing, grid connection, tariffs, and billing do not change unpredictably.

- **The integration of ETS revenue recycling and national green finance instruments** shows how carbon pricing can be transformed into a tool for just transition. The **importance of international cooperation** is evident in the use of EU funding instruments and **knowledge exchange** within the Visegrad framework. Overall, the Mátra case underlines that a phased, multi-technology approach supported by stable policy and blended financing is essential for **a socially acceptable coal-phase-out.**

7. Policy implications and recommendations for Montenegro and Moldova

1) Dual-track PV strategy: residential + utility/industrial with separate regulatory frameworks
- Separate goals, separate tools: **residential** (rooftop, community energy), **corporate/municipal** (rooftop + onsite), **large commercial solar power plants** (auctions/bidding).
- Do not try to manage everything with a single system; financing and administration differ.

2) "Bankable" revenue frameworks: auctions + premiums, and building a cPPA market
- Utility-scale: competitive tender/auction (e.g., premium-based) → price reduction (price cap), transparency.
- Corporate market: **cPPA standardization** (model contracts, balance group/settlement rules, guarantees) so that banks will actually lend.

3) Residential incentives: metering with a "phase-out schedule," predictable gradual transition
- If solar panel subsidies start with a system based on net/balance metering, **a pre-announced, multi-year transition** is needed to switch to gross metering schemes.
- Goal: investor confidence + grid protection. The Hungarian example shows that a sudden switch is risky from both a political and market confidence perspective.

4) Grid connection and flexibility: "grid-first" program alongside PV
- Mandatory parallel investment package: **distribution network development, digital metering, controllability**, and **storage programs** (industrial + residential).
- Permitting: fast, transparent connection process, capacity map, queueing rules.

5) Technology mix: wind and energy storage are not optional, but system-level complements
- With excessive PV dominance, **wind + storage + flexible consumption** are needed to balance the system.
- Policy: Removing administrative barriers to complementary weather-dependent renewables (e.g., wind energy) + hybrid (PV+storage) tenders.

6) Targeted, EU/IFI[14] -compatible subsidies: fewer "general" subsidies, more smart, targeted subsidies
- For households, subsidies should be needs-based/energy-efficiency-focused, preferably comprehensive (insulation + heat pump + PV), not merely PV-panel subsidies.
- If external financing (EU/IFI) is available: the focus should be on the grid and flexibility, as this unlocks private capital.

7) Risk management and communication: scenario-based planning
- Requirement: 3 trajectories (conservative / fast / shock—e.g., energy crisis) and a grid and support framework aligned with these.

[14] IFI = International Financial Institution(s), typically referring to the World Bank Group (World Bank/IBRD/IFC), EBRD (European Bank for Reconstruction and Development), EIB (European Investment Bank), and other multilateral development banks.

- Public "policy roadmap" for 3–5 years: reduces the regulatory risk premium → cheaper capital.

8) Accelerate the just transition of coal-dependent regions while mobilising green investment before full EU accession.

- Systematic involvement of local NGOs in just transition planning to ensure meaningful stakeholder participation.
- Creation of a dedicated local green investment fund inside Eco fund fed by future local and foreign ETS revenues.

8. Conclusions

The most important lesson from Hungary's world-leading solar market boom is that the combination of falling technology costs and market incentives can completely overturn conservative energy policy scenarios within a short period of time. In the 2010s, the steep decline in PV investment costs, along with the evolution of the KÁT/METÁR scheme, enabled a pace of capacity expansion that previous plans and industry expectations had not foreseen. Consequently, national targets and implementation tools must be scaled not only for a "base-case" scenario but also for an accelerating (and, in shock scenarios, rapidly escalating) growth trajectory.

Experience shows that, in the case of incentive schemes, a predictable, financeable ("bankable") regulatory design is at least as important as the level of support. This trend is reinforced by the fact that both Moldova and Montenegro are increasingly moving toward auction-based, long-term revenue mechanisms (fixed-price/market-premium-type, CfD[15] -like structures) for larger projects, while simplified regimes (e.g., FIT and prosumer settlement systems) remain relevant. Based on the Hungarian example, however, the residential and corporate/commercial segments are responding according to different logics: for households, it is the metering rules (shifting from net/balance-based metering to net billing/gross metering) and targeted programs, while for businesses, it is market price risk and long-term PPAs (including the gradual standardization of corporate PPAs) that provide investment security. For Montenegro and Moldova, this means that it is advisable to manage the residential and utility/industrial PV markets with separate sets of tools, and to implement changes (particularly the restructuring of billing systems and auction contract terms) according to a pre-announced, multi-year schedule with transparent rules.

Finally, the systemic constraint on rapid PV growth is the lack of grid integration and flexibility tools: with a high share of solar power, system risk increases and security of supply may be compromised without storage, smart grid developments, forecasting, and optimization. The policy conclusion is therefore a "grid-first" approach: in addition to making connection and permitting procedures transparent, priority must be given to developing the distribution network, regulatability, and the development of the storage capacity market and public financing, while balancing the renewable mix (particularly by increasing the share of wind energy) reduces risks arising from the weather dependence of solar energy.

The comparative analysis of the Mátra Power Plant transition demonstrates that even deeply coal-dependent regions can initiate a credible, socially grounded, and investment-ready transformation when technological, financial, and governance instruments are aligned under a coherent long-term strategy. Hungary's experience shows that combining phased lignite withdrawal with flexible gas capacity, large-scale renewable deployment, and targeted socio-economic measures can preserve energy security while enabling structural change.

[15] CfD = Contract for Difference – a revenue-stabilizing solution in which: there is a pre-determined reference/target price (strike price) and a market price; the difference between the two is settled: if the market price is below the target price, the producer receives a supplement; if it is above, the producer repays the difference.

Crucially, the Mátra case highlights the importance of predictable financing frameworks—particularly ETS-linked revenue recycling, blended public–private investment models, and strong regional governance structures—in sustaining transition momentum.

For Montenegro, these lessons are directly transferable. Pljevlja faces similar technological constraints, labour-market dependencies, and institutional challenges, but also possesses comparable opportunities to leverage EU-aligned policy tools, future ETS revenues, and foreign investment partnerships. By adopting a structured approach that integrates environmental compliance, flexible backup capacity, renewable expansion, and community-centred planning, Montenegro can accelerate its transition well before EU accession. Strengthening local NGO participation, establishing a dedicated green investment mechanism within the Eco Fund, and exploring innovative financing arrangements—such as shadow ETS schemes and quid pro quo investment models—would further enhance the credibility and feasibility of the transition.

Overall, the Mátra experience underscores that a just, investable, and EU-compatible transition for Pljevlja is achievable if Montenegro combines regulatory alignment, institutional strengthening, and diversified financing with a clear long-term vision. Implemented coherently, these measures would not only advance Chapter 27 readiness but also position Montenegro as a regional example of effective coal-region transformation in the Western Balkans.

3. POLAND: Mobilisation of Green Investment in the Context of EU Environment and Climate Policy

Dr. Ewa DRYJAŃSKA [16]

Dr. Andrzej KASSENBERG (editor) [17]

Dr. Wojciech SZYMALSKI[17]

Ewa ŚWIERKULA[17]

Abstract

This chapter examines the mobilisation of green investments in Poland within the framework of European Union environmental and climate policy, highlighting key institutional mechanisms, policy instruments, and implementation challenges. It outlines Poland's economic and environmental context, characterised by continued reliance on fossil fuels, significant air quality issues, and increasing climate-related risks, while also noting progress in renewable energy deployment and energy transition strategies.

The analysis emphasises the role of long-standing financial institutions—such as the National Fund for Environmental Protection and sector-specific programmes—in supporting investments in renewable energy, energy efficiency, and low-emission transport. EU funding instruments, including cohesion funds and the Modernisation Fund, have played a critical role in scaling these efforts. At the local level, case evidence from the Potęgowo commune illustrates how renewable energy investments can stimulate rural development, reduce energy costs, and enhance social resilience.

Despite these successes, the chapter identifies persistent barriers, including regulatory instability, limited institutional capacity, insufficient ESG data infrastructure, and uneven public engagement. It argues that effective green investment mobilisation requires stable policy frameworks, improved data systems, and stronger integration of social dimensions. The chapter concludes with policy recommendations for countries such as Montenegro and Moldova, stressing the importance of early, coordinated, and socially inclusive energy transitions.

Keywords*: green investment; energy efficiency; public buildings; blended finance; Poland*

1. Introduction

At the start of 2026, the Polish economy, one of the largest economies in the EU, is in a phase of stable growth, with slightly optimistic forecasts for the coming months. Poland. Following 2025, which was considered a turning point, GDP growth remains at a solid level, and forecasts for 2026 point to economic growth of around 3.5%–4% but if the conflict in Iran does not de-escalate quickly, could be revised downward by 0.5 to 1.0 percentage points. The economy has a mixed structure. According to the Central Statistical Office, the services sector has generated approximately 58% of gross value added in recent years, industry and construction approximately 30–32%, and agriculture approximately 2–3% (GUS, 2024). However, Poland remains one of the most energy-intensive economies in the EU—primary energy consumption per unit of GDP is significantly higher than the EU average, which stems, among other things, from the structure of industry and historical dependence on fossil fuels (IEA, 2023; GUS, 2023).

[16] Institute for Sustainable Development Foundation, ISD Foundation, Warsaw, Poland;

2. Country context

At the start of 2026, the Polish economy, one of the largest economies in the EU, is in a phase of stable growth, with slightly optimistic forecasts for the coming months. Poland. Following 2025, which was considered a turning point, GDP growth remains at a solid level, and forecasts for 2026 point to economic growth of around 3.5%–4% but if the conflict in Iran does not de-escalate quickly, could be revised downward by 0.5 to 1.0 percentage points. The economy has a mixed structure. According to the Central Statistical Office, the services sector has generated approximately 58% of gross value added in recent years, industry and construction approximately 30–32%, and agriculture approximately 2–3% (GUS, 2024). However, Poland remains one of the most energy-intensive economies in the EU—primary energy consumption per unit of GDP is significantly higher than the EU average, which stems, among other things, from the structure of industry and historical dependence on fossil fuels (IEA, 2023; GUS, 2023).

2.1. Energy transition

Poland's key environmental challenge remains the energy transition. Record low share of coal in the national electricity mix – the total share of hard coal and lignite in electricity production fell below 50% for the first time in history during the first five months of 2025. At the end of August 2025, the installed capacity of renewable energy sources (RES) amounted to almost 36.5 GW (23 GW PV, 10,4GW wind), which is 14.5% more compared to August 2024. The total installed capacity of all electricity sources in Poland in August amounted to 74.6 GW (conventional energy and renewable energy sources), of which 36.5 GW was attributable to renewable energy sources (almost 49%) (Forum Energii, 2025).

An important, though often less highlighted, element of the energy transition is the heat sector, which in Poland remains heavily dependent on fossil fuels. District heating systems, especially in cities, still rely heavily on coal (70%), although the share of natural gas (10%) and—to a limited extent—renewable energy sources such as biomass, heat pumps, and geothermal energy is growing. The transformation of the heating sector poses a particular challenge due to its dispersed infrastructure, high modernization costs, and the need to ensure security of supply and acceptable prices for end-users (Forum Energii, 2025a).

Natural gas, on the other hand, serves as a transition fuel in the Polish energy system, supporting the transition away from the most carbon-intensive sources, particularly in the power and heating sectors. In recent years, its importance has increased in both electricity and district heating production, due to its lower direct emissions compared to coal and the greater operational flexibility of gas units. At the same time, growing dependence on gas is associated with geopolitical and price challenges, as well as the risk of carbon lock-in (Forum Energi 2025a).

The share of RES in gross final energy consumption has reached approximately 16–17%, represents significant progress but still remains below the EU average (Eurostat, 2024). Analyses by the Energy Forum show that the share of RES in electricity production has increased to approximately 29–31%. The transition requires significant investments in the modernization and expansion of power grids, the development of energy storage, and new technologies, including offshore wind and hydrogen (Forum Energii, 2025).

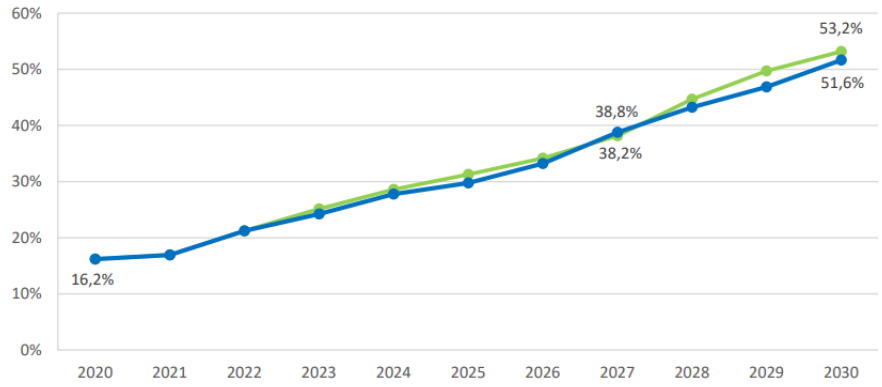
The draft of the updated National Energy and Climate Plan from December 2025 (NECP) significantly raises the ambitions of the transition. It assumes that by 2030, the share of RES in electricity production will reach approximately 51–53%, with a simultaneous increase in electricity demand to approximately 200 TWh, reflecting the ongoing electrification of the economy (Fig. 1). However, it is worth emphasizing that – according to the latest analyses by the Energy Forum – the pace of transformation is still insufficient given the scale of the challenges (Forum Energi, 2023). The Polish economy remains heavily dependent on fossil fuels, which

account for approximately 85% of primary energy consumption (including 41% coal, 27% oil, and 17% gas). At the same time, systemic problems are growing, such as grid constraints resulting in reduced renewable energy production (over 1 TWh of unused energy in 2025) and a lack of coherent coordination of sectoral policies. According to the NECP, greenhouse gas emissions will decline by 43% in the WEM scenario and by 53% in the WAM17 scenario by 2030, and by 61% and 75%, respectively, by 2040. These differences directly translate into the scale of investment, the mix structure, and the rate of decline in energy costs (ME, 2025).

2.2. Air Quality (Smog)

The second major challenge is air quality. Poland is among the EU countries with the highest concentrations of PM2.5 and PM10 particulate matter, particularly during the heating season. Data from the Central Statistical Office and reports from the European Environment Agency indicate that air pollution causes over 40,000–45,000 premature deaths annualy (EEA, 2024).

Figure 7. Share of renewable energy sources in electricity consumption in Poland through 2030 (green line: WAM scenario; blue line: WEM scenario)



Source: Ministerstwo Energii. *Projekt aktualizacji Krajowego planu na rzecz energii i klimatu (KPEiK)*. Warszawa, grudzień 2025.

According to the National Center for Emissions Balancing and Management, the main source of particulate matter emissions is the municipal and residential sector (approx. 40–45%), associated with individual building heating, as well as road transport (KOBiZE, 2023). Public programs for many years implemented by the National Fund for Environmental Protection and Water Management are key instruments for improving air quality through the replacement of heating sources and the thermal modernization of buildings. According to Polish Smog Alert, the pace of replacing so-called “smokers” and the scale of deep thermal modernization remain insufficient. It is noted that despite progress, the number of households using high-emission heat sources remains significant, and the problem of energy poverty limits the investment opportunities of a portion of the population. PAS reports also emphasize the need to better target support toward the poorest groups and to increase the role of energy counseling at the local level (PAS, 2022).

2.3. Biodiversity

Significant challenges also concern biodiversity. Poland has a significant share of protected areas – the Natura 2000 network covers approximately 20% of the country's territory, which is close to the EU average (EC, 2023; EEA, 2024). However, the effectiveness of protection remains limited – according to analyses by the European Environment Agency and reports by the European Commission, only a small portion of habitats and species in Poland are in a good conservation status, with "unsatisfactory" or "bad" ratings prevailing (EC, 2023; EEA, 2024). Environmental

[17] WEM – with existing measure; WAM – with additional measures.

monitoring conducted by the Chief Inspectorate for Environmental Protection and the Institute of Environmental Protection – National Research Institute indicates a decline in farmland bird populations by approximately 20–30% since the 1990s, which is associated with agricultural intensification, landscape simplification, and the pressure of chemical use (GIOŚ, 2023; IOŚ-PIB, 2023). The problem is structural in nature and extends beyond individual species groups. Reports from the World Wildlife Fund and the Institute for Sustainable Development indicate that pressures on ecosystems in Poland also include habitat fragmentation, investment pressures, transport infrastructure development, and hydrological changes (WWF, 2022; InE, 2023). Soil degradation and limited water retention also remain significant problems. According to data from the Ministry of Agriculture and Rural Development and the State Water Management Authority, Poland's water retention capacity is among the lowest in the EU, amounting to approximately 6–7% of annual runoff (MRiRW, 2022; Wody Polskie, 2023). Consequently, Poland faces the challenge of transitioning from formal area-based protection to more integrated landscape management that combines biodiversity protection, water management, and agricultural policy.

2.4. Climate

Climate change further exacerbates existing environmental challenges in Poland, increasing pressure on ecosystems, water management, and public health. Recent decades have seen a significant increase in the frequency and intensity of extreme weather events, including droughts, heatwaves, torrential rainfall, and flash floods. According to data from the Institute of Meteorology and Water Management, the average air temperature in Poland increased by approximately 1.7°C between 1951 and 2020, representing a warming rate higher than the global average. This temperature increase translates into longer periods without precipitation, increased evapotranspiration, and an increased risk of agricultural and hydrological drought. At the same time, Poland remains a country with relatively low water resources. Water availability averages approximately 1,500–1,600 m^3 per capita per year, which is approximately three times lower than the European average (GUS, 2023a; IMGW-PIB, 2022. EEA, 2023). Sectorally, these effects are particularly visible in agriculture, water management, and the energy sector.

Projections for the future are presented in three scenarios. The high emissions scenario (business-as-usual, no decisive action) includes a temperature increase in Poland of approximately +3–4°C by the end of the century, a significant increase in the number of hot days and heatwaves, more frequent and longer droughts, a decrease in water availability below 1,000 m^3/person in dry years, and more flash floods and economic losses. Strong pressure on agriculture, public health, and the energy sector. The moderate scenario (partial transformation), the most likely scenario, is a temperature increase of approximately +2–2.5°C, with a continued increase in extremes, but more controlled. Deepening water stress, but partially manageable, and adaptation (retention, resilient cities) limiting some losses. The ambitious climate policy scenario (EU climate neutrality) includes a temperature increase of approximately +1.5–2°C, with extremes still occurring, but on a much smaller scale, and stabilization of water resources through adaptation and ecosystem restoration. Co-existing benefits: improved air quality, health, and energy security (IMGW-PIB,2021).

In response to these challenges, the importance of adaptation measures is growing, including the development of small-scale retention, nature-based solutions, river restoration, and increasing urban resilience to extreme events. Strategic documents such as the "National Environmental Policy 2030" and the "Strategic Plan for Adaptation to Climate Change" emphasize the need to develop adaptation measures, including green-blue infrastructure, increased retention, and integration of sectoral policies (MKiŚ, 2019; MŚ 2013). However, as OECD and European Commission reports indicate, the scale and pace of implementation of adaptation measures in Poland still do not fully match the dynamics of climate change, indicating the need to accelerate them and better integrate them with sectoral policies (OECD, 2023; EC, 2024).

A significant new element of the climate policy architecture is the draft Social Climate Plan, prepared in connection with the implementation of the ETS2 system (covering buildings and transport). According to the assumptions of the Ministry of Development Funds and Regional Policy and the Ministry of Climate and Environment, this plan is intended to provide protective and investment mechanisms for households at risk of energy and transport poverty, financed, among others, by the EU Social Climate Fund (MFiPR, 2024). In practice, this means support for thermal modernization, the replacement of heat sources, and the development of low-emission mobility, which strengthens the social dimension of the transformation. However, the implementation of the plan depends on the introduction of the EU ETS2, which is currently undergoing change, and it is difficult to predict when it will be introduced.

2.4. Green Economy

The green economy in Poland is focused on several key sectors. First, energy efficiency, particularly in the buildings sector, which – according to the Central Statistical Office – accounts for approximately 40% of final energy consumption. The Ministry of Development and Technology and the National Fund for Environmental Protection and Water Management indicate that several million single-family buildings require modernization, which is one of the greatest investment challenges of the decade (GUS, 2023; MRiT, 2023). Second, renewable energy sources, where Poland is among the fastest-growing markets in the EU – particularly in photovoltaics and the emerging wind energy sector, including offshore wind energy. Third, transport, which accounts for approximately 20–25% of emissions equires accelerated electrification and the development of public and rail transport. Fourthly, the circular economy, where – according to the Central Statistical Office – the level of municipal waste recycling is approximately 40–42%, which is still below the EU targets (55% by 2025), indicating the need for further investments in separate waste collection and processing systems (GUS, 2023).

Poland was included for the first time in the Green Economy Tracker (2026), receiving a score of 3/5, placing it in the group of countries with a medium level of progress in their transition towards a green economy. The report indicates that Poland has a relatively well-developed strategic and institutional framework for the transition, but lags behind most EU countries in terms of the comprehensiveness of implementing green policies. Nature conservation, biodiversity, and the integration of environmental objectives into sectoral policies received particularly poor ratings. At the same time, the development of financial instruments supporting the transition and the gradual incorporation of just transition aspects were considered strengths.

3. Institutional and financial mechanisms for green investments

3.1. Institutional framework for green investments in Poland

Poland has a strong institutional framework for financing green investments. This framework stems from the early 1990s when most of the modern Poland institutions were forming.

The forerunner of innovative efforts toward ecological transformation in Poland was the EcoFund—a globally unique mechanism for financing environmental protection, operating on the principle of converting foreign debt into ecological investments. It was established in 1992 as a result of agreements between Poland and its creditor nations (including the U.S., France, Switzerland, Sweden, and Italy), which agreed to write off part of Poland's foreign debt on the condition that the equivalent of those funds be allocated to environmental purposes in Poland. Funding was primarily directed toward large, environmentally effective projects across five priority areas: climate protection (e.g., CO_2 emission reduction, energy efficiency, renewable energy), air protection (reduction of SO_2, NO_x, and particulate matter emissions), water and Baltic

Sea protection (sewage treatment plants, water management), biodiversity protection (e.g., protection of species and habitats), and waste management and remediation of contaminated sites. Funds were primarily allocated to local governments, municipal enterprises, and other entities implementing environmental projects. The EcoFund operated from 1992 to 2010. 1,300–1,400 projects were implemented, and over EUR 0.6 billion was spent. It was one of the most important sources of financing for Poland's environmental transformation in the 1990s and 2000s, particularly before full access to EU funds (Ernst & Young, & Institute for Sustainable Development, 2002).

A very important role was and is played by financial institutions such as:

- National Fund for Environmental Protection (hereinafter referred to as the National Fund) – formed in 1989. Early it was as a separately managed special-purpose fund in the national budget, which gradually evolved into a separate public, self-financing institution which supports environmental protection investments (NFOŚiGW, 2022, 2023).
- Bank for Environmental Protection – formed in 1991. From the initiative of National Fund a capital was given to establish a bank specialized in financing investments in environmental protection. Bank is still owned mainly by public administration (BOŚ, 2022).
- Regional Funds for Environmental Protection – (hereinafter referred to as the Regional Funds) formed in 1993. They were first formed as separately managed special-purpose funds of the regional administration budgets. Today they are self-standing regional institutions co-managed by National Fund and regional self-governmental authorities (SOA, 2018; OECD 2015).

Establishment and work of those funds was possible due to creation of many obligatory fees or penalties for industrial or service companies for usage (fees) or abuse (penalties) of natural resources. Money gathered from these mechanisms are channeled to those funds for operation of cheap loans and donations that deliver environmental goals.

All those institutions work within the scope of competence of the Ministry responsible for environmental protection, which today holds a name The Ministry for Climate and Environment. Those institutions stand in the first line for financing of green investments in Poland also within EU environment and climate policy. Mainly the National Fund and Regional Funds prepare and operate programs and calls financed from EU funds dedicated to environmental protection and climate mitigation or adaptation. Nevertheless, within the EU funding schemes the Funds must wait for the decision of higher instances.

3.2. European Union funds and Polish green investments institutions

European Union funds are since the beginning managed by a separate ministry – currently under the name the Ministry of Funds and Regional Development. This ministry negotiates agreements with European institutions for the programs of money spending. Those programs are formulated in cooperation with other governmental institutions, such as the Ministry for Climate and Environment and regional self-authorities. Any programs, priorities or calls proposed for the environment or climate protection can be managed by National Funds and already was operating substantial parts of the following EU funds:

1. Pre-accession Funds.
2. Cohesion Funds.
3. European Regional Development Funds.
4. Recovery and Resilience Funds.
5. Modernization Funds.
6. Funds earned by Polish budget from EU ETS revenues.
7. Other non-EU financial mechanisms, eg. Nordic Funds, Swiss Funds, etc.

Currently the National Fund and Regional Funds operate multiple programs and calls dedicated to the following goals:

1. Energy transformation
2. Air quality
3. Circular economy and water management
4. Biodiversity and ecosystem services
5. Monitoring of environment
6. Environmental analyses
7. Environmental education
8. Adaptation to climate change.

3.3. Main environmental funding

Main success for the National Fund since the establishment of EU climate policy for Poland is financing of renewable energy and exchange of heating sources in the housing buildings and others. Since 2010 the National Fund prepared multiple programs to finance those two parallel type of investments through the following exemplary instruments:

- The program "**Aid for the partial repayment of bank loans capital allocated to the purchase and installation of solar collectors for Individuals and residential communities**" which was implemented in Poland in years 2010-2014. Individuals and housing associations could get funding to install on their residential buildings solar collectors for water preparation and heating support. The result of the program was funding of 67,4 thousand installations, which contributed to the reduction of CO2 emissions by 75 thousand tons per year. Thanks to the program in the ranking of sales in Europe, Poland has advanced from ninth place in 2009 to 3rd in 2012. The National Fund received a prestigious award for the program - the Certificate of Good Practices of European Public Sector Award 2011 awarded by European Institute of Public Administration (EIPA) (NFOŚiGW, 2015).
- The program "**Prosumer - line of financing for the purchase and installation of micro-installations of renewable sources of energy**" – a continuation of above mentioned solar collectors program. Program offered subsidies for the purchase and installation of new plants and micro-installations of renewable energy sources to produce electricity or heat for residential single-family or multi-family houses. The beneficiaries of the program could be individual persons, housing associations, housing communities and local government units. By the end of 2015 program concluded agreements with final beneficiaries on the implementation of the 2 842 RES installations. (KAPE, 2017).
- The program "**Clean Air**" which since 2018 is a follower of the previous programs that incorporated three parallel goals: energy efficiency of buildings, exchange of heating source and installation of renewable energy. Donation is given for any of this type of investment mainly to single-family housing owners. The donation incorporates also the principle of fuel poverty as the percentage of donation to investment is getting lower with the rising income of the home owner. The program had high and low periods of performance, but up to the end of 2025 it received 960 788 applications and donated 579 977 investments. As the program is dedicated to single-family housing owners, it does not compete with the other instruments offered for modernization of multi-family housing offered by BGK (described later in this part). (NFOŚiGW, 2025).

3.4. Other type of offered funding on energy transition include nowadays

The "**My Electricity**" program, launched in 2019 and scheduled to operate until 2027, aims to increase energy production from renewable energy sources and self-consumption. Support amounts of €1.4–1.65 billion are planned. Funding sources include the Modernization Fund (revenues from the EU ETS), European Funds for Infrastructure, Climate, Environment, and the

National Fund. Support for the installation of photovoltaic (PV) energy storage and heat management systems is planned. The implementation scale (2019–2025) is approximately over 500–600 thousand PV installations, with an installed capacity of 3–4 GW of PV micro-installations. It is expected to reduce CO_2 emissions by 1.5–2.5 million tons annually. (NFOŚiGW., 2023a, Forum Energii, 2025).

The "**My Heat**" program, which supports heat pumps in new buildings, is more of an investment program than an anti-smog program. It is expected to result in a massive transition from coal and gas to renewable energy sources in the residential sector. The program launched in 2022 and is scheduled to run until 2026. The main source is the EU Modernization Fund (EU ETS funds). With a budget of approximately €140 million, approximately 40,000–80,000 heat pump installations are planned. It is estimated that it will reduce local emissions by 50,000–150,000 tons of CO_2 per year. (NFOŚiGW 2022).

The "**My Electric Vehicle**" program was launched in 2021-2025, aimed at developing the zero-emission vehicle market and reducing transport emissions. It consisted of subsidies for the purchase/lease of electric cars (for individuals, companies, and institutions). The program was heavily dominated by the fleet and leasing market. The number of completed applications amounted to approximately 25,000. The program's budget was approximately €205-220 million. It was financed by revenues from EU ETS auctions and National Fund. It is estimated that this has contributed to an annual reduction in CO_2 emissions of approximately 40,000–60,000 tons. Emissions of NOx, PM10, and PM2.5 have been virtually eliminated at the point of use. Particularly beneficial impact on improving air quality in cities. (NFOŚiW,2023b).

The "**My Electric Vehicle**" program is being continued by the "OurEvehicle" program, launched in 2025. It includes subsidies for the purchase, leasing, and rental of electric vehicles for individuals and local governments. The program's budget is €370–375 million. It assumes higher support (up to approximately €9 300 – 9 400, based on market assumptions) and aims to transition from a pilot to a mass market for electromobility. It is expected that the program will support the purchase of approximately 70,000 BEVs and contribute to reducing approximately 100–170,000 tons of CO_2 annually. The primary source of financing is the National Reconstruction and Resilience Program. (NFOŚiGW, 2025a)

The "**Green Public Transport**" program, launched in 2020 and scheduled to run until 2026, aims to decarbonize public transport and finances the purchase of electric and hydrogen buses, trolleybuses, and infrastructure (chargers, hydrogen stations). The budget for Phase I was €300–305 million, with a funding intensity of up to 80% of vehicle costs. This program is intended to support the rapid electrification of city fleets and the development of the hydrogen bus market in Poland. The main source of funding is the National Recovery and Resilience Plan (KPO), as well as the National Fund (grants + loans), partially linked to the Modernization Fund. The program is expected to cover 110–114 cities, approximately 1,500 low- and zero-emission vehicles, and over 1,000 charging points/infrastructure. It is estimated that it will be reduced by approximately per year: CO2 31,900 tonnes, NOx, 162.7 tonnes and PM10 4.1 tonnes. (NFOŚiGW, 2023c).

The synthetic presentation the above programs consistent with current programs information and analyses of the National Fund and the EU is included in **Annex 1**.

3.5. Others programs

Moreover, in Poland there has been, and continues to be, a set of programmes supporting the development of biogas and biomethane plants, particularly agricultural installations, as summarised in the table below. These include programmes such as *Biogas Plants*, *Biomethane Plants*, and *Energy for Rural Areas*. Detailed information can be found in **Annex 2**.

At the same time, Poland has been supporting, and continues to support, large-scale energy storage (grid-scale Battery Energy Storage System (BESS)), including aspects such as budgets, formal requirements, funding sources, and estimated emission reduction effects. Detailed information can be found in **Annex 3.**

3.6. Other sources of financing to environmental protection

However, not all financing that matters for environmental protection is carried or managed by the Environmental Funds and the Bank of Environmental Protection. Some support to environmentally positive investments is also channeled through institutions coordinated by the Ministry of Finance. The main such institution is the State Development Bank of Poland (SDBP). This bank offers different kind of financial instruments dedicated to public and private companies and self-governments (BGK 2025).

3.7. Thermomodernisation Surplus

Since 1999 main environmentally important program of this bank is Thermomodernisation Surplus. The Surplus can be granted to public or private operators of multi-family or office buildings, when they finance modernization of it through a debt. The Surplus is dedicated to make interest rates of the debt lower for the building operator. Money for the Surplus comes mainly from national budget donation, but it can come also from other sources. Since its inception in 1999 to December 31, 2020, the Fund was credited with €487M. By that time SDPB granted approx. 27.400 surpluses. Most of the surplus received housing cooperatives for the modernization of multifamily buildings. The modernization effort of many years is visible in space of Polish cities. Refurbished buildings from 60s, 70s, 80s have new facades or windows. The amount of annual energy cost savings resulting from realized program between the years 1999 to 2014 amounts to €187.7M (Ofiarska 2021).

3.8. Green bonds

As the Ministry of Finance is responsible for the whole public budget it also decides upon the debt instruments, such as bonds, including green bonds. Polish government decided upon emission of public green bonds in 2016. They were sold for about €750M to other countries and investors. In 2018 second emission of green bonds was sold for €1bn (MF 2018). Money from both emissions was used to finance mainly: sustainable transport, agriculture, renewable energies, biodiversity and circular economy (MF 2021, KOZK 2022).

Polish government started the ground for emission of green bonds also for other Polish financial institutions and corporations. In years 2019-2021 at least €10.400M green bonds were emitted by such institutions including: PKN ORLEN (main Polish refinery producer to invest in renewable energy and electromobility), Tauron (big Polish energy company to invest in renewable energy), Columbus Energy (big renewable energy developer to finance its projects), mBANK, PKO and ING (banks to finance debt on green buildings). Also cities like Łódź, Toruń and Kraków emitted green bonds since 2019 (MF 2021).

3.9. Role of local authorities

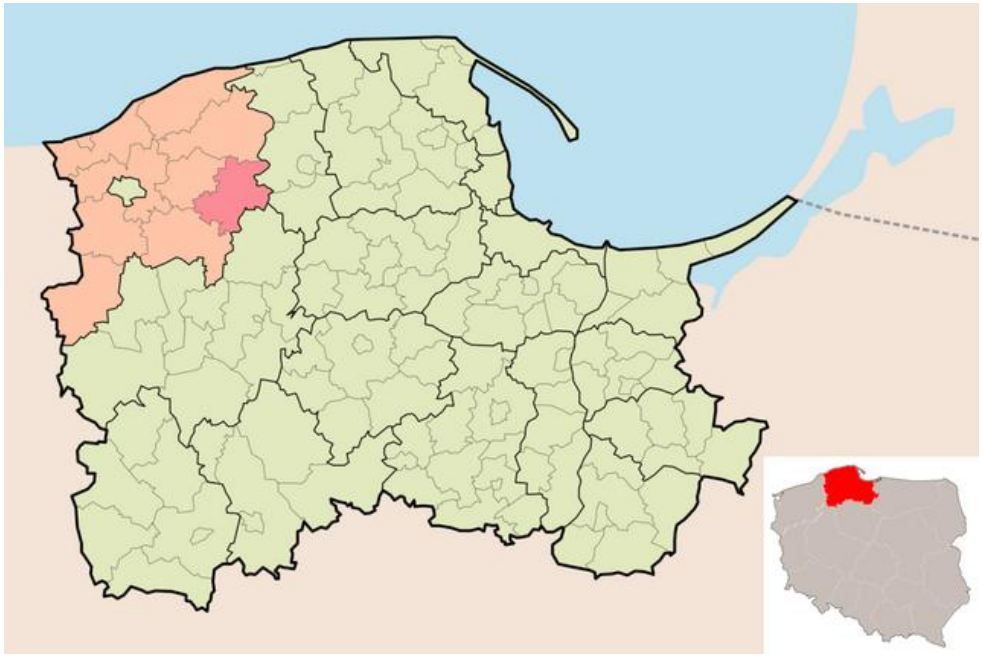
Local authorities often also manage environmental funding as they earn a part of environmental fees and penalties paid by companies. Since 2009 some municipalities were preparing and operating Programs for Minimalization of Low-emission. Goals of these programs were refurbishment of buildings, exchange of heat sources with possible installation of renewable energy. Those programs were partly financed from funds available in municipalities budget and partly financed by Regional Funds in a form of cheap loans. Later on, since 2014 by 2018 National Fund supported this kind of operations through KAWKA Program. From 2018 “Clean Air”

program further centralized such actions. Nevertheless, some municipalities were realizing programs for renewable energy investments donations to inhabitants from their own sources, eg. Warsaw.

4. The Commune of Potęgowo – from Post-communist Collective Farm and Unemployement to Renewable Pioneership

Potęgowo is commonly called „the greenest commune in Poland". It is definitely an example of a successful rural community in the country, which made its countryside location turn into an advantage. Potęgowo, located in Northern Poland (Map 1), for years has been showing that engaging in pioneer investments pays off and renewables are the right direction which brings in the long run savings and economy stimulation. Right now this commune has the biggest number of wind turbines and the biggest agricultural biogas production facility in the country. It produces the biggest amount of green energy through its wind turbines, PVs, hydro plants and biogas facility.

Map 1. The location of Potęgowo in Poland[18]



The transformation from a farming commune into the most popular renewable commune in Poland took several years. Before 2001 r., when the first investor started talking with the mayor of Potęgowo at the time („Potęgowo: od rolniczej wsi ...", 2022), the commune was not really prospering farming area. During communist times there was a State Agricultural Farm (Pol. PGR), which was a form of collective farming - relatively inefficient and subsidized by the government. Most of SAFs went bankrupt quickly after the fall of communism and adoption of a market economy by Poland. Because of that workers of SAF became jobless (Michałek 2024). However the communist legacy of the past in Potęgowo was used to its advantage as the sites of former state-owned farms and their unique layout (large tracts of farmland) have become the foundation for today's wind farms. For example, the biogas plant in Darżyn and the local district heating network utilize modernized elements of the former transmission infrastructure (Smoglab.pl, 2022).

Still in the beginning of green investments, for many, renewables were not an obvious choice. One of the main obstacles to realizing such investments were combined with the distrustful attitude

[18] Wikimedia Commons Michiel1972, CC BY 2.5.

towards renewables, espiecially towards wind turbines and biogas plant. The inhabitants were familiar with the bad sides of having such installations in their neighborhood – often in exaggerated form, but not aware of the potential benefits. In the early 2000 it was a common belief in many circles that the neighbourhood of wind turbines might prevent cows from giving milk or hens from laying eggs. Not once investors were asked for explanation or a meeting by locals who wanted to make sure that new investments would not bring harm (Smoglab.pl, 2022).

It is quite remarkable that one of the obstacles for renewable investments in Potęgowo was also the attitude of neighbouring communes which were strongly opposed to wind turbines. Those communes were trying to block those investments. Now, seeing the success of their neighbour and benefits associated with green investments, the inhabitants of those communes – Dębnica Kaszubska, Damnica and Główczyce want to follow the example of Potęgowo.

It is also worth of noting that Potęgowo didn't lose influx of tourists because of big, green investments (Wartecka-Ważyńska, 2023). Before the commune was and still is being visited by kayakers thanks to its two rivers – Łeba and Łupawa (Potęgowo Commune, 2015). The commune also hosted the championship of Poland in nordic-walking. Tourists also still visit it for its hiking trails and historical sites including a church from XVII century and palaces from XIX century (Potęgowo Commune, 2015) as well as a kurgan from 1700 – 1500 BC (Naszemiasto.pl, 2022). What is interesting is that the boom for renewables in Potęgowo attracted a new group of visitors – local government officials from Poland and abroad, specialists and groups of students eager to see the pioneer, green commune.

The first big wind farm in the commune, realized by Mashav Management Sp. z o. o., were wind turbines of 278.9 MW. The project received a loan from 5 banks including: the European Bank for Reconstruction and Development and Polish Bank PKO SA (Bank.pl 2019). Next investors followed: Polish PAK Polska – Czysta Energia and Belgian Virya Energy. The farmers who lease their fields to the owners of the wind turbines have grater gain from them it from the harvest (Magazyn Biomasa, 2025). They themselves negotiate the payment for the future investment.

After the election of a given area by an investor, the construction is proceeded by the examination of bird migration and strength of wind in that location. The farmers are able to still cultivate the land as the area of a turbine together with a road and square occupies around 0.5 km^2 (Smoglab.pl, 2022). The impact for the environment was even more important to examine taking under consideration that in the area of the commune there is a sight of Nature 2000, protected landscape areas and 19 natural monuments (Potęgowo Commune, 2015).

The commune managed to keep their course at the wind investment in the second half of the 2010s and at the beginning of the 2020s even despite unfavourable political atmosphere created by the government of that time and the new „10 H" law restricting ability to locate new turbines. When the law was introduced, which increased the minimal distance of a turbine from a household, the commune found a way to avoid this restriction. It decided to prepare a local land use plan which was quite costly but allowed building new residential housing closer than the new limit from the legislation. New wind investments could be built in Potęgowo during this unfavourable period also because the wind energy investors gained their licences before the introduction of the law (Smoglab.pl, 2022). Again looking ahead and pioneership paid off.

Currently in the commune function 79 wind turbines and the biggest agricultural biogas production facility, opened in 2013, of 2.4 MW in Poland which provides heating and hot water to locals. The warmth is a byproduct of producing electricity. That is why, thanks to the support from regional authorities and EU funds, Potęgowo also built a district heating network to distribute it localy to 1000 recipients of the approximately 1,400 residents of Potęgowo, spending €2.1M on this investment from which €1,5M came from the state (Potęgowo Commune, 2017). However the commune was not using the warmth from the plant right away. It started being used in 2019,

after 6 years the facility started its operation. People sometimes complain at the smell coming from the biogas facility which appears few times a year during special weather conditions - in heat and lack of wind. Twelve communes from the region bring their waste to it to process it there. Still currently the price of energy in the commune is 3 times cheaper than the country average.

The pipeline has 29 heat distribution stations, six of which are public facilities: Potęgowo Municipal Office, Potęgowo Kindergarten, Potęgowo Elementary School, Potęgowo Municipal Cultural Center, Potęgowo Municipal Social Welfare Center, the old boiler house, and 15 apartment buildings (Magazyn Biomass, 2023). The commune also plans another 21 wind turbines in the future (Radio Gdańsk, 2025).

The development and direction at renewables was also an inspiration for other commune investments, also those not related with energy production. The daycare center built for €1,9M was connected to the heating network and has PVs on its roof (TV Słupsk, 2026).

In the development of the green investments the authorities of the commune see also a way to mitigate negative social phenomenas affecting rural areas like for example outflow of residents from countryside to major metropolitan areas. Green investents created new work places and also make the cost of living cheaper (TV Słupsk, 2026). Also the process of construction of the facilities contributed to benefits for local businesses. Workers are needed not only for the construction of the installations or roads leading to them or for security but also in branches like accommodation and gastronomy (Magazyn Biomasa 2025). When maintenance is needed for wind turbines all the accommodation options get booked. Thanks to these investments and flow in local economy the worth of land and real estates in Potęgowo also increases (Smoglab.pl, 2022).

Thanks to the existence of the wind turbines the commune receives €1.4M of the tax annualy, what is is around 8% of its annual budget. Each year the commune spends €18 – 20M a year as a part of EU investments on its jurisdiction.

Income from taxes from the investors allow the commune to keep its infrastructure in a good condition. Apart from the obligatory payment the investors also sponsor some local investment – they finances building some local roads the purchase of a firefighter car and coaches for school children.

The commune also supports its inhabitants through state run programs of clean energy. It co-finances the exchange of old furnanes not complying with the emission norms and co-finances PV investments in households and domestic wastewater treatment plants. Below is the list of EU support the commune (Tab. 2).

Table 2. List of EU funds financing renewable investments in Potęgowo

Project Name	Main Fund / Program	Investment Goal
Sunny Potęgowo (Słoneczne Potęgowo)	ROP PV (ERDF)	Installation of PV panels and heat pumps for private households.
Darzyno-Potęgowo District Heating Network	ROP PV (ERDF)	Utilizing waste heat from the biogas plant for district heating in residential blocks.
Clean Air (Czyste Powietrze - EU component)	Cohesion Fund / FEnIKS	Subsidies for replacing inefficient solid-fuel boilers with eco-friendly alternatives.
Street Lighting Modernization	ROP PV (ERDF)	Replacing old street lamps with LED units powered by renewable energy sources.

Another initiative in which the commune got involved is the regional project entitled „The Pomeranian Archipelago of Energy Islands", supported by Pomeranian Voivodeship. In this initiative chosen local government entities take part in pilot energy projetcs. On 8th of April 2026

the authorities of Potęgowo signed a letter of intent with the regional state-owned energy company Energa Wytwarzanie S.A.to establish Energy Cooperative Potęgowo. The main idea of the project is that energy is to be used in the place of its production. That is why buildings at the spot are to be recipients of the energy produced by local sources, including small hydroelectric power plants on Łupawa River and PVs in the area. Among the main recipients will be administrative buildings, educational facilities, and municipal infrastructure, such as wastewater treatment plants, pumping stations, and water pressure stations (Nadmorski24.pl, 2026).

5. Challenges and Barriers to Mobilizing Green Investments in Poland

5.1. Introduction

Poland's transition towards a low-carbon economy is taking place within the rapidly evolving EU sustainable finance framework. Over recent years, the European Union has developed one of the most comprehensive regulatory systems globally, including the SFDR, the EU Taxonomy, and the CSRD. These instruments aim to redirect capital flows toward environmentally sustainable investments. However, Poland's experience demonstrates that the existence of advanced regulations does not automatically translate into effective investment mobilisation. The key issue lies in the gap between regulatory ambition and implementation capacity at the national level. This gap is structural and multidimensional, encompassing regulatory, institutional, and social dimensions. This analysis argues that the main barriers can be grouped into three interconnected areas: regulatory inconsistency, limited operational capacity, and insufficient ESG data infrastructure, complemented by a critical social dimension.

5.2. Regulatory inconsistency and policy instability

The core challenge in Poland has not been the lack of regulation but its incomplete translation into national practice. For a long period, Poland lacked detailed national guidance on the application of the EU Taxonomy and clear verification mechanisms for sustainable investments. The absence of standardised documentation, interpretation tools, and national guidelines created significant uncertainty for both companies and financial institutions (MRiT, 2023). This situation was further exacerbated by delays in implementing EU directives. The transposition of the CSRD occurred after the EU deadline, and reporting obligations were subject to shifting timelines. Such regulatory instability increases compliance costs and undermines long-term investment planning. At the strategic level, delays in updating key policy documents such as the NECP and PEP2040 weakened policy credibility (NIK, 2024). For investors, this translated into higher risk premiums and reduced confidence in the policy environment.

5.3. Limited preparedness of enterprises and institutions

A second major barrier is the limited operational readiness of enterprises, particularly SMEs. Evidence shows that ESG awareness remains relatively low, and many firms lack the necessary expertise, human resources, and analytical tools (BGK, 2023; PEI, 2024).

This leads to a "two-speed transition", where large companies adapt more quickly, while SMEs struggle to comply. For many smaller firms, ESG requirements are perceived as an administrative burden rather than a strategic opportunity.

Capacity gaps also exist among supporting institutions, including auditors and local administrations. The introduction of ESG reporting requirements necessitates large-scale training programmes, which are still being developed.

5.4. ESG data gaps and market risks

One of the most fundamental barriers is the lack of a robust ESG data infrastructure. Poland does not yet have a fully developed system for collecting, verifying, and sharing environmental data.

There is a shortage of both firm-level ESG disclosures and national reference benchmarks, particularly in areas such as greenhouse gas emissions, carbon footprint calculations, and climate risk assessment (MRiT, 2023). This data gap increases investment risk and complicates project evaluation. Financial institutions operate under information uncertainty, leading to more conservative lending practices. At the same time, insufficient data availability contributes to the risk of greenwashing. Without clear standards and verification tools, sustainability claims may be incomplete or misleading (ESMA, 2024).

5.5. Social dimension and the role of citizens

Poland's energy transition relies heavily on public support programmes targeting households. Initiatives such as *Clean Air* and *My Electricity* play a crucial role in mobilising local-level investments. However, their effectiveness depends on citizen engagement. Household investment decisions are strongly influenced by economic factors, including upfront costs, access to financing, and regulatory stability. Administrative complexity and limited access to advisory services often discourage participation. At the same time, the transition offers significant social benefits, including improved air quality, lower long-term energy costs, and enhanced living standards. Ensuring a just transition remains a key challenge, particularly in addressing energy poverty and avoiding social inequalities.

5.6. Conclusions

Poland's experience highlights that effective green investment mobilisation requires:

- stable and predictable regulatory frameworks,
- well-developed ESG data infrastructure,
- capacity-building for businesses and institutions,
- active citizen engagement.

Without these elements, even well-funded programmes may fail to achieve their full transformative impact.

6. Recommendations for Montenegro and Moldova

1. **Build stable and predictable policy frameworks**
   Poland's experience shows that regulatory uncertainty weakens investor confidence and raises the cost of capital. This lesson is directly relevant to both countries, but in different ways.
   Montenegro should:
   - finalise and implement its National Energy and Climate Plan as a credible investment roadmap;
   - align climate, energy and EU accession planning, especially under Chapters 15 and 27;
   - provide a clear timetable for coal phase-down, renewable auctions, grid investments and permitting reforms;
   - avoid delayed or ambiguous signals on the future of the Pljevlja coal power plant.

   Moldova should:
   - treat the NECP 2025–2030 as the central framework for energy security, decarbonisation and EU integration;

- ensure that emergency energy-security measures do not crowd out long-term clean energy investment;
- provide predictable rules for renewable auctions, prosumers, energy communities and energy efficiency programmes;
- connect NECP implementation with the forthcoming Energy Strategy 2050.

2. Create strong national institutions for green investment mobilisation

Poland's experience with national and regional environmental funds shows that green transition requires not only strategies, but also permanent institutions able to prepare, finance and monitor investments.

Montenegro should:

- strengthen institutional capacity for preparing climate and environmental investment pipelines;
- use access to the EU LIFE Programme and IPA funds to build project-preparation capacity;
- create stronger coordination between energy, environment, finance, tourism and local government institutions;
- prioritise bankable projects in renewables, grid modernisation, waste, water and climate-resilient infrastructure.

Moldova should:

- strengthen the role of national energy and environmental institutions in implementing the NECP;
- develop a dedicated green investment facility or climate-finance coordination platform;
- coordinate EU, EBRD, World Bank, UNDP and bilateral support around one national investment pipeline;
- ensure that energy-security investments are compatible with long-term decarbonisation.

3. **Develop sustainable finance systems beyond EU compliance.**

Poland's lesson is that sustainable finance should not be treated only as future EU compliance. It should become a tool for reducing investment risk and attracting private capital.

Both countries should:

- prepare national sustainable finance roadmaps;
- introduce voluntary ESG and climate-risk reporting guidance before EU rules fully apply;
- build supervisory capacity in central banks and financial regulators for climate-risk assessment;
- promote green lending, energy-efficiency credit lines and municipal green finance.

For Montenegro, sustainable finance should be linked to tourism resilience, nature protection, clean energy exports and infrastructure.

For Moldova, it should be linked to energy independence, building renovation, renewable energy deployment and reduction of vulnerability to external energy shocks.

4. Invest early in ESG, energy and climate data infrastructure.

Poland's experience shows that poor data quality limits access to finance and weakens policy credibility.

Montenegro and Moldova should:

- create national ESG and climate-data platforms;
- standardise reporting on emissions, energy use, renewable generation, energy poverty and climate risks;
- develop transparent project databases for public and private investors;
- strengthen verification systems to reduce greenwashing and improve access to international finance.

5. Treat energy efficiency as the first fuel.

This recommendation is particularly important for Moldova, but also relevant for Montenegro.

Moldova should:

- make deep renovation of residential and public buildings a national priority;
- link building renovation with social protection and energy-poverty reduction;
- modernise district heating and support efficient heat pumps where technically and socially justified;
- use energy efficiency as the fastest route to lower import dependence and household vulnerability.

Montenegro should:

- improve energy performance of tourism infrastructure, public buildings and housing;
- use energy efficiency to reduce peak electricity demand, especially during tourist seasons;
- integrate renovation, cooling demand management and climate-resilient urban planning.

6. Accelerate distributed renewable energy systems

Poland's prosumer boom shows the potential of decentralised renewables, but also the risk of grid bottle necks if deployment is not coordinated with network investment.

Montenegro should:

- accelerate solar and wind deployment, including rooftop solar in tourism and public buildings;
- develop storage and grid flexibility alongside new renewable capacity;
- ensure that large-scale renewable projects are complemented by community and municipal energy schemes;
- avoid replacing coal dependence with dependence on a small number of large projects.

Moldova should:

- expand wind and solar auctions while supporting prosumers and local energy communities;
- simplify permitting and grid-connection procedures;
- invest in interconnections, storage, smart grids and demand-side flexibility;
- treat renewables as a core element of energy security, not only climate policy.

7. Avoid carbon lock-in and delayed transition

Poland's prolonged coal dependence increased transition costs and social tensions. This lesson is especially relevant to Montenegro.

Montenegro should:

- define a credible pathway away from coal;
- avoid new investments that extend the economic life of high-emission assets beyond what is compatible with EU accession and climate goals;
- prepare a just transition plan for regions and workers linked to coal;
- use renewables, storage, interconnections and efficiency to replace coal gradually but decisively.

Moldova should:

- avoid new long-term dependence on imported fossil gas;
- continue diversification away from Russian-controlled energy supplies;
- strengthen electricity interconnections with Romania and ENTSO-E;
- prioritise clean domestic generation and efficiency as energy-security measures.

8. Link climate policy with economic development priorities

Poland's experience shows that climate policy is more effective when framed through jobs, competitiveness, health, security and regional development.

Montenegro should frame the transition around:

- tourism competitiveness;
- protection of natural assets;
- reduction of air pollution;
- clean-energy exports and regional integration;
- climate-resilient infrastructure.

Moldova should frame the transition around:

- energy independence;
- resilience to geopolitical shocks;
- lower household energy bills;
- EU accession;
- rural development and agricultural resilience.

9. Strengthen local government involvement

Local authorities are essential for building renovation, local renewables, adaptation and public acceptance.

Both countries should:

- provide municipalities with dedicated access to climate finance;
- create technical assistance facilities for local project preparation;
- support local energy communities, municipal solar projects and adaptation plans;
- build local capacity for public consultation and citizen participation.

For Moldova, local governments should be central to energy-poverty reduction and building renovation.

For Montenegro, municipalities should be central to tourism resilience, coastal adaptation, waste management and local renewable deployment.

10. Ensure a just transition from the outset

Poland's lesson is that delaying social measures increases resistance and raises transition costs.

Montenegro should:

- prepare a just transition plan for coal-dependent communities;
- establish retraining, regional diversification and social-support programmes early;
- use EU accession and climate finance to support affected regions.

Moldova should:

- focus just transition policies on vulnerable households, energy poverty and regions exposed to energy-security shocks;
- integrate social tariffs, renovation support and clean heating programmes;
- ensure that transition costs do not undermine public support for EU integration.

Overal updated lessons learned from Poland

The main lesson from Poland is that green investment mobilisation depends not only on access to EU funds, but on stable institutions, predictable regulation, credible strategic documents, strong public investment vehicles, reliable data and active local participation.

For Montenegro, the priority is to turn EU accession momentum into a credible coal phase-down, renewable-energy deployment and environmental investment programme.

For Moldova, the priority is to make energy security and decarbonisation mutually reinforcing: reducing exposure to external fossil-fuel pressure while accelerating efficiency, renewables, interconnections and social protection.

Countries that build these foundations early can achieve faster, cheaper and more socially accepted transitions while strengthening competitiveness, energy security and EU integration.

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Table 3. Energy transformation and anti-smog programs (building, prosumers, transport)

Area	Programme	Main sources of financing	Budget (Euro, bn)	Tangible effect	Environmental effect (CO_2/year)
EV (cars)	My Electric Car	Modernisation Fund + National Fund for Environmental Protection and Water Management (NFOŚiGW)	~0.4	approx. 50–60 thousand electric vehicles	~150–250 thousand tonnes
EV (cars)	OurEVehicle	National Recovery and Resilience Plan (KPO)	~0.3	approx. 40–50 thousand vehicles	~120–200 thousand tonnes
Public transport	Green Public Transport	Modernisation Fund + KPO + NFOŚiGW	>0.9	approx. 1,500 buses (electric + hydrogen) + infrastructure	~30–40 thousand tonnes
Buildings	Clean Air	KPO + Modernisation Fund + FEnIKS + NFOŚiGW	>0.14	>1 million retrofits (boiler replacement + thermal renovation)	~6–10 million tonnes
Heat pumps	My Heat	Modernisation Fund + NFOŚiGW	~0.14	40–80 thousand heat pumps	~50–150 thousand tonnes
Prosumers	My Electricity	Modernisation Fund + FEnIKS + NFOŚiGW	~0.3–0.4 (1.4–1.7)	>500–600 thousand PV installations (~3–4 GW)	~1.5–2.5 million tonnes
Prosumers	Prosumer Programme	NFOŚiGW + Regional Environmental Funds + EU funds (limited share)	~0.2–0.25	~30–40 thousand micro-installations (PV, solar thermal, heat pumps, biomass)	~0.2–0.4 million tonnes

Sources: (NFOŚiGW 2022; NFOŚiGW 2023; NFOŚiGW 2023a; NFOŚiGW 2023b; NFOŚiGW 2023c; NFOŚiGW 2024)

Table 4. Energy transformation (rural areas, biogas and biomethane)

Area / Programme	Period	Budget (Euro, bn	Sources of financing	Forms of financing	Tangible effect	Environmental effect
Biogas plants (historical support system)	2007–2020	several	EU funds (Infrastructure & Environment OP, Regional OPs), national funds, green certificate scheme	investment grants, operational support (green certificates), feed-in / market-based revenues	~350–400 plants (incl. ~150–200 agricultural)	~1–2 million t CO_2/year
"Energy for Rural Areas"	2023–2025	~ 0.05	National Fund for Environmental Protection and Water Management (NFOŚiGW), Modernisation Fund	grants + concessional loans	several dozen installations	~0.1–0.3 million t CO_2/year
FEnIKS (biogas/biomethane)	2024–2027	~ 0.7	EU Cohesion Policy funds (Cohesion Fund / ERDF) + national co-financing	investment grants	several dozen installations	~0.2–0.5 million t CO_2/year
Biogas CHP (cogeneration support)	2025–2030	~0.24	Modernisation Fund (EU ETS revenues) + NFOŚiGW	grants + loans + cogeneration premiums	≥40 million m^3 of biogas/year	~0.3–0.7 million t CO_2/year
Biomethane programmes (dedicated schemes)	2025–2030	~ 0.19	Modernisation Fund + potential EIB financing + national funds	investment grants + repayable instruments (loans, blended finance)	≥80 million m^3 biomethane/year	~0.5–1 million t CO_2/year
Planned / delayed biomethane programmes	2024–2026	0.24- 0.94 (planned)	EIB + Modernisation Fund + national funds	planned: grants + guarantees + blended finance	not yet implemented	potentially high

Sources: KOWR 2021; NFOŚiGW 2023d; MFiPR 2022; NFOŚiGW 2024; EC 2022)

Table 5. Energy transition (large facilities – storage, energy networks, BESS and capacity market)

Programme / Instrument	Period	Budget (PL allocation)	Source of Funding	Form of Support	Key Formal Requirements	Indicative Physical Output	Estimated CO_2 Reduction Effect*
Modernisation Fund – Energy Storage Programme	2021–2030	~€13–15 bn (total PL envelope; storage = part)	EU ETS revenues (Modernisation Fund)	Grants + concessional loans	- Project aligned with NECP/KPEiK- Compliance with EU Taxonomy & DNSH- Grid connection conditions- Environmental permits- Often minimum capacity thresholds (e.g. >2–10 MW)	Hundreds of MW of new storage capacity (projects ongoing)	Indirect: ~0.2–0.6 Mt CO_2/year (system-wide, via RES integration and peak fossil reduction)
National Recovery and Resilience Plan (KPO/RRF)	2021–2026	~€59.8 bn total; energy component several €bn (storage included)	EU Recovery and Resilience Facility	Grants + loans	- DNSH compliance mandatory- Milestones & targets (EU monitoring) - Integration with RES/grid modernisation- Public procurement rules	Pilot and mid-scale storage projects; grid flexibility investments	Indirect: ~0.1–0.3 Mt CO_2/year (reduced curtailment, better RES utilisation)
NFOŚiGW National Programmes (incl. hybrid schemes)	2022–2028	Several billion Euro (varies by call; often blended with EU funds)	National funds + EU funds (Modernisation Fund, Cohesion Policy)	Grants / loans / blended finance	- Financial viability- Environmental impact assessment- Compliance with state aid rules- Often linked to RES installations or grid services	Growing number of BESS installations co-located with RES	Indirect: project-specific; typically 10–50 kt CO_2/year per large installation
European Investment Bank (EIB) financing	Ongoing	Project-based (often €50–300+ million per project)	European Investment Bank	Loans / guarantees	- Bankability (IRR, risk profile)- EU climate alignment (Paris Agreement)-	Utility-scale storage (>100 MW projects possible)	Indirect: depends on project scale; up to ~0.1–0.5 Mt CO_2/year

					Large-scale projects (>50–100 MW typical)- Environmental and social standards		for large projects
Capacity Market (Polish power market mechanism)	2018–present	Market-based (multi-billion Euro commitments)	National electricity consumers (capacity payments)	Operational revenue support	- Prequalification in capacity auctions- Availability obligations- Technical performance standards	Enables commercial viability of storage assets	Indirect: supports displacement of high-emission peaking units

Sources: MKiŚ 2023, MFiPR 2023, NFOŚiGW 2023, EIB 2023, URE 2023

2. SLOVAK REPUBLIC: Mobilisation of Green Investment in the Context of EU Environment and Climate Policy

Karol MORVAY[19]

Martin HUDCOVSKÝ[20]

Roman KLIMKO[20]

Abstract

This chapter analyses the mobilization of environmentally classified investment in the Slovak Republic within the framework of EU environmental and climate policy. The analysis focuses on institutional arrangements, financing mechanisms, and implementation practices, with particular attention to the energy efficiency renovation of residential buildings. Slovakia represents a relevant case due to its strong dependence on EU funding, its industrial economic structure, and persistent implementation constraints that limit the conversion of available resources into actual investment. The chapter identifies key enabling factors for investment mobilization, including institutional continuity, performance-based programme design, and the deliberate sequencing of grant and market-based instruments, while highlighting structural barriers such as administrative complexity, weak data infrastructure, and the limited role of private finance. The analysis concludes with transferable lessons for enlargement candidates, particularly Montenegro and Moldova.

Keywords*: green investment; energy efficiency; building renovation; blended finance; Slovak Republic; EU cohesion policy; implementation capacity*

1. Introduction

The current debate on EU climate policy is often framed in terms of targets and regulatory frameworks. In practice and especially in the case of Slovakia, however, the key constraint lies in the ability to translate these ambitions into actual investment. The mobilization of green investment, therefore, represents the operational core of EU climate policy rather than its complementary dimension. Instruments such as the European Green Deal define the direction of transformation, but their effectiveness depends on whether Member States can convert these frameworks into investable projects and functioning financial pipelines, a point repeatedly emphasized in both European Commission assessments (European Commission, 2023a). The outcome is thus determined less by the formal ambition of targets and more by institutional and administrative capacity.

This gap between ambition and implementation reflects a structural feature of the current policy framework. Climate policy increasingly relies on classification systems, reporting standards, and conditionalities that define what should be financed but do not ensure that investment will occur. The EU taxonomy is a clear example. It provides a detailed classification of sustainable activities, yet its impact depends on how it is translated into actual financing decisions (ESMA, 2023). Similarly, EU funding instruments influence resource allocation, but they do not eliminate constraints related to project preparation, administrative procedures, or regulatory uncertainty.

[19] Bratislava University of Economics and Business & MESA10, Bratislava, Slovakia

The result is a persistent discrepancy between the volume of available resources and the level of realized investment.

At the same time, the concept of green investment itself is analytically less precise than policy documents suggest. While it is typically defined as an investment that contributes to mitigation, adaptation, or environmental protection, in practice, it overlaps with standard investment motives. A substantial share of projects classified as green investments is driven by asset renewal, regulatory compliance, or cost-efficiency considerations. Slovakia is not an exception to this understanding of green investments. This is particularly evident in sectors such as building renovation or energy infrastructure, where investments generate both environmental benefits and operational savings (IEA, 2023). The implication is that increases in green investment do not necessarily reflect additional activity, but may partly capture a reallocation or relabelling of existing investment flows.

The financing structure further complicates this picture. Although EU policy increasingly emphasizes the role of private capital, in Slovakia, as well as in other Member States, the investment process remains heavily dependent on public support. This is particularly relevant in sectors with long payback periods or high regulatory risk, where purely market-based investment is limited. Public co-financing, guarantees, and subsidies therefore act not only as complementary instruments but often as a precondition for investment. In this context, EU-level funding plays a dual role. It provides additional resources, but also shapes the timing, structure, and sectoral allocation of investment through programming cycles and eligibility criteria.

These features shift the analytical focus from policy design to implementation. Slovakia is not different from other Member States, where the central question is not how ambitious climate targets are, but under what conditions they translate into actual investment. This requires examining the interaction between EU-level frameworks and domestic institutional capacity, including project preparation, administrative procedures, and coordination mechanisms. The chapter, therefore, approaches green investment as an operational phenomenon, focusing on how investment is mobilized in practice rather than how it is defined in policy documents. This perspective is particularly relevant for countries where funding availability is relatively high, but implementation capacity remains a binding constraint.

2. Country context

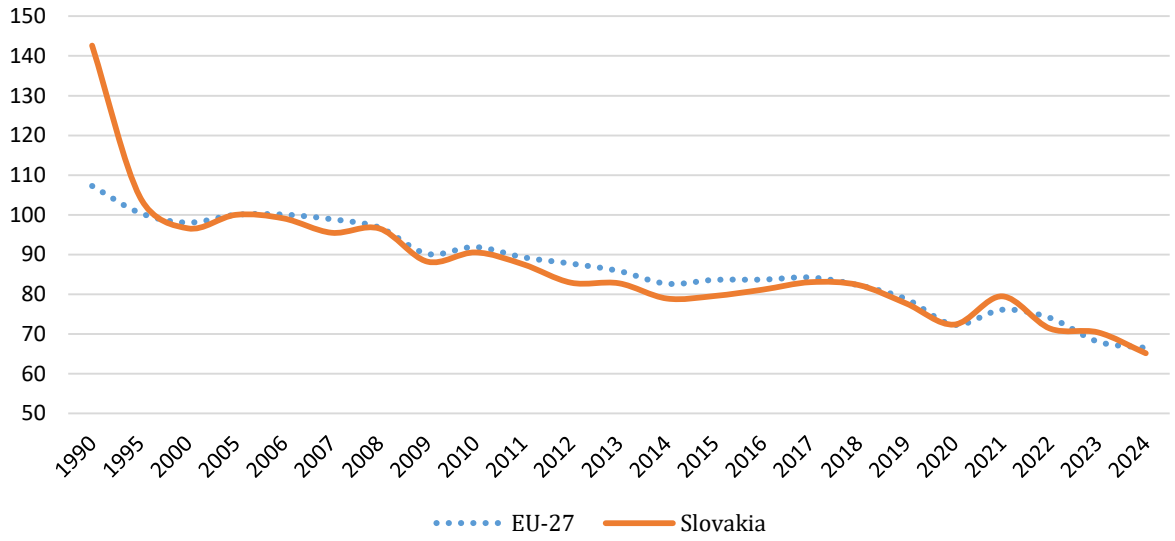
External financing is crucial for Slovakia

The Slovak Republic represents a case where high investment needs coexist with strong dependence on external financing and persistent implementation constraints. The economy is characterized by a high degree of openness and a strong industrial base, with manufacturing accounting for approximately a quarter of gross value added (OECD, 2024a). This structure is closely linked to a relatively high energy intensity and a concentration of emissions in industrial production and transport, which, in turn, shapes the profile of required investments.

From a climate perspective, Slovakia has achieved a substantial reduction in greenhouse gas emissions, with total emissions declining from approximately 73,603 Gg CO_2 equivalent in 1990 to around 36,115 Gg by 2023 (excluding LULUCF). That is a reduction of over 50 percent against the base year (SHMÚ, 2025). However, a large share of this decline reflects structural economic changes rather than a continuous decarbonization process. More recent data indicate a slower pace of reduction, with emissions decreasing by approximately 27 percent per capita between 2005 and 2023, slightly below the EU average of 30% (European Parliament, 2025). This is particularly relevant for sectors outside the EU Emissions Trading System, where Slovakia faces a binding target of reducing emissions by 22.7 percent by 2030 compared to 2005 levels

(European Commission, 2025c). These sectors, especially buildings and transport, are therefore at the center of future investment needs.

Figure 8. Net GHG Emissions in Slovakia and EU-27 excluding LULUCF (index 2005 = 100)

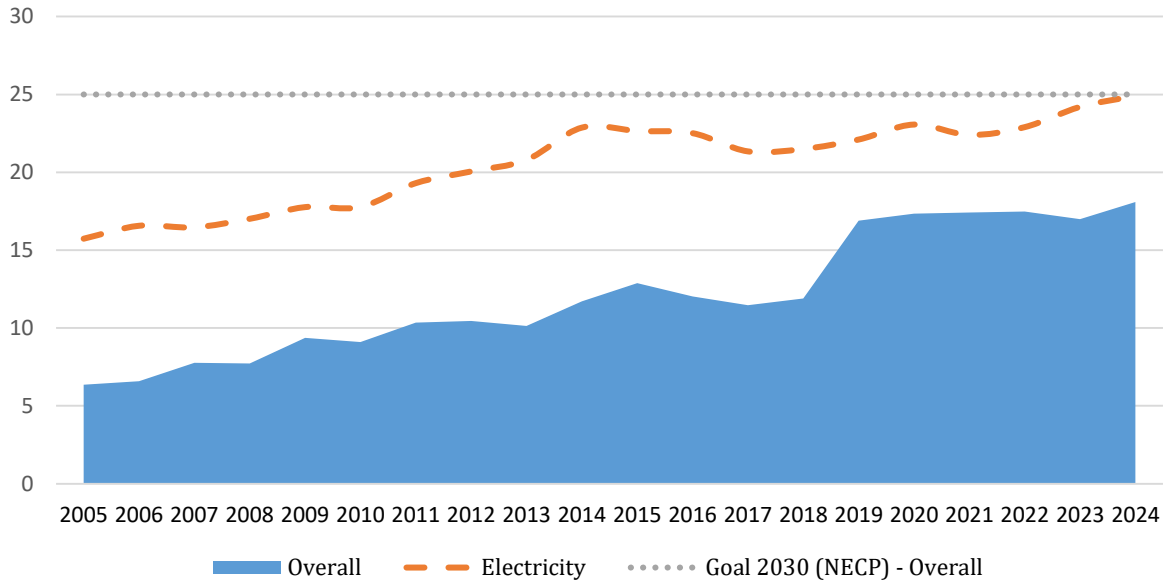


Source: EEA (2025), own processing.

This is reflected in the structure of current investment programmes. The Recovery and Resilience Plan allocated approximately €446.5 million to building renovation, targeting more than 25,000 family houses and aimed for energy savings of at least 30 percent per building (European Commission, 2021). The broader Long-term Renovation Strategy aims to achieve a 40 % reduction in energy consumption in buildings and a substantial reduction in emissions, indicating the scale of the transformation required (MDV SR, 2020). At the same time, previous renovation waves have already covered a large share of the housing stock, with around 68 percent of apartments and 45 percent of family houses having undergone some form of renovation by the end of the 2010s (MDV SR, 2020). This implies that future investments will need to be more capital-intensive, focusing on deep renovation rather than incremental improvements.

Investment activity in renewable energy has also accelerated in recent years, although from a relatively low base. Installed photovoltaic capacity exceeded 1.36 GW by the end of 2025, with annual additions of around 243-274 MW in 2024-2025 (SAPI, 2025; PV Magazine, 2026). This expansion has been supported by subsidy schemes such as “Green for Households” and by EU-funded programs targeting firms and public institutions. Despite this progress, the share of renewable energy in gross final consumption remains relatively low, at around 17 percent in 2023, compared to a gross final energy consumption target of approximately 25 percent by 2030 (EEA, 2025; European Commission, 2025c). This gap, on one side, highlights the need for continued investment not only in generation capacity but also in grid infrastructure and system integration. On the other hand, the share is relatively low due to the large number of nuclear power plants, which account for roughly 60% of total electricity production (SEAS, 2026).

Figure 9. Share of Renewable Fuels in Gross Final Consumption of Energy from Renewables in Slovakia (in %)

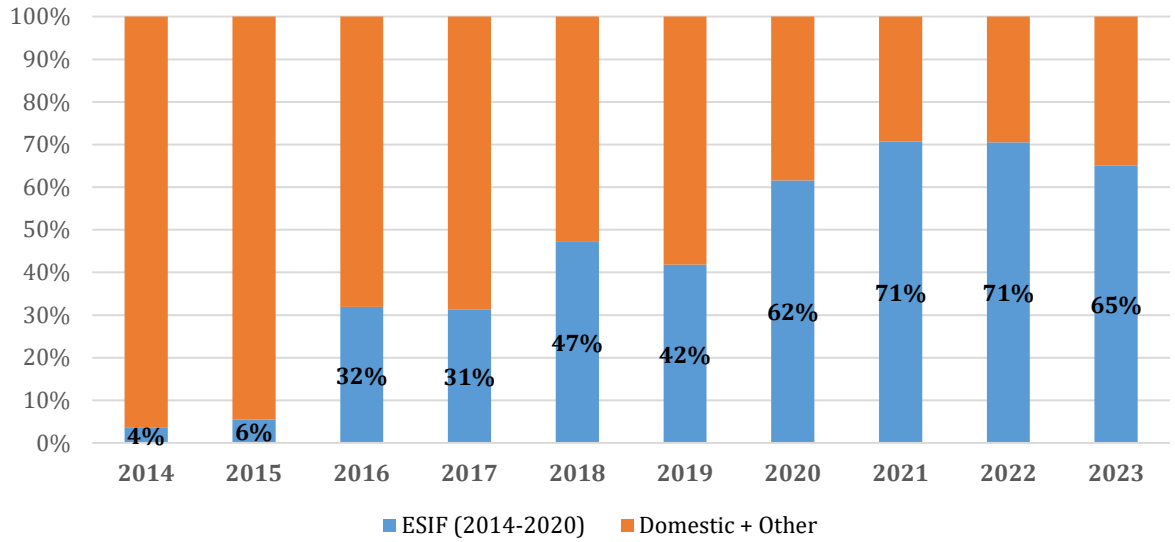


Source: Eurostat (2026), own processing.

In addition to energy and buildings, a substantial share of investment is directed toward transport and environmental infrastructure. The Recovery Plan allocated approximately €764.5 million to sustainable transport, including investments in railway modernization, charging infrastructure, and the development of cycling networks (European Commission, 2021). Further resources are directed toward climate adaptation and water management, with investments exceeding €100 million to improve water retention, restore ecosystems, and enhance resilience to climate risks. These investments are complemented by cohesion policy funding, which continues to support waste management, wastewater treatment, and air quality improvements.

A defining feature of the Slovak investment environment is the dominant role of EU funds. In the period 2014–2020, Slovakia received approximately €15.3 billion from European Structural and Investment Funds, corresponding to roughly 1.5–2.0 percent of GDP annually (European Commission, 2023b). In some years, EU funds accounted for approximately two-thirds of public investment (see Figure 3; IMF, 2019), effectively substituting for domestic investment, which is not their original purpose. In the current programming period, Slovakia has been allocated approximately €12.8 billion under the cohesion policy, complemented by around €6.3 billion under the Recovery and Resilience Facility (European Commission, 2021; European Commission, 2022). This creates a situation in which the scale, timing, and sectoral allocation of investment are strongly influenced by EU-level frameworks.

Figure 10. EU Structural and Investment Funds (2014–2020 Programming Period) as a Share of General Government GFCF in Slovakia, 2014–2023 (%)



Note: EU payments refer to net transfers from the European Commission to Slovakia under ESIF 2014–2020 programmes, aggregated across all funds (ERDF, CF, ESF, EAFRD, EMFF, YEI). Annual values are derived from cumulative payment data (year-end snapshots). The relatively low payment volumes recorded in 2014–2016 reflect the transitional phase at the start of the 2014–2020 programming period, during which a significant share of public investment was still financed through the residual absorption of commitments from the 2007–2013 programming period. General government gross fixed capital formation is sourced from Eurostat (dataset teina210, current prices). EU payments from the Commission may lag actual beneficiary expenditure by one to two years, which may affect year-on-year comparisons.
Source: European Commission, Cohesion Open Data Platform (2026); Eurostat (2025); own calculation and processing.

Despite the availability of funding, implementation remains a key constraint. Audit evidence indicates persistent issues of delays, underutilization of funds, and weaknesses in project preparation (NKÚ SR, 2022). These constraints are particularly visible at the municipal level, where a large share of investment is implemented and where administrative capacity is often limited. Government strategies also highlight insufficient project pipelines and complex administrative procedures as major barriers to scaling up investment, particularly in the building sector (MDV SR, 2020).

Private financing plays a complementary but still limited or even marginal role. Although financial institutions have gradually expanded green lending products, a large share of investment continues to depend on subsidies and public co-financing. This reflects both the risk profile of projects and the structure of incentives created by policy frameworks. Macroeconomic conditions further affect investment dynamics. Rising interest rates and labor shortages in the construction and energy sectors have increased the cost of capital and constrained the pace of implementation in recent years, necessitating further contract amendments and overbudgeting (OECD, 2024a).

Taken together, the Slovak case illustrates a specific configuration of green investment dynamics. Investment needs are substantial and supported by significant external funding, yet the effectiveness of mobilization depends primarily on translating financial resources into concrete projects. The presence of defined programs, quantified targets, and allocated funding does not eliminate implementation constraints. Instead, it shifts the focus to project preparation capacity, administrative efficiency, and coordination mechanisms, which ultimately determine whether investment occurs at the required scale and speed.

3. Institutional and financial mechanisms

Slovakia incorporated the Sustainable Development Goals (SDGs) into six national priorities guiding the implementation of the 2030 Agenda, including the green economy. These priorities are aligned with regional development goals outlined in Slovakia's Vision and Development Strategy 2030, adopted in 2021. To strengthen coordination, several inter-ministerial councils have been set up, bringing together experts and senior representatives from ministries, specialized agencies, the Government's Office, and other stakeholders. Despite this, environmental responsibilities remain fragmented. The Ministry of Environment develops and implements environmental and climate policies through its agencies, but does not have authority over energy and forestry. These areas are managed by the Ministry of Economy and the Ministry of Agriculture and Rural Development, while responsibility for energy efficiency in buildings lies with the Ministry of Transport (OECD, 2024b).

Reforming the tax system to better support economic growth while promoting environmental sustainability. The tax structure places a heavy burden on labor, and overall taxation rose in the past decade. Shifting taxes toward environmentally harmful activities could support economic growth by reducing distortions. Expanding environmental taxes would create space to ease labor taxation. Environmental taxes should be strengthened and better aligned to ensure consistent pricing of carbon and pollution, enabling more cost-effective emissions cuts. Raising landfill taxes would also help reduce waste sent to landfills, which remain well above the OECD average. These taxes should be regularly adjusted for inflation, while energy tax exemptions should be phased out, with targeted support for vulnerable groups (European Commission, 2025a, b; OECD, 2024a).

Shifting to green technologies and energy systems requires significant upfront investment, and achieving environmental goals requires expanding green finance across all sectors while phasing out harmful investments. Achieving these goals requires aligning all financial flows with climate targets, cutting emissions, and building resilience in line with the Paris Agreement, including through dedicated support for developing economies. The EIB (2025) has approved phase two of its roadmap and Energy Sector Orientation, reinforcing its role as a climate-focused bank with a stronger focus on competitiveness. This phase focuses on boosting clean and affordable energy, doubling adaptation funding to €30 billion in 2026-2030, and simplifying processes. In 2026, the EIB (2026a) provided €150 million to ČSOB Leasing to support Slovak SMEs and Mid-Caps, with the initiative expected to generate up to €420 million in financing to strengthen the country's economic competitiveness. This covers funding for electric and hybrid vehicles, energy-efficient equipment, and renewable energy solutions such as rooftop solar. It will speed up Slovakia's green transition, lower business energy costs, reduce emissions, and improve air quality and overall quality of life. Another initiative proposed by the EIB (2026b) in April 2026 would support public-sector investment, especially in Slovakia's Just Transition regions, while improving access to financing through loans from Slovenská Sporiteľňa.

Institutional specifics in Slovakia

Local state administration bodies operate under guidance from central authorities. District offices, which include environmental protection departments, are responsible for implementing policies at the local level, although they fall under the Ministry of Interior. The Ministry of Environment provides methodological support and direction, but since the 2013 public administration reform, these departments have received less training and assistance from line ministries. Municipalities are tasked with delivering environmental services and maintaining related infrastructure, yet their own tax revenues are limited, making them heavily reliant on national transfers. Slovakia remains one of the most centralized OECD countries in terms of subnational tax revenue and expenditure. The small average size of municipalities, just over 1,800 residents, constrains their capacity, efficiency, and revenue generation, highlighting the need for stronger inter-municipal cooperation (OECD, 2024b).

4. Case Study: Energy Efficiency Renovation of Residential Buildings

The Slovak residential renovation program represents a particularly relevant case for analyzing how environmentally classified investment is operationalized in practice. Rather than focusing on regulatory targets or aggregate funding allocations, the case allows examination of program architecture, administrative processes, and investment delivery at the household level. In this sense, it illustrates the transition from policy ambition to implementation capacity, where the effectiveness of green investment depends primarily on uptake, processing capability, and measurable outputs. This perspective is consistent with broader analytical approaches that emphasize that the mobilization of green investment is determined less by the availability of funding than by the ability to convert resources into functioning investment pipelines (European Commission, 2023a; OECD, 2024a).

A defining feature of the Slovak case is that the renovation program did not emerge as a new policy instrument, but as an extension of an already existing institutional and financial framework. Public support for housing renovation has been present since the mid-1990s, particularly through subsidized loans and grant schemes administered by the State Housing Development Fund. These instruments created a financing culture around renovation and introduced technical verification mechanisms requiring measurable energy savings (MDV SR, 2020). At the same time, this historical layer also shapes current constraints. A large share of the housing stock has already undergone partial renovation, often using suboptimal materials or incomplete solutions. As a result, the present phase of investment is no longer characterized by initial uptake, but by the need for deeper, more capital-intensive interventions, a point explicitly highlighted in the Long-Term Renovation Strategy (MDV SR, 2020).

The Recovery and Resilience Plan transformed this legacy system into a large-scale investment program focused on family houses. Initially, the program envisaged support of approximately €528 million targeting at least 30,000 residential units, later revised to €446.5 million and at least 25,164 family houses following adjustments linked to REPowerEU and fiscal constraints (European Commission, 2021; European Commission, 2023b). The program design is based on performance-based grants linked to energy savings thresholds, with a minimum requirement of 30 percent primary energy savings and higher support levels for deeper renovation. This reflects a shift from input-based funding toward outcome-oriented investment, where eligibility is tied to measurable energy performance rather than expenditure categories. Such an approach is consistent with OECD recommendations that emphasize the importance of ex ante and ex post technical verification to ensure policy effectiveness (OECD, 2024a). From an implementation perspective, the most striking feature of the program is the scale of household demand. Early pilot phases have already recorded several thousand applications within a relatively short period, indicating substantial latent demand for renovation investment. As administrative procedures were clarified and documentation requirements simplified, demand increased sharply. Later calls demonstrated extreme oversubscription, with tens of thousands of applications submitted within hours of opening, including cases where application limits were reached in less than a day. This dynamic suggests that the primary constraint on investment was not a lack of willingness to invest, but rather administrative complexity and uncertainty, which initially limited participation.

At the same time, the rapid increase in demand exposed significant administrative bottlenecks. The Slovak Environmental Agency (SAŽP), responsible for program implementation, reported a substantial increase in consultations, phone inquiries, and application processing requirements. According to implementation data, thousands of in-person consultations and tens of thousands of calls were handled during the program's early phases, highlighting the intensity of service delivery required for household-level investment programs. This confirms that green investment at scale is not only a financial challenge, but also an administrative and organizational one. Without sufficient processing capacity, even well-funded programs face delays and inefficiencies.

The program gradually evolved in response to these constraints.. Simplifying procedures, clarifying eligibility criteria, and expanding eligible activities improved processing rates and increased completion rates. Later calls incorporated lessons from earlier phases, including reduced documentation burdens and more accessible application procedures. In addition, the program introduced targeted schemes for vulnerable households and regions with lower administrative capacity, including smaller-scale "mini" schemes designed to improve accessibility and avoid competitive allocation mechanisms based on application speed. These adaptations illustrate a process of implementation learning, where program design is continuously adjusted in response to operational experience (Slovak Environmental Agency, 2025).

In terms of measurable outputs, the program has achieved substantial progress. By 2025, more than 13,000 renovated family houses had been completed, with total disbursements exceeding €200 million, and more than 20,000 contracts concluded across the program. Subsequent updates indicate further increases, with payments surpassing €230 million and the number of supported households continuing to grow. Public dashboard data confirm that individual calls have processed thousands of applications, with a significant share resulting in completed payments. These figures demonstrate a transition from formal allocation to actual spending, which is particularly relevant in the context of EU-funded programs where absorption capacity often represents a key constraint.

Despite these achievements, the Slovak case also reveals several structural limitations that are important for analyzing green investment mobilization. The available data primarily capture administrative outputs, such as applications, contracts, and payments, rather than long-term energy savings or emission reductions. This creates a gap between investment activity and environmental impact. While performance thresholds provide a proxy for expected outcomes, actual savings depend on implementation quality, user behavior, and long-term monitoring. OECD analysis highlights that renovation subsidies can be costly per unit of emissions reduced, particularly if not sufficiently targeted toward the worst-performing buildings (OECD, 2024a).

A second limitation concerns diminishing returns. As noted above, much of Slovakia's housing stock has already undergone partial renovation (MDV SR, 2020). However, much of this earlier renovation was incomplete or technically insufficient, requiring further intervention to meet post-2020 standards. The Long-Term Renovation Strategy explicitly notes that many family houses were renovated using unsuitable materials or without professional oversight, implying that future investment will need to correct earlier inefficiencies at a higher cost (MDV SR, 2020). This "second wave" problem significantly increases the complexity and cost of investment, reducing the marginal effectiveness of additional spending.

A third constraint relates to the information infrastructure. MDV SR data indicate that buildings with energy performance certificates represent only a small fraction of the total housing stock, limiting the availability of reliable data for targeting and financing decisions (MDV SR, 2020). This weak data environment constrains both public policy and private investment, as lenders lack the standardized information necessary for risk assessment. Planned investments in a unified building-energy database represent a step toward addressing this issue, but the current gap remains a significant barrier to scaling private finance.

From a financial perspective, the program remains heavily dependent on public funding. While co-financing requirements exist, private capital plays a limited role in the overall investment structure. This reflects both the risk profile of household-level projects and the absence of standardized underwriting frameworks. OECD analysis suggests that a more balanced financing model would combine grants with subsidized loans and guarantees, particularly for non-vulnerable households, in order to mobilize private capital more effectively (OECD, 2024a). Without such mechanisms, public funding continues to act as the primary driver of investment rather than as a catalyst for broader financial market participation.

Overall, the Slovak residential renovation program represents a convincing example of investment delivery under real-world constraints. Its effectiveness is not based on a single policy innovation, but on the interaction between long-term institutional structures, EU funding mechanisms, and adaptive program design. At the same time, the case highlights persistent challenges related to data availability, diminishing returns, and the mobilization of private finance. This combination of measurable progress and unresolved structural constraints makes it a particularly relevant case for analyzing the practical limits and possibilities of green investment mobilization within the EU framework.

5. Challenges and Barriers to Mobilizing Environmentally Classified Investment

Long-term climate change poses serious risks to economic performance

Higher global temperatures and more frequent natural disasters can slow growth by damaging assets and lowering labor productivity. These changes may also lead to inefficient allocation of capital, as spending on adaptation can crowd out more productive investment. In addition, adjustment costs related to capital, labor, and materials can further increase economic pressures. For these reasons, the OECD (2026) policy recommendations for energy and natural capital emphasize the importance of a clear, coordinated green transition strategy. This includes higher carbon taxation with support for investment in clean energy, sustainable transport, building infrastructure, and climate resilience. While carbon pricing can contribute to growth, targeted measures are also essential to support long-term economic growth. The key role will be played by well-designed regulation and the removal of price distortions that support brown energy.

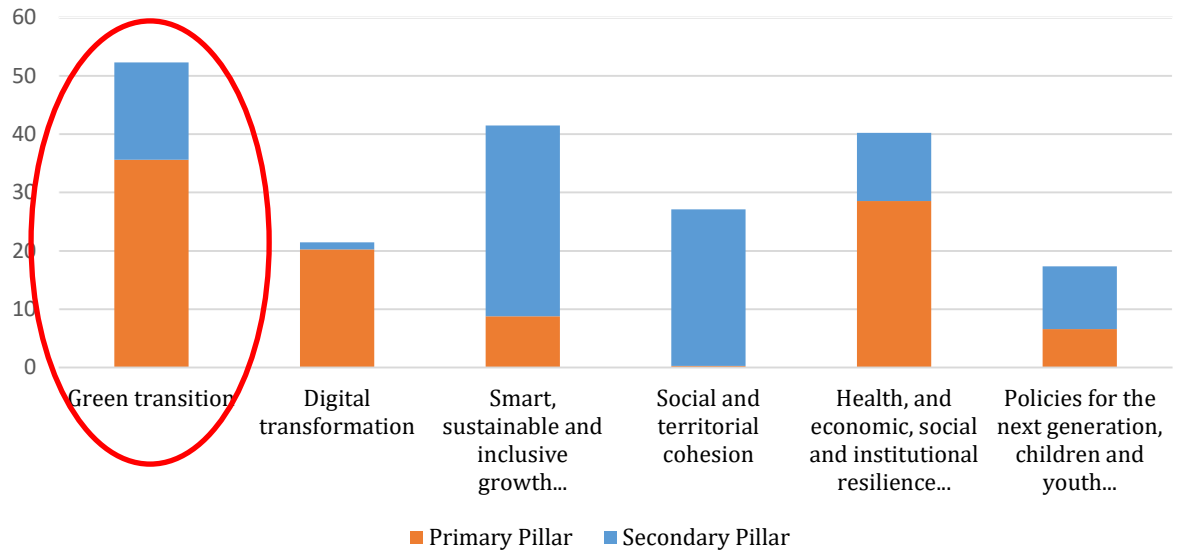
Russia's invasion of Ukraine has underscored the urgency to accelerate the green transition, cut reliance on Russian fossil fuels, and strengthen the resilience of the EU's energy system. That is the reason why the European Commission introduced the REPowerEU plan. The aim of the Recovery and Resilience Plan is to reduce Slovakia's dependence on fossil fuels and accelerate the integration of renewable energy. Key measures include simplifying permitting processes and investing in energy infrastructure, zero-emission transportation, and building energy efficiency. In addition to the Recovery and Resilience Plan, the Slovakia Programme and the Modernization Fund will be crucial in the green transition (MoF SR, 2024).

The Recovery and Resilience Plan supports the shift toward a greener economy

Slovakia has been among the EU countries in implementing its Recovery and Resilience Plan. However, ensuring adequate administrative capacity and strong engagement by local and regional authorities will be key to its successful delivery, as the OECD concluded in its report (2024b). In 2021, Slovakia submitted its Recovery and Resilience Plan to support economic recovery using Next Generation EU funds. It was updated in 2023 to diversify energy sources, reduce reliance on Russian fossil fuels, accelerate the deployment of renewables, and improve energy savings, in line with the REPowerEU plan. Slovakia's Recovery and Resilience Plan includes reforms and investments supported by €6.4 billion in grants and is expected to contribute up to half of GDP growth in peak absorption years (Ministry of Finance, 2025) and is estimated to raise the level of GDP cumulatively by around 5.7% by 2030 (European Commission, 2022). Green transition represents the single largest policy pillar of the plan, reflecting a deliberate policy choice to embed climate objectives across multiple investment streams rather than confining them to a single dedicated programme. With 35.6 percent of estimated expenditure directed at climate-related objectives as the primary policy goal, and a further 16.7 percent carrying green transition as a secondary objective, over half of all measures (52.3 percent) have at least a partial green transition dimension, as illustrated in Figure 4 below. Key priorities include energy efficiency and sustainable transport. The Recovery and Resilience Plan aims to renovate at least 25,000 family houses (subsequently revised from an initial target of 30,000), enhance

industrial efficiency, and deploy new technologies, with particular emphasis on vulnerable households. It also supports the modernization and expansion of rail, tram, and trolleybus lines, the expansion of cycling infrastructure, and the development of electric vehicle charging stations.

Figure 11. Share of the RRF's Estimated Expenditure Contributing to Each Policy Pillar in Slovakia (%)



Note: The figure displays the share of the recovery and resilience plan's estimated contribution to each policy pillar. As each measure contributes to two policy areas within the six pillars (primary and secondary assignments), the total contribution to all pillars shown in this graph amounts to 200% of the RRF funds allocated to the Member State.
Source: European Commission, Recovery and Resilience Scoreboard, 2026.

Enhancing economic incentives to speed up emissions reductions

The OECD report (OECD, 2024a) identifies four main recommendations for strengthening economic incentives to accelerate emission reductions: a) improving carbon pricing, b) boosting green investment and innovation, c) reducing transport emissions, and d) increasing renewable energy. There have been multiple actions taken since 2021 to address past OECD recommendations on environmental policies in Slovakia. Environmentally harmful subsidies for coal in electricity generation ended in 2023. Slovakia updated its Recovery and Resilience Plan and the REPowerEU Plan to allocate more financial resources to climate objectives, such as building renovations and promoting sustainable transport. Slovakia also successfully implemented a deposit refund system for single-use PET bottles and aluminum cans.

Barriers to private and public investment

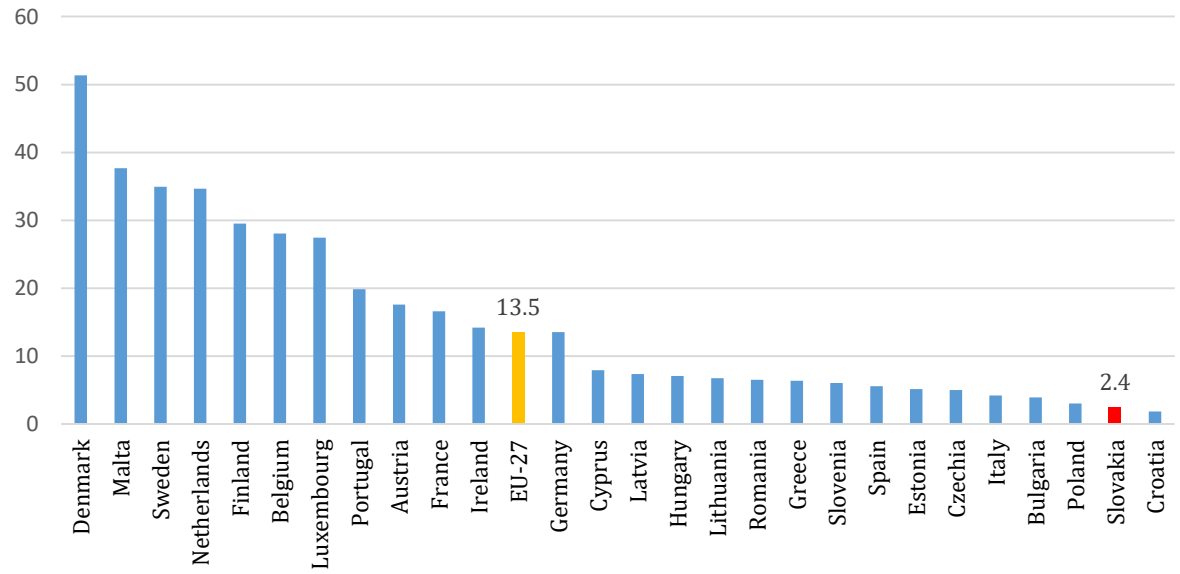
European Commission (2025a, b) points out that Slovakia faces major barriers to mobilizing both public and private investment, which limits its growth potential and competitiveness. Investment activity is heavily concentrated in industrial manufacturing sectors. Key country-specific barriers are a) fragmented governance and complex regulatory environment; b) limited access to finance for innovative projects; and c) shortage of skilled staff. The fragmented governance structure is a critical issue, mainly at the regional and local levels. Moreover, regional disparities further limit effective planning and implementation of strategic investments and slow down the use of EU funds. Limited availability of private financing restricts the growth of innovative start-ups and SMEs, particularly in scaling up and investing in research and development. Insufficient human capital (OECD, 2024b), especially in research and development, and combined with regional inequalities, constrains innovation capacity.

Slovakia needs to focus on a finance strategy that would support a more strategic and systematic approach to mobilizing and allocating resources. First, that strategy should be based on an assessment of needs and barriers to effective spending. Second, it is very important to identify opportunities for increasing the efficiency and cost-effectiveness of existing funding. Third, priorities should be clear for mobilizing additional resources, mainly domestic and private finance. Addressing these barriers is therefore a prerequisite for the effective implementation of any green finance strategy, as they are critical to its further implementation, including inadequate financing and low institutional capacity and coordination (OECD, 2024b).

Investing in renewable energy, clean transport infrastructure, and nature-based solutions is among the key areas for upcoming investment

In 2024, renewables accounted for 25% of Slovakia's electricity generation, significantly below the EU average of 47%. Meanwhile, the country's 2030 renewable energy target is 23%. Although Slovakia has introduced reforms to support renewable energy deployment and speed up permitting procedures, some important measures remain to be implemented. Slovakia's large automotive sector faces difficulties in advancing zero-emission mobility. Although the industry is strongly export-oriented, domestic demand for zero-emission vehicles remains weak. Zero-emission vehicles make up only 2.4% of new car registrations in 2024 (see Figure 5). This low demand for zero-emission vehicles could undermine the sector's future competitiveness, as it is now transitioning to produce only such vehicles. While progress is gradually improving thanks to reforms under the Recovery and Resilience Plan, including the Electromobility Action Plan, key structural barriers persist. These include slow implementation of incentives and limited affordability for households and businesses alike. In addition, the rollout of recharging and hydrogen refueling infrastructure remains underdeveloped (European Commission, 2025a, b).

Figure 12. Zero-emission Passenger Cars in 2024 (% of new registered vehicles)



Source: Eurostat (2026), own processing.

6. Lessons Learned and Best Practices

The Slovak experience with mobilizing environmentally classified investment offers a set of operationally grounded lessons that extend beyond the specificities of a single program or policy cycle. These lessons are particularly relevant for countries at an early stage of developing

investment frameworks, including enlargement candidates such as Montenegro and Moldova, where institutional conditions, financing structures, and implementation capacity resemble those that characterized Slovakia at the outset of its green investment scale-up.

Institutional continuity as a precondition for investment mobilization

One of the most consistent findings from the Slovak case is that investment programmes are most effective when they build on pre-existing institutional structures rather than creating new delivery mechanisms from scratch. The residential renovation programme achieved its early momentum precisely because it extended an established financing culture developed since the 1990s through the State Housing Development Fund. This pre-existing infrastructure, including technical verification requirements, administrative routines, and a familiarity among applicants with grant-based instruments, significantly reduced barriers to uptake in early programme phases. The implication is that institutional continuity is itself an investment. Countries designing green investment frameworks should prioritize the adaptation and strengthening of existing public entities over the creation of parallel structures, which typically require longer lead times and generate fragmented delivery (OECD, 2024b).

Performance-based eligibility as a condition for credibility and cost-effectiveness

A structural feature of the Slovak renovation programme is its reliance on minimum energy performance thresholds (specifically, a requirement that supported investments achieve at least 30 percent primary energy savings) as a condition of eligibility. This design choice links public support directly to measurable environmental outcomes rather than to expenditure categories alone. It provides a transparent basis for verification, reduces the risk of subsidizing low-impact interventions, and creates an incentive structure that favors technically substantive renovation over cosmetic improvements. OECD analysis of renovation subsidy programmes across member states consistently highlights performance-based design as a precondition for cost-effective investment, particularly given evidence that grants without outcome requirements tend to support interventions that would have occurred regardless of public funding (OECD, 2024a). For candidate countries with constrained fiscal resources, the targeting efficiency enabled by performance-based criteria is especially important.

Adaptive programme design and implementation learning

The Slovak programme evolved substantially across successive calls, with each phase incorporating adjustments in response to operational experience. Simplified documentation requirements, clearer eligibility criteria, reduced administrative burdens, and targeted sub-schemes for vulnerable households all emerged from direct observation of the bottlenecks created by earlier phases. This iterative process, sometimes described in the public administration literature as implementation learning, reflects a broader principle: that green investment programmes are not static policy instruments but require embedded feedback mechanisms that allow continuous refinement (Slovak Environmental Agency, 2025). The capacity to translate operational feedback into programme adjustments within a single funding cycle represents a significant organizational competence. Countries designing new investment frameworks should build evaluation and adaptation mechanisms into programme architecture from the outset, rather than treating them as post-hoc additions.

Administrative capacity as a binding constraint, not a secondary concern

Perhaps the most direct lesson from the Slovak experience is that administrative capacity determines programme outcomes at least as much as financial resources. The rapid oversubscription of successive programme calls (with tens of thousands of applications submitted within hours of opening) demonstrated that demand for renovation investment existed well before the programme scaled up. The binding constraint was not financial but operational: the Slovak Environmental Agency's capacity to process applications, verify documentation, and manage consultations. The IEA's Slovak Republic Energy Policy Review (2024) similarly identifies

the absence of a centralized data system for public buildings as a key barrier to creating a targeted public building renovation plan and recommends developing a national inventory of public sector building stock. For candidate countries, this translates into a clear sequencing priority: investment in administrative infrastructure (including data systems, staff capacity, and procedural standardization) must precede or accompany the scaling of financial instruments, not follow it.

The structural limits of grant-only financing models

The Slovak renovation programme is heavily reliant on public grants, with private capital playing a limited role in the overall investment structure. This design reflects a rational response to the specific risk profile of household-level renovation projects (high transaction costs, fragmented collateral, long payback periods), but it also implies a structural ceiling on the scale of investment achievable within any given programming cycle. OECD Environmental Performance Reviews: Slovak Republic (2024) notes that Slovakia's RRP has dedicated 45 percent of its budget to climate objectives, but highlights that untargeted energy price support measures have dominated the fiscal response, rather than instruments designed to catalyze private co-financing. A more balanced model, combining grants with subsidized loans, guarantees, and potentially energy performance contracting mechanisms, would allow public resources to act as a catalyst for broader financial market participation rather than as a substitute for it. This shift requires both the development of standardized underwriting frameworks and a stronger role for financial intermediaries, including commercial banks and national promotional banks such as the Slovak Investment Holding. The EIB's recent engagement with Slovak financial institutions, including the €150 million facility provided to ČSOB Leasing in 2026 to support SME green investment, illustrates the potential for structured blended finance at scale (EIB, 2026a).

Data infrastructure as a precondition for private finance mobilization

A recurrent limitation across sections of this chapter is Slovakia's weak building energy data environment. The low share of buildings with energy performance certificates, the absence of a standardized national registry of building energy characteristics, and the limited availability of verified post-renovation performance data collectively constrain both public targeting and private lending decisions. The IEA's Slovak Republic Energy Policy Review (2024) explicitly recommends introducing a one-stop shop scheme offering start-to-finish project management services, noting that many rural communities lack the capacity to undertake complex renovation projects. Without reliable energy performance data, lenders cannot adequately assess collateral values, insurers cannot price renovation risks, and public programmes cannot effectively target the worst-performing segments of the building stock. The development of a unified building energy database, currently planned but not yet operational, represents a foundational investment in the enabling conditions for private capital mobilization, not merely a technical administrative improvement.

The role of EU funding cycles in shaping investment timing and quality

A systemic feature of the Slovak investment environment is the strong influence of EU programming cycles on the timing and sectoral allocation of public investment. EU funds play a crucial role in public investments, as noted in previous sections (IMF, 2019), leading to a pronounced investment spike at the end of each programming period as authorities race to absorb available allocations. This pattern has been documented across multiple cohesion policy cycles and generates well-known risks: pressure to approve projects on speed rather than quality, reduced attention to long-term operational sustainability, and vulnerability to fund discontinuity between programming periods (European Parliament, 2024). For candidate countries in the pre-accession phase, this dynamic represents both an opportunity and a warning. Access to EU pre-accession instruments (including IPA funds and the forthcoming integration into cohesion policy frameworks) will provide significant additional resources, but only if accompanied by the institutional and administrative infrastructure necessary to absorb and effectively deploy them.

Transferable principles for Montenegro and Moldova

Several of the enabling factors identified in the Slovak case are directly applicable to enlargement. First, establishing a long-term renovation strategy with quantified targets and defined eligibility criteria provides a stable framework within which both public programmes and private investment decisions can be anchored. Second, the use of performance-based conditionalities, linking support to measurable energy savings rather than expenditure categories, improves targeting efficiency and reduces fiscal risk. Third, the development of project preparation capacity and pipeline management at the sub-national level is essential for translating financial allocations into investable projects, particularly in contexts where municipal capacity is limited. Fourth, the deliberate sequencing of grant instruments and market-based instruments (beginning with grants to establish demand and demonstrate financial viability, then progressively introducing subsidized loans and guarantees) allows public resources to build market confidence rather than substitute for it. Finally, investment in data and monitoring infrastructure, including energy performance certification systems and post-investment outcome tracking, is a prerequisite for the credible evaluation of programme effectiveness and for the development of private-sector lending products tailored to green investment.

7. Policy Implications and Recommendations for Montenegro and Moldova

Building on the lessons identified in the previous section, this section draws out their policy implications for candidate countries, with particular reference to Montenegro and Moldova.

In Slovakia, residential heating accounts for about 11% of CO_2 emissions. These emissions depend on both the fuels directly used by households and the energy sources used to generate electricity and district heating. Although Slovakia's electricity mix relies heavily on low-carbon nuclear energy, keeping indirect emissions relatively low, households still use natural gas and solid fuels like coal and wood for heating, leading to higher direct emissions. One potential solution is extending the EU Emissions Trading System (EU ETS) to the residential sector. From 2027, the EU plans to raise carbon prices for road transport and residential heating under the EU ETS II, indirectly affecting more than half of households currently reliant on fossil fuels. To accelerate decarbonization, national authorities could anticipate these changes by introducing a domestic emissions trading system for uncovered sectors or by implementing a gradually increasing carbon price outside the EU ETS (European Commission, 2025a; MoF SR, 2024; OECD, 2024b).

Addressing market failures also requires expanding high-quality energy performance certifications, tightening regulations, and offering financial incentives to make low-emission technologies more accessible. Policy sequencing can play a key role, so it is very important to a) strengthen energy efficiency standards, b) provide financial support to vulnerable households, and c) raise awareness on the benefits of energy efficiency improvements. Carbon pricing should be complemented by reliable energy performance certifications, clear regulations, and incentives for building renovations. These measures reinforce price signals and encourage households to invest in energy-efficient upgrades (OECD, 2024a).

However, financing remains a key challenge (European Commission, 2024; MoF SR, 2024; OECD, 2024a), as renovations involve high upfront costs. The State Housing Development Fund (described in the case study section) provides subsidized loans covering up to 100% of costs, subject to at least 35% energy savings, but the number of supported renovations has declined since 2016. Grants should complement these loans, especially for low-income households. EU-funded programs currently cover up to 50% of the costs of installing renewable heating systems, such as heat pumps or solar panels — support that is particularly important as rising carbon prices will disproportionately affect households reliant on coal. Strategies and measures need to include simplifying permitting processes and investing in energy infrastructure, zero-emission transportation, and building energy efficiency.

One major recommendation is to strengthen environmental governance and management at all levels (OECD, 2024b). Additionally, given the high degree of administrative fragmentation in Slovakia, authorities could consider consolidating smaller municipalities or mandating inter-municipal cooperation for responsibilities that remain at the local government level.

8. Conclusions

The Slovak experience examined in this chapter illustrates a fundamental tension that characterizes green investment mobilization in many EU member states: the gap between the formal availability of financial resources and the actual capacity to deploy them effectively. Slovakia has access to significant public funding through EU cohesion policy, the Recovery and Resilience Facility, and national instruments, yet the pace and quality of investment remain constrained by factors that financial allocations alone cannot resolve.

The country has achieved substantial reductions in greenhouse gas emissions since 1990, but recent trends indicate a slowing trajectory. The remaining reductions required under the Effort Sharing Regulation will be concentrated in sectors where investment is structurally more difficult: residential buildings, transport, and distributed energy systems. These are precisely the sectors where administrative complexity, fragmented governance, and the limited role of private finance are most pronounced. As documented earlier, environmental responsibilities in Slovakia remain divided across multiple ministries, with energy managed separately from climate policy and building efficiency falling under a third authority, while the small average size of municipalities and their limited fiscal autonomy constrain their capacity to plan and implement investment at the local level, where much of the required activity must take place.

The residential renovation program analyzed in this chapter demonstrates both the potential and the limits of grant-based investment programs. Demand for renovation support proved substantial once administrative barriers were reduced, confirming that the binding constraint was not household willingness to invest but programme accessibility. At the same time, the programme revealed persistent bottlenecks in processing capacity, data infrastructure, and targeting efficiency. The experience also illustrates a broader dynamic: programme design must be treated as an iterative process rather than a fixed policy instrument, with embedded mechanisms for operational learning and continuous adjustment.

A structural feature of the Slovak investment environment is the dominant role of EU funding cycles in shaping the timing and quality of public investment. This dependence creates predictable distortions, including end-of-period absorption pressure and discontinuity between programming periods, which affect investment quality in ways that aggregate spending figures do not capture. Addressing this requires strengthening domestic project preparation capacity and pipeline management so that investment programmes can function independently of the rhythm imposed by external funding cycles.

The mobilization of private capital remains an unresolved challenge. The current financing model relies heavily on public grants, with commercial banks and other financial intermediaries playing a limited role. Scaling green investment to the levels required by the 2030 climate targets will not be achievable through public resources alone. The transition toward blended finance instruments, combining grants with subsidized loans, guarantees, and energy performance contracting, is therefore not optional but structural. This transition requires both the development of standardized underwriting frameworks and investment in the data infrastructure that private lenders need to assess project risk, particularly in the building sector, where energy performance data remains sparse.

For Montenegro and Moldova, the Slovak case offers a set of transferable lessons grounded in operational experience rather than policy design alone. Institutional continuity, performance-based conditionality, administrative investment that precedes financial scaling, and deliberate sequencing from grant instruments to market-based mechanisms are principles relevant across sectors and national contexts. The key insight is that the effectiveness of green investment frameworks depends less on the ambition of targets or the volume of allocated resources than on the quality of the institutional and administrative infrastructure through which those resources are converted into functioning investment pipelines.

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III. MOBILISATION OF GREEN INVESTMENT OF MONTENEGRO IN THE CONTEXT OF THE EUROPEAN INTEGRATION PROCESS

Mobilisation of green investment of Montenegro in the context of the European integration process

Milica MUHADINOVIC[20]

Nina PERUNOVIC[21]

Teodora LADJIC[22]

Djordjije DJUROVIC[23]

Petar RAICEVIC[23]

Abstract

This chapter analyses the mobilisation of green investment in Montenegro within the context of European Union accession and alignment with EU environmental and climate policies. It examines the strategic, institutional, legal and financial frameworks that support the transition towards a low-carbon, climate-resilient and resource-efficient economy. Particular attention is given to Montenegro's National Energy and Climate Plan (NECP), Low-Carbon Development Strategy, Nationally Determined Contribution (NDC), Climate Change Law, and other policy instruments that establish the foundation for green investment mobilisation.

The chapter identifies renewable energy, energy efficiency, sustainable transport, circular economy, and climate adaptation as the principal sectors for green finance. It reviews the existing system of environmental and climate-related revenues, the role of the Eco-Fund, EU and international financial instruments, and the growing importance of blended finance mechanisms combining public, private and international resources. The analysis highlights the scale of investment needs associated with energy transition, climate adaptation, environmental infrastructure, and compliance with Chapter 27 of the EU acquis.

The findings indicate that Montenegro has established an increasingly comprehensive policy framework for green investment but continues to face significant challenges related to implementation capacity, project preparation, institutional coordination, and access to long-term financing. The chapter concludes that successful mobilisation of green investment will require a stronger pipeline of bankable projects, enhanced use of blended finance instruments, improved green budgeting practices, and closer integration of climate, environmental and economic development objectives. Green investment is therefore presented not only as an environmental necessity, but also as a key driver of economic modernisation, resilience, and convergence with the European Union.

***Keywords**: green investment; mobilisation; blended finance; Montenegro;*

[20] Faculty of Economics, University or Montenegro;
[21] Centre for Finance, Podgorica, Montenegro;
[22] Montenegrin Pan-European Union, Podgorica, Montenegro;

1. Country Context and Strategic Framework for Mobilisation of Green Investment

1.1. National policy frameworks supporting green investment

Montenegro, with the Declaration on the Ecological State of Montenegro from 1991, the constitutional definition and the adoption of the National Strategy for Sustainable Development, has opted for sustainability as one of the basic principles of its development. The Government of Montenegro, as an active factor in the processes taking place at the national and global levels, is firmly committed to the fact that future economic development must be fair and based on good governance, knowledge and innovation, combined with green transition and digital economy projects, which will enable the introduction of new business processes and easier adaptation to new market circumstances.

By adopting the new **National Strategy for Sustainable Development (NSSD)** on July 7, 2016 (the first NSSD was adopted in April 2007), Montenegro became one of the first UN member states to "nationalize" the process of implementing the global Agenda 2030 in the context of national policy (Djurovic et al., 2018).

The main part of the NSSD by 2030 is the Action Plan, which is divided into six thematic areas with 30 strategic goals for sustainable development of Montenegro, 102 measures and 601 sub-measures.

The NSSD 2030 is defined as an umbrella, horizontal and long-term development strategy of Montenegro that refers not only to the environment and economy, but also to human resources, valuable social capital, recommendations for establishing a financing and management framework for sustainable development (MORT, 2016, p. 19).

In order to accelerate achievement of SDGs, Montenegro established an SDG Acceleration Fund (SDG MAF), as a pooled fund mechanism, as well as to support the country's EU accession process. It was established in 2022 to provide catalytic support to priority areas in line with the NSSD 2030, Programme of Accession of Montenegro to the EU and the UNSDCF for Montenegro 2023-2027. In early 2023 the Government of Montenegro allocated €1 million for the Montenegro SDG Acceleration Fund, while the Government of Switzerland supported this initiative with €1.5 million. Additional benefits that the Fund yields are related to achieving synergies of participating UN Organisations and thus support in-country implementation of the UN Reform. The Fund is supported by the EU and the governments of Luxembourg, Switzerland, Montenegro, Austria and Ireland. The Fund targets support to development initiatives from three strategic priority areas of UN work in Montenegro:

- inclusive economic development and environmental sustainability;
- human capital development, reducing vulnerability, social inclusion; and
- social cohesion, people-centred governance, rule of law and human rights.

Regarding the EU accession process, specifically N*egotiation Chapter 27 – Environment and climate change*, according to the latest EU Commission report, Montenegro has some level of preparation in this area. Some progress was made since 2024 report, particularly in adopting and implementing legislation on waste management; as well as the national climate change adaptation plan covering the period until 2035. In April 2025 Montenegro joined the LIFE programme, the EU funding instrument for the climate and environment action. Montenegro has to significantly intensify work in the area of air quality, waste management, climate change, water and nature protection, to achieve the closing benchmarks in Chapter 27 (European Commission, 2025).

The European Green Deal was launched by European Commission President von der Leyen in 2019. It sets out a plan to transform Europe's economy, energy, transport, and industries for a

more sustainable future. It is also transforming the EU into a modern, resource-efficient and competitive economy. The European Green Deal provides a roadmap with activities to strengthen the resource efficiency of the transition to a clean, circular economy and halt climate change, retrograde impacts on biodiversity loss and reduce pollution. It presents the necessary investments and available funding tools and explains how to ensure a fair and comprehensive transition. The European Green Deal covers all sectors of the economy, especially transport, energy, agriculture, buildings and industries such as steel, cement, ICT, textiles and chemicals (European Commission, 2019).

At the beginning it aimed to cut emissions by at least 50% by 2030, rising towards 55%, while legally binding the 2050 neutrality goal through the European Climate Law. Climate Law entered into force, making 2050 climate neutrality commitment binding, and an agreement to reduce emissions by at least 55% by 2030 and 90% reduction was proposed for 2040. It pushes forward a clean transition that protects people and planet, is economically sound and socially fair[23].

As for Montenegro's obligations towards the international community, there are several important energy and climate documents, that will help decarbonise the economy and complement the global efforts in the fight against climate change.

In December 2025 Montenegro adopted the **Law on Climate Change** (Ministry of Ecology, Sustainable Development and Northern Region Development, 2026). Targets include a long-term emission reduction target of climate neutrality by 2050 established in the Law and an intermediate target of a 55% reduction in net, economy-wide emissions by 2030 (compared to 1990) as expressed in Montenegro's Updated Nationally Determined Contribution (NDC).

The Law on Climate Change establishes the **legal and institutional framework for climate policy in Montenegro**, aiming to mitigate greenhouse gas (GHG) emissions, strengthen climate adaptation, and protect the ozone layer. It aligns national legislation with the **Paris Agreement** and European Union climate policies.

Low-Carbon Development Strategy (LCDS) (Ministry of Ecology, Sustainable Development and Northern Region Development, 2026) outlines the pathway for Montenegro's transition to a **low-carbon economy by 2050** and includes: emission reduction targets, sectoral mitigation policies, greenhouse gas projections, economic and investment analysis, indicators for monitoring implementation. The strategy is adopted for a 30-year horizon, revised every five years, and updated every ten years.

Montenegro's extensive forests provides a substantial but uncertain carbon sink. The LCDS therefore provides a pathway to meet these targets with increased confidence by focusing on the minimisation of gross emissions at the sectoral level while proposing further activity in the land use, land use change, and forestry (LULUCF) sector Low Carbon Development Strategy (LCDS) for Montenegro.

The **Nationally Determined Contribution (NDC)** reflects the political will and plan to reduce emissions through actions, policies and measures within all sectors - energy, industry, transport, agriculture, LULUCF (land and forests), etc. Montenegro will implement measures in the energy, industry, agriculture and transport sectors, with a special focus on forest ecosystems as key sinks of carbon dioxide.

In the previous NDC from 2021, the target was "at least 35% reduction (economy-wide), excluding LULUCF" by 2030. So, NDC 3.0 has been significantly tightened - higher ambition, broader coverage of sectors, and a longer time horizon (2035). The updated NDC 3.0 was

[23] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

submitted to the UNFCCC on 21 February 2025. Montenegro's updated NDC sets an ambitious goal to reduce GHG emissions by 55% by 2030 and 60% by 2035 — a significant increase from the previous NDC's 35% target. Montenegro was among the first 16 countries worldwide to adopt this updated document.[24]
The **energy sector** is the main source of anthropogenic GHG emissions. The share of electricity produced in facilities using renewable energy sources out of the total electricity generation in 2023 was 62.36%. In the **metal industry sector**, the most prominent activities are aluminum and steel production. Other industrial facilities involve the processing of food, beverages, tobacco, textiles, agricultural lime, leather products, paper, medications, and rubber and plastic products.

Agriculture continues to be an important strategic sector within the economic development of Montenegro and has many economic activities that are linked to it, particularly in the rural parts of the country. In 2023, the agriculture, forestry, and fishing sectors represented 5.7% of GDP.

The **tourist sector** in Montenegro in recent years has experienced rapid development with an increase in the number of visitors and investments, becoming the main and most dynamic economic sector. The total (direct and indirect) contribution of the tourism and travel sector to GDP was 29.1%2 in 2023.

In the **transport sector,** the Transport Development Strategy of Montenegro for the period 2019-2035 was adopted in July 2019. For the purpose of drafting the Strategy, a regional traffic model for Montenegro has been developed to assess traffic flows in different scenarios. A significant increase in road travel is expected in the future, and this will inevitably have an impact on the efficiency of the national network and planned highways.[25]

As in almost all countries of the world, the dominant sector in terms of total greenhouse gas emissions excluding LULUCF in Montenegro is the **Energy sector**, which caused 74.5% of total national greenhouse gas emissions in 2022, followed by the Industrial Processes and Other Product Use (7.5%), Agriculture (7.8%) and Waste (10.3%).

In 1990, the energy sector in the production of greenhouse gases accounted for 54.1% of total national greenhouse gas emissions. The Industrial Processes and Product Use (IPPU) sector accounted for 27.0% of total national greenhouse gas emissions. The remaining greenhouse gas emissions are divided between agriculture (10.3%) and waste (8.7%).

The updated NDC establishes emission reduction targets of 55% by 2030 and 60% by 2035, providing the strategic framework for Montenegro's climate-related investments. The new GHG reduction clearly show that Montenegro is undertaking a more ambitious climate policy than before. This means greater transformation of the energy sector, industry, transport, agriculture, etc. The inclusion of LULUCF means that the protection of forests, the adequate use of land and forest resources, and not only the reduction of emissions from industry and traffic are also important.

The statistical drop in emissions (such as the one until 2022) shows that reductions are possible, but that it is necessary to continuously monitor inventories and implement measures in order to achieve the goal by 2030/2035. Since the energy sector is the dominant source of emissions, the focus of policy and investment in clean-energy, renewable sources, energy efficiency and modernization of the energy and transport sectors is crucial.

[24] UNDP Montenegro (2025). Montenegro NDC 3.0 Brief, Podgorica, 2025.
[25]Ministry of Ecology, Sustainable Development and North Region Development (2025). The Fourth National Communication and the First Biennial Transparency Report of Montenegro to the UNFCCC.

The integration of environmental and climate change issues into ambitious development and energy policies and strategies is one of the country's greatest challenges in joining the European Union. In this regard, in December 2018, the European Parliament adopted Regulation 2018/1999 on the Governance of the Energy Union and Climate Action. The main provisions of this regulation relate to the adoption of a long-term strategy, namely an integrated national energy and climate plan. The national energy and climate plan should be a key key document with the main objectives of ensuring transparency and predictability of national policies and measures in order to ensure investment security.

In 2006, Montenegro became a full member of the Energy Community, which aims to harmonise national legislation with EU energy law, legislation on gas and energy protection, environment, competition, renewable energy sources and energy efficiency. Montenegro adopted its **National Energy and Climate Plan (NECP)** in late 2025. NECP sets 2030 targets of a 55% reduction in GHG emissions, a renewable energy share of at least 50%, and substantial progress in energy efficiency.

NECP is a plan that is aligned with the obligations from the Paris Agreement and EU regulations. The main goal of the NECP is to direct the transformation of the energy sector towards a low-carbon economy, increasing the share of renewable energy sources (RES), energy efficiency, reducing GHG emissions, energy diversification, and system resilience, while balancing economic development and energy supply stability.

Key goals and ambitions in the NECP are:

- **Increasing the share of renewable sources in total energy consumption —** and in electricity production. This reduces dependence on fossil fuels and CO_2 emissions from the thermal energy sector.
- **Energy efficiency in all sectors**: households, industry, construction, transport - which includes energy saving measures, infrastructure modernization, encouraging investment in "green" technologies.
- **Decarbonisation of the energy sector**: reduction of the participation of thermal power plants on fossil fuels (especially lignite), transition to clean energy, possible closure or reconstruction of old thermal capacities.
- **Diversification of the energy mix**: a combination of hydro, solar energy, possibly wind energy, mini- and micro hydro, and other RES alternatives, in order to ensure security of supply and stability of the electrical system.
- **Integration of climate and energy policies**: NECP is not only related to energy, but also to GHG emissions, adaptation to climate change, system resilience, and sustainable use of natural resources.

NECP envisages several **specific activities**, including:

- **Investments in renewable sources**: construction of new hydro, solar, possibly wind power plants, support for the development of RES projects - to increase the share of green sources.
- **Renewal and modernization of the electric power system**: modernization of the network, reduction of losses, strengthening of distribution, flexibility of the system to accept a greater share of RES and resistance to production fluctuations.
- **Promotion of energy efficiency**: measures in buildings, insulation, heating/cooling, modernization of the industrial sector, encouragement of energy-efficient devices and processes.
- **Gradual reduction and abolition of thermal capacity on fossil fuels** - or their transformation into "greener" sources, with plans for "timely transition", while minimizing social and economic impact (employment, energy security).

- **Strengthening the institutional framework**: regulations, monitoring systems, strategies, implementation plans, monitoring of climate and energy indicators, to ensure that the plans are implemented and do not remain "on paper".

Achieving NECP's goals requires large investments in renewable sources, network modernization, infrastructure, and technology. This requires financing (state, private, and international). The transition from thermal capacity (e.g. lignite) to RES must be carefully planned so as not to lead to energy instability, job losses, and social problems. It requires political will, institutional capacity and continued commitment.

Key initiatives include:
- Environmental reconstruction of Pljevlja Thermal Power Plant in order to comply with environmental standards.
- Development of a large number of renewable energy projects, such as HPP Komarnica, HPP Kruševo solar power plants and wind power plants.
- Promotion of electro mobility and biofuels in order to reduce emissions in transport sector (Ministry of Energy and Mining, 2025).

To achieve net zero emissions by 2050, Montenegro must transition from coal to renewable energy sources — wind and solar — supported by hydroelectric power. Urban initiatives such as green infrastructure and water management systems, alongside nature-based approaches like floodplain restoration, are identified as cost-effective options. An energy system modeling analysis shows that achieving economy-wide net zero GHG emissions by 2050 is feasible given Montenegro's natural assets, particularly its large forestry carbon sinks, but requires significant transformation and decisive action (World Bank, 2024).

National Adaptation Plan (NAP) covers the period 2025–2035, with a first Action Plan for 2025–2027. It was initiated in response to international and national obligations, and developed through the GCF-funded NAP project implemented by UNDP. NAP priority sectors, that are most at risk are agriculture, water, health, and tourism, each with its own set of sectoral objectives, priority measures, cost estimates, and designated responsible actors.

Projected impacts in the NAP include increased frequencies and intensities of floods and droughts, water scarcity, intensification of erosion and sedimentation, snowmelt disruption, sea level rise, and damage to water quality and ecosystems. The implementation of Montenegro's NDC is estimated to cost €1.57 billion, with an additional €1.26 billion needed to meet EU accession requirements by 2035. The NAP explicitly recognizes alignment with the NDC's adaptation component[26].

The cross-cuting policy recommendation puts the headline climate investment need at $5.7B and the NDC implementation alone requires over €2.8B to 2035. Bridging that gap, through green bonds, blended finance, EU instruments, and GCF/GEF pipelines, will be the central challenge for Montenegro's **green investment** framework.

The **National Circular Transition Strategy by 2030** is based on two overarching development documents of Montenegro: the **National Sustainable Development Strategy by 2030** and the **Economic Reform Program for the period 2022-2024**. The starting point for the development of the National Strategy is **Montenegro's Roadmap towards a Circular Economy**, which identifies five focus areas for the circular transition: the food system; the forest system; the built environment; the tourism sector; and the manufacturing sector.

[26] https://climatepromise.undp.org/what-we-do/where-we-work/montenegro

The Circular Economy Roadmap, adopted prior to this Strategy, concluded that strategic documents in Montenegro view the circular economy through the lens of waste management, focusing on recycling, landfill management and waste collection. It also concluded that the need for resource efficiency is viewed only through energy efficiency and the energy aspect of waste, and that important aspects of the circular economy, such as the blue economy, bioeconomy, circular value chains, etc., are not fully addressed in existing public policy documents (Government of Montenegro, 2022).

In March 2020, the EU adopted the **Circular Economy Action Plan (CEAP).** The four key themes of the 2020 Circular Economy Action Plan are: making sustainable products the norm in the EU; empower consumers; focus on the product life cycle; and ensure less waste.

Alongside strategic measures enabling the transition, the EU is also providing a financial framework to support such a transition:

- An Investment Plan for a Sustainable Europe,
- A Just Transition Mechanism, ensuring that no one is left behind,
- Investing in a climate-neutral and circular economy.

The National Circular Transition Strategy to 2030 defines six strategic objectives. For each of the four identified priority sectors (agriculture, forestry, construction and tourism), one strategic objective is defined, while the fifth and sixth strategic objectives relate to horizontal topics that represent a kind of prerequisite for circular transformation in the four key sectors.

Montenegro's strategic landscape is filled with plans and documents, but international reviewers consistently flag the same gap: implementation capacity, institutional coordination, and financing mechanisms need strengthening to turn ambitious targets into reality. That is why the EU accession process, NECP adoption, and the NDC 3.0 submission, as well as other mentioned strategies, create a strong window for operationalizing the green investment framework now.

1.2. Outline of Montenegro's Economic Structure and Environmental Challenges

Montenegro's economic structure is shaped by a **small, open and euroised economy** whose growth model remains predominantly **consumption and investment-led**, with activity concentrated in services, particularly tourism, trade, real estate and related construction. Following a strong post-pandemic rebound, economic growth has been moderate but remained resilient, averaging slightly above 3 per cent in 2024–2025 and projected to continue at a similar pace in the medium term, driven by household consumption, public and private investment and rising real wages (United Nations Montenegro, 2024).

Despite these positive headline indicators, the underlying structure of growth remains **narrow and externally dependent**. Tourism continues to play a central role as a source of income, but also exposes the economy to external demand shocks, geopolitical developments and climate-related risks. High import dependence, particularly for energy, food and capital goods has contributed to a **structurally large current account deficit exceeding 20 per cent of GDP**, financed primarily through foreign direct investment and external borrowing (World Bank, 2025). This pattern reinforces Montenegro's reliance on foreign capital inflows rather than productivity-driven, export-led growth.

Public debt dynamics illustrate both progress and vulnerability. After peaking during the COVID-19 crisis, public debt declined to around **60 per cent of GDP** by 2025, supported by growth and fiscal consolidation efforts. However, this improvement coincides with **persistent fiscal pressures**, including rising social transfers, declining social contribution revenues and expanding capital expenditure, resulting in a **fiscal deficit of around 4 per cent of GDP** (World Bank, 2025).

These trends underscore unresolved tensions between redistribution, investment needs and fiscal sustainability within a constrained fiscal space.

Labour-market developments further shape the structural profile of the economy. Employment and poverty indicators have improved, with poverty declining to an estimated 7.5 per cent in 2025, supported by wage growth, tourism-driven consumption and social transfers (UN Montenegro, 2026). At the same time, structural challenges persist: labour-market fragmentation, informality, skills mismatches and pronounced **gender and regional inequalities** continue to constrain productivity and inclusive growth. Out-migration of young people, particularly from northern municipalities combined with population ageing reduces the domestic labour supply and intensifies pressures on pension and social systems (United Nations Montenegro, 2026).

Taken together, Montenegro's economic structure characterised by **consumption-led growth, infrastructure gaps and persistent external imbalances** creates a strong rationale for **green investment as a structural transformation tool**, capable of improving productivity, enhancing resilience and reducing import dependence, particularly in energy. Environmental pressures in Montenegro are closely intertwined with its growth pattern. Expansion of tourism, construction and transport has intensified pressures on **air quality, water resources, waste management systems and biodiversity**, while institutional capacity has struggled to keep pace with the scale and speed of development (UNECE, 2025). Despite its constitutional designation as an "ecological state," environmental degradation remains visible through illegal dump sites, low recycling rates, urban air pollution and ecosystem stress, undermining public health and long-term economic sustainability.

Climate change has emerged as a **systemic risk multiplier** rather than a sector-specific concern. Rising temperatures, prolonged droughts, floods and forest fires increasingly affect agriculture, forestry, hydropower generation and tourism infrastructure (UNECE, 2025). Hydropower, historically the backbone of electricity production, has become more vulnerable to hydrological variability, while unsustainable urban expansion heightens exposure to heatwaves and flooding. Climate-related economic losses are expected to rise, posing risks to growth, fiscal stability and social cohesion if adaptation measures remain under-financed. **Air pollution** constitutes one of the most acute environmental and public-health challenges. Emissions from coal-based electricity generation, residential heating using coal and firewood, transport and illegal waste burning contribute to elevated concentrations of particulate matter and sulphur dioxide, particularly in urban areas and the northern region (European Environment Agency, 2025). Mortality linked to fine particulate air pollution significantly exceeds EU averages, with disproportionate impacts on children and vulnerable populations, translating environmental degradation directly into health-system costs and productivity losses (UN Human Rights Office, 2026).

Water and waste management represent additional structural bottlenecks. Although Montenegro is relatively water-rich, **high network losses, outdated infrastructure, limited wastewater treatment and fragmented governance** undermine drinking-water safety and ecosystem health (UNECE, 2025). Waste management systems remain underdeveloped, with recycling rates around 1 per cent and investment needs estimated at **approximately EUR 400 million** to meet EU standards (European Commission, 2024). These deficits constrain environmental performance, reduce the sustainability of tourism-led growth and weaken alignment with the EU acquis.

In recent years, Montenegro has significantly strengthened its **climate and environmental governance framework**, particularly within the context of EU accession under **Chapter 27 (Environment and Climate Change)**. The country updated its **Nationally Determined Contribution (NDC)** and, in 2025, became the first Western Balkan country to submit an enhanced climate commitment under the UNFCCC, committing to net greenhouse-gas reductions of **at least 55 per cent by 2030 and 60 per cent by 2035** compared to 1990 levels (Government

of Montenegro, 2025). Importantly, these targets are accompanied by a financial overview, signalling a growing effort to link climate ambition with investment planning.

This shift is reinforced by the **National Adaptation Plan 2025–2035**, which identifies priority adaptation investments, estimated at around USD 30 million, focused on resilient infrastructure, flood protection and community preparedness (UNECE, 2025). Montenegro has also pioneered approaches to **biodiversity financing**, integrating a Biodiversity Financing Plan into the National Biodiversity Strategy and Action Plan to mobilise public and private resources for ecosystem restoration with direct livelihood and economic benefits (United Nations Montenegro, 2026).

Spatial and disaster-risk governance have evolved in parallel. The **Spatial Plan 2040** makes biodiversity protection legally binding in land-use decisions for the first time, while the **Law on Recovery after Hazards (2025)** establishes a unified, needs-based framework for post-disaster recovery aligned with EU Civil Protection standards (UNECE, 2025). These reforms reflect a transition from fragmented environmental policies toward a **more integrated climate–biodiversity–risk–finance framework**.

However, the Fourth Environmental Performance Review characterises Montenegro's transition as **"progressive but capacity-constrained."** While legal alignment with EU directives has advanced and institutional frameworks have been strengthened, **limited administrative capacity, fragmented responsibilities and insufficient financing** continue to hinder effective implementation (UNECE, 2025). The central challenge has shifted from regulatory alignment to **mobilising and absorbing green investment at scale**.

Energy transition represents the most strategic intersection between economic structure, environmental policy and green financing. Montenegro's electricity mix is relatively low-carbon due to hydropower and wind, yet **continued reliance on the coal-fired Pljevlja power plant** poses challenges for EU climate alignment, air-quality compliance and long-term decarbonisation (Energy Community Secretariat, 2024). At the same time, climate-induced hydrological variability exposes the limitations of hydro-dependence, underscoring the need for diversification, grid flexibility and storage.

Recent reforms aimed at **electricity-market integration with the EU**, including transposition of the Electricity Integration Package and alignment with Energy Community rules, are designed to attract private investment in renewables, support competitive auctions and enable market coupling ahead of accession (Energy Community Secretariat, 2024). Montenegro's geographic position and existing interconnections, notably the undersea electricity cable to Italy, offer potential to position the country as a regional energy hub. Realising this potential requires **substantial investment in grids, system balancing, regulatory capacity and just-transition mechanisms**, particularly for coal-dependent regions (World Bank Group, 2024).

Beyond energy, climate risks affect multiple sectors central to Montenegro's development model. Agriculture faces rising temperatures, reduced rainfall, water scarcity and extreme weather events, while adaptive capacity among small-scale producers remains limited (Government of Montenegro, 2025). Tourism, highly concentrated along the coast and seasonally uneven remains sensitive to climate hazards, yet lacks a comprehensive sustainability and adaptation framework (World Bank, 2024).

Health systems are increasingly exposed to climate-related risks, including heat stress, air pollution, flooding and vector-borne diseases, with vulnerabilities concentrated among poorer and remote populations (European Environment Agency, 2025). These sectoral vulnerabilities reinforce the need for **cross-sectoral, investment-driven adaptation**, rather than isolated pilot initiatives.

Montenegro's economic structure and environmental challenges together create a **compelling rationale for mobilising green investment as a core pillar of EU convergence**, rather than as a secondary environmental objective. Energy transition, air-quality improvement, waste and water management, biodiversity protection and climate adaptation are **foundational to sustaining growth, reducing external vulnerabilities and protecting public health** (World Bank, 2024; European Commission, 2024).

Investment needs are substantial and span renewable energy, grids, energy efficiency, waste and water infrastructure, sustainable transport and nature-based solutions. Meeting these needs requires a **blended-finance approach**, combining public resources, EU instruments (IPA III, the Growth Plan for the Western Balkans, WBIF), IFI lending and guarantees, municipal finance and private capital (Western Balkans Investment Framework (WBIF), 2024).

At the same time, the absence of **green budgeting** within public financial management limits Montenegro's ability to systematically align fiscal policy with climate and environmental objectives. Introducing green budgeting integrated into the annual budget cycle and aligned with national sustainability strategies would strengthen transparency, improve investment prioritisation and enhance credibility with investors and EU partners.

Overall, Montenegro's evolving environmental governance architecture increasingly functions as a **platform for green investment mobilisation**, translating Chapter 27 compliance into bankable projects. The success of this transition will depend on closing the gap between policy ambition and implementation capacity through **predictable, well-sequenced and adequately scaled green financing**.

1.3. Key Sectors Targeted for Green Finance in Montenegro

Montenegro's green finance priorities are shaped by the interaction between its **economic structure**, **environmental vulnerabilities**, and **EU accession obligations**, particularly under Chapter 27 (Environment and Climate Change). As a small, open economy with limited fiscal space and high exposure to climate risks, Montenegro faces the dual challenge of financing environmental compliance while sustaining growth and social cohesion. In this context, green finance is not a niche instrument, but a **central mechanism for structural transformation and EU convergence**.

Across EU funding instruments, international financial institution programmes and national reform agendas, a consistent prioritisation has emerged around four interrelated sectors: **renewable energy, energy efficiency, sustainable transport, and the circular economy**. These sectors are repeatedly identified as having the highest potential to deliver **emissions reductions, resilience gains and productivity improvements**, while remaining attractive for blended financing approaches that combine public resources, EU grants and private capital (European Commission, 2024). Montenegro's green-finance agenda now depends increasingly on building a **credible pipeline of investable projects** rather than on broad strategic declarations. These areas combine **clear policy relevance with measurable environmental impact** and can be financed through **commercial lending, concessional credit lines, public-private instruments, and, over time, green-bond structures** (Central Bank of Montenegro, 2025).

At the same time, Montenegro's exposure to **climate-related disasters** including floods, earthquakes, landslides, droughts, wildfires and heatwaves reinforces the need to integrate **adaptation and resilience investments** across sectoral priorities. Floods alone affect around 10,000 people annually and cause average damages of approximately USD 90 million, while earthquakes generate additional losses of around USD 70 million per year (World Bank, 2024).

Without timely adaptation, climate-related damages could reduce GDP by nearly 8 per cent by mid-century, implying substantial macro-fiscal risks (World Bank, 2024).

Against this backdrop, sectoral green-finance prioritisation reflects both **risk management and opportunity creation**, with a strong emphasis on investment readiness, private-sector participation and alignment with EU standards.

Renewable energy constitutes the **central pillar of green finance mobilisation** in Montenegro, it is the most capital-intensive segment of Montenegro's green finance agenda, guided by the NDC, LCDS, and NECP. Electricity generation has historically relied on hydropower, complemented by wind energy, resulting in a relatively low-carbon electricity mix. However, this structure remains vulnerable to hydrological variability and climate change, while continued reliance on the coal-fired Pljevlja power plant poses challenges for EU climate alignment, air-quality compliance and long-term decarbonisation (Energy Community Secretariat, 2024).

In response, Montenegro has prioritised **diversification into solar and wind energy**, alongside energy storage and grid modernisation. Recent reforms supported by the European Union and the EBRD have introduced competitive renewable-energy auctions and strengthened the regulatory framework in line with EU renewable-energy legislation, improving price discovery, transparency and investor confidence (European Bank for Reconstruction and Development, 2024). Flagship projects presented at EU–Montenegro investment fora illustrate the scale and diversity of planned investments, including floating solar installations, high-altitude wind technologies and battery-storage facilities.

EU instruments such as **IPA III and the Western Balkans Investment Framework** play a critical role in this sector by **blending grants with concessional loans**, thereby de-risking projects that require grid upgrades, system balancing and cross-border interconnections (Western Balkans Investment Framework (WBIF), 2024). Renewable energy is also central to Montenegro's long-term decarbonisation pathway: achieving net-zero emissions by 2050 will require a full transition away from coal, supported by electrification of heating and transport and improved energy efficiency, with more than 70 per cent of additional investment expected to be financed by the private sector through green bonds, public–private partnerships and carbon-pricing mechanisms (World Bank, 2024).

Key investments include hydropower and grid expansion for the Komarnica and Kruševo projects, seeking up to €500 million through the EU Growth Plan for the Western Balkans, alongside wind energy expansion at the Gvozd wind farm, which reaches 75 MW capacity via €26 million EBRD financing by 2026 (Pajic, 2025a), complemented by planned capacity auctions (Pajic, 2025). Solar development accelerates through EPCG's "Solari 5000+" rooftop programme targeting ~70 MW (EPCG Solar Gradnja, 2022), plus utility-scale initiatives like the Tupan solar park and Slano floating solar pilot. Grid modernisation and digitalisation projects, including 240 MWh battery storage tenders and EBRD's €215 million 2025 commitments, further enable higher renewable penetration while ensuring system stability (Delegation of the European Union to Montenegro, 2025).

Energy efficiency represents one of the **most cost-effective and socially inclusive green-finance sectors** in Montenegro. Energy efficiency is the most accessible entry point for green finance in Montenegro, as it requires relatively modest investments while delivering broad social and economic benefits. Key measures include building insulation, window replacement, efficient heating and cooling systems, heat pumps, solar thermal solutions, and energy management systems across households, SMEs, municipalities, and public buildings, all of which reduce energy use and operating costs (UNDP Montenegro, 2025).

The building stock, particularly public buildings constructed between the 1930s and 1980s is characterised by outdated heating systems, insufficient insulation and high energy consumption, contributing to air pollution, energy poverty and elevated fiscal costs (Regional Cooperation Council, 2024). Green finance in this sector focuses on three main areas: **renovation of public buildings** (schools, hospitals and administrative facilities), **energy-efficiency investments in households and SMEs**, and **targeted measures to reduce energy poverty**. These investments generate multiple co-benefits, including emissions reductions, improved indoor air quality, lower energy bills and enhanced resilience to energy-price shocks.

Programmes such as the **EBRD's SME Go Green** initiative illustrate effective financing models, combining credit lines delivered through local financial institutions with grant incentives and technical assistance to improve project viability and uptake (European Bank for Reconstruction and Development, 2024). By lowering upfront costs and addressing information barriers, such schemes demonstrate how energy efficiency can be scaled through **market-based instruments**, while supporting competitiveness and employment.

Energy efficiency also plays a critical role in adaptation: improved building envelopes and cooling systems reduce vulnerability to heatwaves, while modernised public facilities enhance service continuity during extreme weather events. As such, the sector is well suited to **performance-based and blended financing**, particularly when aligned with social and regional inclusion objectives.

Transport is another priority sector for green finance, given its contribution to **greenhouse-gas emissions, air pollution and spatial inequality**. Montenegro's mountainous terrain and transit position within the Western Balkans make transport infrastructure both costly and environmentally sensitive, requiring careful balancing of connectivity, climate resilience and ecosystem protection.

EU-supported investments increasingly prioritise **sustainable and low-carbon transport solutions**, including rail modernisation, road-safety improvements, electrification of transport systems and alignment with Trans-European Transport Network (TEN-T) standards (Western Balkans Investment Framework (WBIF), 2024). Through the Economic and Investment Plan for the Western Balkans and the WBIF, green finance supports projects that reduce emissions, enhance regional integration and strengthen resilience to climate impacts, particularly in ecologically sensitive corridors. Although large-scale urban mobility projects remain at an early stage, sustainable transport is expected to gain importance as Montenegro advances toward EU membership and adopts stricter climate and air-quality standards. The sector offers significant scope for **blended finance**, particularly where grant support is used to address environmental externalities and enable private participation in rolling stock, charging infrastructure and intelligent transport systems. Green-finance instruments can operate at several levels: retail-level loans for electric or hybrid vehicles for households and SMEs; municipal-level lending for electric buses, depot upgrades, and charging infrastructure; and blended-finance structures for corridor-level electrification and city-scale mobility packages.

Transport is increasingly important for green finance because it links climate ambition directly to daily mobility, tourism, and urban infrastructure. In Montenegro, this includes cleaner public transport, low-emission vehicle fleets, EV-charging infrastructure, traffic-management upgrades, cycling lanes, and pedestrian-oriented urban design. Because citizens see cleaner buses, charging stations, and safer mobility infrastructure, transport projects act as a visible demonstration of green finance's impact on everyday life, reinforcing public support for decarbonisation policies.

Concrete examples include the Solaris Urbino 12 mild-hybrid bus purchased by the Port of Bar for public-transport purposes under the EU-funded SuMo sustainable-port project (Interreg IPA CBC Italy–Albania–Montenegro, 2022), alongside expansion of a growing network of public EV-

charging stations under GEF-funded green-transport initiatives targeting key domestic and tourist corridors.
The transition toward a **circular economy** is an emerging but increasingly important focus of green finance in Montenegro. Deficits in waste management, wastewater treatment and resource efficiency are closely linked to EU environmental acquis requirements and represent one of the most capital-intensive components of Chapter 27 compliance (UNECE, 2025).

The circular economy broadens green finance beyond energy and transport by targeting how materials, products, and waste move through the economy. In Montenegro, this includes waste sorting and recycling infrastructure, composting, reuse and remanufacturing, industrial resource efficiency, and water-saving technologies. This sector addresses environmental pressures beyond energy policy, such as landfill dependence, pollution, and raw-material intensity. The European Environment Agency highlights that Montenegro has substantial room to improve its circular-material-use rate, pointing to a clear unmet investment need (European Environment Agency, 2025). The national 2030 targets, which were not met by 2020, aim to achieve at least a 50% recycling rate for household and similar waste streams such as paper and plastic, as well as a 70% rate of reuse or recycling for construction and demolition materials (Službeni list Crne Gore, 2024).

Concrete projects include the World Bank-supported Montenegro Waste Management Reform Project (€40 million), which finances institutional strengthening and a Regional Waste Management Center in Nikšić with recycling, composting, and modern treatment capacity, alongside remediation of about 11 hectares of contaminated land at the KAP industrial site near Podgorica. The CircleWaste Adrion project pilots a circular model for electronic-waste recovery and reuse across the Adriatic-Ionian region, with Montenegrin partners testing e-waste collection, refurbishment, and recycling business models. Circular-economy-related projects are often smaller and more heterogeneous than big-scale renewables, making them more complex to standardise and often requiring technical assistance, concessional elements, or public-backed guarantees. Yet they allow Montenegro to diversify its green-finance pipeline and embed green finance in resource efficiency and pollution control.

Beyond mitigation-oriented sectors, Montenegro's **National Adaptation Plan 2025–2035** identifies agriculture, water, tourism and health as priority sectors requiring targeted adaptation investment, with total implementation costs estimated at approximately **EUR 27 million** (Government of Montenegro, 2025).

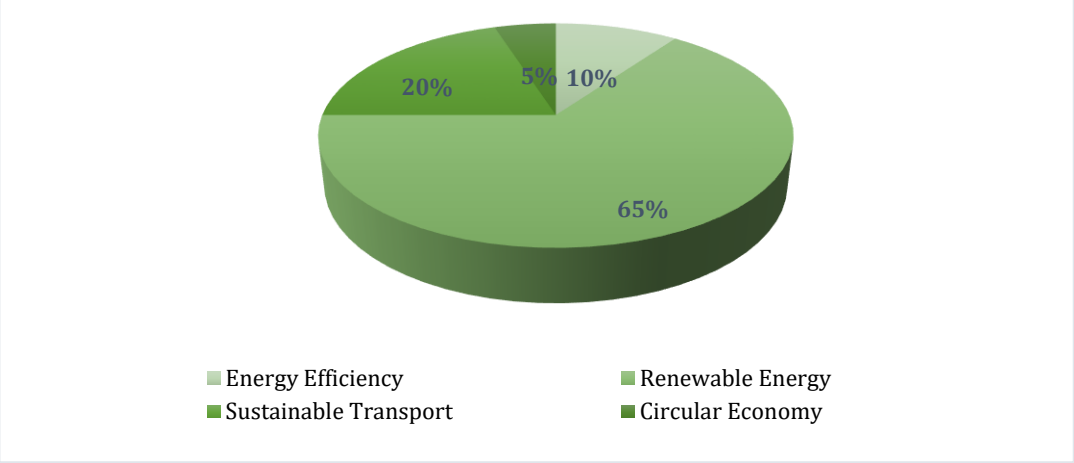
In **agriculture**, green finance supports climate-smart practices, sustainable land use and resilience of livestock systems. In the water sector, priorities include strengthening monitoring networks, upgrading flood-risk mapping and implementing nature-based solutions such as natural water-retention measures. In **tourism**, adaptation finance focuses on product diversification, community-based and eco-tourism models, early-warning systems and climate-resilient infrastructure. In health, investments target preparedness for heatwaves, floods and disease outbreaks, supported by early-warning systems and capacity building (Government of Montenegro, 2025). These sectors are particularly suited to **grant-heavy and blended instruments**, given their public-good characteristics and strong social returns.

Urban development, housing and land management are emerging as **potential future green-finance sectors**, particularly in light of climate risks, demographic pressures and energy-poverty concerns. Recent international assessments highlight the role of sustainable housing, compact urban development and climate-resilient land-use planning in reducing emissions, improving living conditions and strengthening disaster resilience (UNECE, 2026).

While this sector is not yet a primary recipient of green finance in Montenegro, it offers growing opportunities for **integrated investments** linking energy efficiency, social inclusion and climate adaptation, especially in urban and peri-urban areas.

Across all sectors, green finance in Montenegro increasingly relies on **blended financing mechanisms** that combine public, EU and private resources. In this context, the **UN Montenegro SDG Acceleration Fund (MAF)** represents an important platform for pooled financing and partnership-based interventions. The Fund supports joint initiatives aligned with national priorities in inclusive economic development, environmental sustainability and human capital, operating through institutional and EU-focused funding windows (United Nations Montenegro, 2026). While MAF remains relatively modest in scale, it provides a **proof of concept** for integrated financing approaches that could be scaled or linked more systematically with larger EU and IFI instruments, particularly in pilot sectors such as energy efficiency, adaptation and community-based resilience.

Figure 13. Montenegro Green Finance Pipeline by Sector (Est. €1.25B Total)



Source: Authors' own calculations using data from: EBRD (2025), EU Growth Plan/WBIF project allocations, World Bank Montenegro Waste Management Reform, European Commission Enlargement Report 2025.

Figure 1 illustrates the estimated green finance pipeline across these sectors, with renewables comprising 65% (€800M) of the €1.25B total due to large-scale hydro, wind, and grid projects. Author's calculations based on EBRD 2025 investments (€215M primarily energy), EU Growth Plan hydro/grid allocations (€500M+), World Bank waste management (€40M), and EC Enlargement Report 2025 sector assessments. Energy efficiency (10%) and transport (20%) offer diversified, visible impacts, while circular economy (5%) represents emerging potential requiring blended finance. This distribution underscores renewables' dominance while highlighting the need for pipeline diversification to sustain green finance momentum. To move from policy-to-practice, Montenegro should:

- **pre-qualify bankable projects** in each sector with technical-feasibility and impact-data;
- **align eligibility criteria** with EU-style taxonomy and sustainable-finance standards;
- **aggregate projects into diversified portfolios** that can support **green-bond or quasi-sovereign-issuance**; and
- **disclose green-finance volumes and impacts** systematically

In sum, Montenegro's green-finance-suitable sectors reflect a strategic alignment between **economic transformation needs, environmental challenges and EU accession requirements**. Renewable energy, energy efficiency, sustainable transport and the circular economy form the core investment pillars, complemented by adaptation-focused interventions in agriculture, water, tourism and health, and emerging opportunities in urban development and housing. The effectiveness of green finance in these sectors will depend on **blended financing**

structures, institutional capacity and policy coherence, ensuring that investment translates into durable economic convergence and environmental resilience.

2. Institutional and Financial Mechanisms for green investments

2.1. Legal framework for green revenues in the public sector of Montenegro

The system that explain different legal bases and modalitis of green revenues in the public sector in Montenegro is not centralized in a single law but is instead distributed across multiple horizontal and sectoral laws, such as those governing air protection, water, waste, mining, and climate change. This indicates a cross-sectoral approach, where environmental revenue collection is embedded into different areas of public policy.

According to the Law on Environment (Article 75) **funds for financing environmental protection** shall be provided from:

- the Budget of Montenegro;
- the budget of the local self-government unit;
- eco-charge revenues;
- funds of the Environmental Protection Fund (hereinafter: the Eco-Fund);
- loans, donations, and financial assistance;
- instruments, programmes, and funds of the European Union, United Nations, and other international organizations;
- foreign investments intended for environmental protection; and
- other sources in accordance with the law.

Funds for climate change mitigation, adaptation to climate change, and ozone layer protection shall be provided from the Budget of Montenegro, the budgets of local self-government units, as well as from other sources in accordance with the Law on Climate Change. Other sources shall include: donations, loans, state aid, international assistance, as well as foreign investments intended for the ozone layer protection, climate change mitigation, and adaptation to climate change. Financial funds collected from the sale of emission allowances through a public auction shall be deposited into a special account of the Eco-Fund.

At its core, the framework reflects a **"polluter pays"** principle, where entities that generate environmental harm or use natural resources are required to pay fees or charges. Instead of the general public covering these costs through taxes, the financial burden is placed directly on the companies or individuals responsible for the pollution. This creates a strong incentive for businesses to find cleaner, more efficient ways to operate to avoid high fees. These revenues are then directed either to the state budget, local governments (municipalities), or the Eco-Fund, depending on their purpose.

The following table outlines the framework for collecting green (environmental and climate-related) revenues in Montenegro, showing three key elements for each revenue stream: the type of fee, its legal basis, and the destination of the revenue. Together, these elements form a structured system that links environmental policy objectives with fiscal instruments.

Table 6. Environment and Climate-Related Revenues in Montenegro's Budget

Type of Fee	Legal Basis	Destination of Revenue
Fees for environmental pollution (eco-charges): - the emission of pollutants into the air – environmental pollution charges[27]; - the import of substances that deplete the ozone layer[28]; - the generation and disposal of hazardous waste[29].	Law on Environment, OGM, No. 52/16, 73/19 and 84/24; (Article 77); Law on Air Protection, OGM, No. 25/10, 40/11, 43/15, 73/19 and 84/24; (Article 48); Decree on the Amount of Fees, the Method of Calculation and Payment of Fees for Environmental Pollution, OGRM No. 26/97, 9/00, 52/00, OGM, No. 033/08, 5/09, 64/0, 40/11, 49/11, 119/22) – Articles 2, 4 and 5.	State budget (mostly transferred further to the Eco-Fund, based on Article 76 of the Low on Environment)
Fees for Environmental Protection and Improvement by Local Self-Government Units[30] (Article 79 of the Law)		Local Self-Government Units budget
Environmental and climate related fines and penalties	Law on environment (Article 87), Law on Climate Change (Article 94 & 95)	State budget LSG units - local budgets
Fees for discharge of pollutants into water	Law on Waters, OGRM, No. 27/07, and OGM No. 73/10, 32/11, 47/11, 48/15, 52/16, 55/16, 2/17, 80/17, 84/18 and 84/24	State budget + municipalities
Fees for the use of water resources		State budget + municipalities
Fees for GHG emissions	Law on Climate Change, *OGM*, No. 149/25	Eco-Fund
Revenues from emissions trading (ETS)		Eco-Fund
Fees for exploitation of mineral resources	Law on Mining, OGM, No. 65/08, 74/10, 40/11 and 84/24	State budget + municipalities
Fees for the use of maritime domain	Law on Maritime Domain, OGRM, No. 14/92, 59/92, 27/94, and OGM, No. 51/08, 21/09, 73/10 and 40/11	Public Enterprise for the Management of the Coastal Zone of Montenegro[31]
Fees for forest use and forest land owned by the State (Ar.78)	Law on Forests OGM, Nos. 74/10, 40/11 and 47/15	State budget + municipalities

[27] Legal entities operating combustion installations and electrically powered installations with an installed capacity exceeding 1 MW shall pay monthly **environmental pollution charges**, depending on the type of fuel used and the type of harmful and hazardous substances emitted into the air, calculated per tonne, as follows: benzo(a)pyrene – €180.67, carbon monoxide (CO) – €2.225, sulphur oxides expressed as SO_2 – €4.005, nitrogen oxides expressed as NO_2 – €3.204, gaseous inorganic fluorine compounds expressed as HF – €13.483, gaseous inorganic chlorine compounds expressed as HCl – €2.67, organic substances expressed as total carbon – €3.115, lead, nickel, chromium, cadmium and mercury – €31.550, manganese and copper – €8.90, pyrene – €26.70. phenanthrene – €26.70, anthracene – €26.70 and total particulate matter – €18.868 (Article 2 of the Decree)

[28] **Legal entities importing ozone-depleting substances** shall pay a fee in the amount of €0.90 per kilogram of the imported substance (Article 4 of the Decree);

[29] **Legal entities that generate and dispose of hazardous waste** containing one or more constituents of toxic materials and substances, including: arsen and arsenic compounds; mercury and mercury compounds; cadmium and cadmium compounds; thallium and thallium compounds; beryllium and beryllium compounds; chromium; lead and lead compounds; antimony and antimony compounds; phenols and phenolic compounds, including chlorophenols; cyanides, both organic and inorganic; isocyanides; organohalogen compounds, excluding inert polymerised materials; chlorinated solvents; organic solvents; biocides and plant protection products; residues from refining, distillation and any other pyrolytic treatment; pharmaceutical compounds; peroxides, chlorine compounds, fluorides, perchlorates and azides; ethers; asbestos (dust and fibres); selenium and selenium compounds; tellurium and tellurium compounds; polycyclic aromatic compounds (with carcinogenic effects); metal carbonyls; copper compounds; acids and bases used in surface treatment of metals, shall pay monthly fees as follows: €151.51 per tonne for waste management; €75.75 per tonne for waste disposal. (Article 5 of the Decree);

[30] **A local self-government unit may prescribe fees for environmental protection and improvement**, in accordance with its needs and specific characteristics. The criteria, types, and amounts of the fees referred to in paragraph 1 of this Article, the method of payment, liable entities, as well as exemptions for certain categories of payers, shall be prescribed by the local self-government unit, subject to prior approval of the Government. Funds collected on the basis of the fees referred to in paragraph 1 of this Article must be used exclusively for environmental protection and improvement within the territory of the local self-government unit.

[31] Total revenues of the Public Enterprise for the Management of the Coastal Zone of Montenegro in 2023 and 2024 were 13.53 and 16.06 mil euro.

Fees for packaging and packaging waste (plastic, paper, metal, glass, etc.).	Law on Waste Management (OGM, No. 34/24 and 92/24)	Eco-Fund
Fees for electrical and electronic equipment waste		Eco-Fund
Fees for batteries and accumulators		Eco-Fund
Fees for end-of-life vehicles		Eco-Fund
Fees for special waste streams		Eco-Fund
Administrative environmental permit fees (EIA – Environmental Impact Assessment, SEA – Strategic Environmental Impact Assessment, IPPC –Integrated Pollution Prevention & Control)	Law on Environment, OGM, No. 52/16, 73/19 and 84/24 (Article 38); Law on Industrial Emissions (OGM No. 17/19, 3/23, 34/24 and 84/24) (6-31); Law on Strategic Environemntal Assessment, OGRM 80/05, OGM 73/10, 40/11, 59/11, 52/16 and 84/24); Law on Environmental Assessment, OGM 75/18 and 84/24;	State budget
Eco-label and EMAS – Eco Management and Audit Schemes - registration fees	Law on Environment, OGM, No. 52/16, 73/19 and 84/24 (Article 43)	State budget

Source: author's compilation;

2.1.1. Pollution-Based Fees

a) Air emissions (under the Law on Air Protection, Official Gazette of Montenegro, No. 25/10, 40/11, 43/15, 73/19 and 084/24). This particular law provides that Operators that emit pollutants into the air are required to pay fees for their emissions**.** In practice, the fee level depends on the type of pollutant (e.g., SO_2, NOx, particulate matter), the quantity of emissions**,** and the type of emission source**.** The amount and calculation of these fees are not specified directly in the law, but are determined through secondary legislation. The detailed methodology and specific amounts are regulated in the Decree on the amount of fees, the method of calculation and payment of fees for environmental pollytion (related to the Law on Environment). Secondary legislation consists of various decrees and rulebooks that further elaborate the provisions of the Law on Air Protection.

From the State budget, funds are allocated for the assessment of air quality and the classification of zones according to air quality categories; the establishment, maintenance, operation, and development of the State Monitoring Network; the implementation of air quality monitoring programmes within that network; the conduct of extraordinary, special-purpose measurements; the preparation and implementation of the National Air Quality Management Strategy; the implementation of air quality plans and short-term action plans; the implementation of measures aimed at reducing the adverse impacts of climate change and protecting the ozone layer; the establishment and operation of the Clean Development Mechanism Council; the establishment and maintenance of the greenhouse gas emissions inventory and the air quality information system; the fulfilment of obligations undertaken under international agreements; and the financing and/or co-financing of other projects, programmes, and measures intended to protect and improve air quality. From the budget of the local self-government unit, funds are allocated for the establishment and maintenance of the local air quality monitoring network; the implementation of monitoring programmes within the local network; the implementation of air quality plans and short-term action plans referred; the maintenance of a local register of air pollution sources; and the financing and/or co-financing of other projects, programmes, and measures aimed at the protection and improvement of air quality.

In practice, air quality in Montenegro remains a significant environmental challenge, particularly in urban and northern regions. Although there has been progress in environmental governance,

particulate matter ($PM_{2.5}$ and PM_{10}) concentrations still frequently exceed recommended limits, especially during the winter period. Air pollution is mainly caused by household heating, traffic, and industrial sources. Recent data show that Montenegro's average pollution levels remain above World Health Organization guidelines, and achieving long-term reduction targets continues to be difficult. Nevertheless, ongoing regulatory improvements and alignment with EU standards indicate gradual progress in air quality management.

b) Water pollution (Law on waters, *Official Gazette of the Republic of Montenegro*, No. 27/07, and *Official Gazette of Montenegro*, No. 73/10, 32/11, 47/11, 48/15, 52/16, 55/16, 2/17, 80/17, 84/18 and 84/24). This law regulates the protection and management of water resources and establishes obligations for the prevention and control of water pollution. It provides that operators and other entities that discharge pollutants into surface or groundwater are required to obtain permits and, where applicable, pay water-related fees and charges. the use of water resources—such as water rights fees, concessions on public water assets, compensation for damage during the exploitation of river sediments, and water pollution charges—are primarily regulated by the Law on Waters, which establishes the legal basis, categories of charges, and obligations of users. However, the amounts of these fees are not fixed in the Law itself; they are determined by implementing acts adopted by the Government or the competent ministry, or, in certain cases, by contracts (e.g. concession agreements or agreements for specific services). In practice, the level of charges depends on the type and quantity of pollutants, the characteristics of the receiving water body, and the type of activity. Overall, the Law on Waters establishes a framework for water protection, monitoring, and sustainable use, while detailed technical and procedural rules are regulated separately. Secondary legislation also consists of various decrees, plans and rulebooks that further elaborate the provisions of the law, including those related to water classification, wastewater discharge standards, monitoring conditions, and permitting procedures.

Main water-related fees are the following: 1. Water Right Fee that covers use of water or water resources (abstraction, hydropower, irrigation, etc.); amount is determined by secondary regulations prescribing tariff levels, calculation, and payment method; 2. Concession Fee on Public Water Assets **-** legal bases are Law on Waters + Law on Concessions; Covers use of public water resources or infrastructure under concession and amount is determined by Concession agreement (contract) based on tender conditions and the Government decision; 3. Compensation for Damage from Exploitation of River Sediments - provisions on river sediments / water land use, for the cases of extraction of sand, gravel, etc. from riverbeds; amount is determined by the Government regulation or contractual agreements (depending on permit/concession); 4. Water Pollution Charge - legal bases is Low on waters and environmental legislation (polluter pays principle), covers discharge of pollutants into water bodies, amount is determined by secondary legislation defining tariff per pollutant/unit, calculation of methodology and payment procedures; and 5. Fees for Discharge of Wastewater / Use of Water Services (legal base are Law on Waters and laws on communal services and wastewater management) that covers public water supply and wastewater services; amount is determined by LSG decisions (tariffs for services), often implemented through utility company pricing system.

In practice, water quality in Montenegro is generally satisfactory in many areas; however, challenges remain due to insufficient wastewater treatment, industrial discharges, agricultural runoff, and seasonal tourism pressures, particularly in coastal regions. Although investments in wastewater infrastructure and alignment with EU water directives have led to improvements, full compliance with environmental standards and effective protection of water resources remain ongoing challenges.

c) Greenhouse gas (GHG) emissions and emissions trading (Law on Climate Change, *Official Gazette of Montenegro*, No. 149/25). The Law establishes a comprehensive legal framework for

regulating greenhouse gas (GHG) emissions and introducing market-based instruments aligned with EU climate policy, particularly the emissions trading system (ETS). Under the Law, operators of stationary installations, regulated entities, aircraft operators, and shipping companies are subject to strict monitoring, reporting, and verification (MRV) obligations (Articles 24, 33–38). A central financial obligation is the requirement that operators must surrender emission allowances corresponding to their verified emissions (Articles 15 and 22), which represents the core economic instrument of the system. Through this mechanism, the Law effectively operationalizes the "polluter pays" principle by attaching a financial cost to each tonne of emitted CO_2 equivalent. Although the Law does not always define classical environmental "fees," it introduces a range of climate-related economic obligations and cost-based instruments. The ETS allows the allocation and trading of emission allowances (Article 6 – definition of emission allowance and emissions trading), thereby creating a carbon pricing mechanism and incentivizing emission reductions. In addition, the Law establishes cost recovery obligations, including: the obligation of operators to bear the costs of verification of emissions reports (Articles 35–37), the obligation to bear the costs of conservative assessment of emissions in cases of non-compliance (Article 34), and compliance-related costs associated with monitoring plans and reporting systems (Articles 24–25, 33). These instruments function as indirect financial burdens linked to emissions and non-compliance, reinforcing regulatory discipline.

Furthermore, the Law provides a regulatory basis for controlling fluorinated greenhouse gases (F-gases) and ozone-depleting substances (ODS) as part of broader climate and ozone layer protection measures (Articles 1 and 2), aligning national policy with international obligations such as the Paris Agreement. While detailed fee levels for these substances are typically established through secondary legislation, the Law creates the legal foundation for their regulation and associated financial mechanisms. Importantly, revenues generated from climate-related instruments—including emissions trading obligations, penalties, and charges—are integrated into the broader environmental financing system, notably through mechanisms such as the Eco-Fund. These funds are used to support climate mitigation and adaptation measures, including investments in renewable energy, energy efficiency, and environmental protection. In this way, the Law ensures that financial flows generated from emissions-related obligations are reinvested into achieving long-term policy objectives, particularly the transition towards climate neutrality by 2050 (Article 3).

2.1.2. Resource Use Charges - fees for the use or exploitation of natural resources

a) Concession fee on public water assets - the Law on Waters *(*Official Gazette of the Republic of Montenegro, No. 27/07, and Official Gazette of Montenegro, Nos. 73/10, 32/11, 47/11, 48/15, 52/16, 55/16, 2/17, 80/17, 84/18 and 84/24) provides that the use of water resources is subject to fees and charges, representing a form of resource-use (exploitation) revenue. While the law establishes the obligation to pay, the detailed methodology and fee levels are defined through secondary legislation. These revenues are typically shared between the state budget and municipalities, reflecting both the national importance and the local impact of water resource management. Importantly, fees related to water pollution (discharge of pollutants into water) are regulated separately and fall under pollution-based charges.

b) Concession fee for the exploitation of mineral resources - mineral extraction is governed by the Law on Mining (Official Gazette of Montenegro, Nos. 65/08, 74/10, 40/11 and 84/24), which provides that a fee is paid for the use of mineral resources. More specifically, revenues from the concession fee for the exploitation of mineral resources are shared between the central and local levels of government, with 70% allocated to the state budget and 30% to the municipality where exploitation takes place. This makes mining-related revenues a clear example of resource-use charges linked to both national fiscal policy and local territorial impacts.

c) Fees for the use of fores resources (fees for the use of forests, forest land and non-timber forest products in state ownership, but also: fees for the endangerment and use of general forest functions, revenues from the sale of timber assortments and other forest products from State-owned forests fees paid by owners of privately owned forests (Art.76), fees paid by legal and natural persons whose profit-generating activities benefit from the general beneficial functions of forests or whose activities endanger those functions (Article 72)). Forest use is regulated by forestry legislation, primarily the Law on Forests *(Official Gazette of Montenegro, Nos. 74/10, 40/11 and 47/15)*. The law provides that forests, as a natural resource of public interest, are subject to regulated use and that various fees and charges are paid for their exploitation, including timber harvesting and the use of forest land. These revenues are generally allocated to the state budget and municipalities, supporting both national forest policy and local environmental management, as well as sustainable use and conservation of forest resources.

d) Maritime domain fees - maritime domain is governed by the Law on Maritime Domain (Official Gazette of the Republic of Montenegro, Nos. 14/92, 59/92, 27/94, and Official Gazette of Montenegro, No. 51/08, 21/09, 73/10 and 40/11), which regulates the use, protection and management of coastal and marine public goods. The law provides that the conditions of use and the amount of the fee are determined by the Government, while the fee for the use of maritime domain constitutes revenue of the public enterprise managing maritime domain, to be used for its protection, improvement and related infrastructure. This makes maritime domain charges a distinct form of environmental and resource-use revenue tied to coastal management. These revenues are typically shared between the state and municipalities, reflecting the local impact of resource use. This creates a fiscal link between environmental exploitation and local development, incentivizing municipalities to manage resources sustainably while benefiting financially.

2.1.3. Waste Management and Circular Economy Fees

The framework also includes a comprehensive set of **waste-related fees**, covering: packaging waste, electrical and electronic equipment, batteries and accumulators, End-of-life vehicles and special waste streams

Waste-related fees are regulated under the Law on Waste Management (Official Gazette of Montenegro, No. 34/24 and 92/24). In line with "extended producer responsibility principles", producers and importers are required to pay fees related to the management of these specific waste streams. All of these revenues are directed to the Eco-Fund of Montenegro, which suggests a deliberate policy design: funds collected from waste-related activities are recycled into environmental protection and circular economy initiatives. This reflects alignment with EU environmental policy, especially extended producer responsibility (EPR) systems.

2.1.4. Administrative Fees and Market-Based Instruments

Administrative fees include charges for environmental permits (EIA, SEA, IPPC) and eco-label and EMAS registrations. These are paid into the state budget and serve more of a cost-recovery function, ensuring that regulatory systems are financially sustainable. The emissions trading revenues are the example of market based instruments, and represent a more advanced mechanism. These not only generate income but also create economic incentives to reduce emissions, aligning Montenegro with EU climate policy frameworks.

2.1.5. Fines and Penalties

Finally, Finally, the framework includes environmental fines and penalties, which are allocated to both state and local budgets. These have a dual purpose, both deterrence, discouraging non-compliance, and revenue generation, although this is secondary to enforcement, ensuring that

regulatory standards are upheld and that environmental protection remains the primary objective of the system.

Table 7. Estimated budget revenues based on environmental and climate fees

Econ. Classif.	Description of curent revenues (fees)	2023	% of current revenues	2024	% of current revenues
714	**Total Fees**	**55,717,586**	**2.2%**	**53,128,167**	**2.0%**
7141	**Fees for the use of goods of general interest** – including fees for the use of water, extraction of materials from watercourses, water protection against pollution, and the use of results of geological research.	2,260,507	0.1%	2,023,897.66	0.1%
7142	**Fees for the use of natural resources** – including fees for the use of forests, use of the coastal/maritime domain, mineral resources, and raw mineral materials.	6,223,198	0.2%	4,982,950.81	0.2%
7144	**Fees for organizing games of chance**	13,411,048	0.5%	20,288,683.34	0.7%
7148	**Road fees**	3,957,857	0.2%	3,955,240.98	0.1%
7149	**Other fees** – this category includes fees related to environmental pollution, negative impacts of climate change, waste management, and others.	29,864,976	1.2%	21,877,393.89	0.8%
	Current revenues of the Budget of Montenegro	**2,495,187,292**	100.0%	**2,714,861,913**	100.0%
	7141+7142+7149 – the State level	**38,348,681**	1.5%	**28,884,242**	1.1%
	7141+7142+7149 - LSG units level	**23,706,561**	6.3%	**22,136,567**	5.1%
	Public Enterprise for the Management of the Coastal Zone of Montenegro - total revenues	**13,631,655**		**16,066,900**	

Source: Ministry of Finance, Data on the Budget execution for 2023. and 2024; Budget of PE Costal Zone Management and GDDS tables (2026);

Based on available data, revenues from environmental protection and climate-related fees remain relatively low, accounting for approximately 1.5% of total revenues in the Budget of Montenegro in 2023 and 1.1% in 2024, corresponding to €38.3 million and €28.9 million, respectively.

At the level of local self-government units, revenues generated on these grounds amounted to €23.7 million and €22.13 million in 2023 and 2024, respectively. However, their share in total current revenues of municipalities is relatively higher, reaching 6.0% in 2023 and 5.1% in 2024. Total revenues of the Public Enterprise for the Management of the Coastal Zone of Montenegro in 2023 and 2024 were 13.53 and 16.06 mil euro.

The total estimated revenues on these grounds amounted to €75.68 million in 2023 and €67.09 million in 2024.

2.1.6. Multi-level Governance and Role of the Eco-Fund of Montenegro

The framework reflects a system of multi-level governance, in which revenues are distributed across the state budget, municipalities, and the Eco-Fund. The state budget supports national policies and administrative functions, while municipalities receive funding for local environmental management and infrastructure. At the same time, the Eco-Fund ensures targeted investments in environmental protection and sustainability projects. This layered structure ensures that national priorities are adequately funded, local governments are provided with financial incentives, and environmental objectives receive dedicated and consistent financial support.

A central feature of the framework is the Eco-Fund, which acts as a dedicated financial mechanism for environmental and climate action. The activity of the Eco-Fund is the financing of the preparation, implementation, and development of programmes, projects, and similar activities in the fields of environmental protection, sustainable use, conservation and improvement of the environment, energy efficiency, and the use of renewable energy sources at both the national and local levels. The mission of the Eco-Fund is to collect and invest financial resources in building a sustainable society in Montenegro, based on the efficient use of natural resources and low-carbon development. The vision of the Eco-Fund is to position itself as a leading professional and financial institution in the field of environmental protection and sustainable development in Montenegro. In order to fulfil its mission and vision, the Eco-Fund receives revenues from climate-related fees (GHG emissions, ETS), waste management fees and fees for harmful substances (e.g., fluorinated gases). This creates a ring-fenced system, where environmentally related revenues are reinvested into climate mitigation and adaptation projects, waste management systems and environmental protection programs. The Eco-Fund thus strengthens policy coherence by linking revenue collection with targeted environmental spending.

Overall, the framework demonstrates several important strengths. It is comprehensive, covering key areas such as pollution, natural resources, waste management, and climate policy. Each revenue stream is clearly grounded in legislation, ensuring legal certainty and transparency. In addition, the use of the Eco-Fund for earmarking revenues enhances the effectiveness of environmental spending, while the overall system shows a high degree of alignment with EU practices, particularly in the fields of waste management and climate policy.

However, the framework also presents certain challenges. The existence of multiple laws and regulations may lead to fragmentation and complicate coordination across sectors. Furthermore, the overall effectiveness of the system depends heavily on the level of enforcement and the adequacy of fee structures. Finally, balancing revenues between the general state budget and earmarked environmental funds can be complex and may affect the efficiency of resource allocation.

This overview illustrates a structured yet decentralized system for the collection of green revenues in Montenegro, integrating traditional environmental charges with modern climate finance instruments. By linking legal frameworks, revenue streams, and expenditure channels, thereby translating environmental policy objectives into concrete financial instruments.

Importantly, the presence of the Eco-Fund as a central financing mechanism signals a shift toward more strategic and targeted use of environmental revenues, which is essential for supporting Montenegro's transition toward a greener and more sustainable economy.

2.2. Legal framework for mobilisation of a green investment in Montenegro

The legal framework for the mobilisation of green investment in Montenegro can be understood as a structured system of constitutional principles, statutory obligations, regulatory instruments, and EU-driven harmonisation processes, all of which collectively shape the conditions under which sustainable investment is encouraged, directed, and controlled.

At the highest normative level, the **Constitution of Montenegro** establishes the state as an ecological state, thereby embedding environmental protection as a fundamental legal value. This constitutional orientation has both symbolic and practical implications: it imposes a duty on public authorities to integrate environmental considerations into economic policymaking and

provides a legal basis for prioritising sustainable investment over environmentally harmful activities.

At the statutory level, the framework is defined by a set of core environmental laws that operationalise the principle of sustainable development. The **Law on Environment** establishes general principles such as precaution, prevention, and the polluter-pays principle, which directly influence investment behaviour by internalising environmental costs. Complementary legislation, including the **Law on Environmental Impact Assessment (EIA)** and the **Law on Integrated Pollution Prevention and Control (IPPC)**, introduces mandatory procedural requirements for investment projects. These mechanisms ensure that environmental considerations are incorporated ex ante into project planning, effectively conditioning market entry on compliance with environmental standards. In this sense, the legal framework does not merely regulate investment but actively shapes its direction towards greener alternatives.

A central characteristic of Montenegro's legal framework is its **ongoing alignment with the acquis of the European Union**. This harmonisation process has significant legal and economic implications. From a legal perspective, it requires the transposition of a comprehensive body of environmental directives into domestic law, thereby raising regulatory standards. From an economic perspective, it reduces legal uncertainty for investors by approximating Montenegro's regulatory environment to that of the EU internal market. Consequently, EU accession acts as a structural driver of green investment, particularly in sectors such as renewable energy, waste management, and water infrastructure.

In addition to regulatory obligations, the framework incorporates **economic instruments** designed to influence investment decisions. These include environmental charges, fees, and penalties based on the polluter-pays principle, as well as public funding mechanisms and access to EU financial instruments. While such measures can generate public revenue, their primary legal function is corrective: they aim to alter market incentives by making environmentally harmful activities more costly and sustainable investments more attractive. Thus, the framework **combines command-and-control regulation with market-based instruments**, reflecting a hybrid regulatory approach.

Strategic policy instruments further reinforce this framework. Documents such as the National Energy and Climate Plan (NECP) establish long-term decarbonisation targets and define priority investment areas, thereby providing regulatory predictability and signalling state commitment to green transition pathways. Although these instruments are not always directly binding in the same manner as legislation, they play an important interpretative and coordinative role within the legal system.

Institutionally, the implementation of this framework depends on a **network of administrative bodies**, including the competent ministry for environmental protection (Ministry for environment, sustainable development and developmen of the North region) and the Environmental Protection Agency. These institutions are responsible for permitting, monitoring, and enforcement. However, the effectiveness of the legal framework is contingent upon administrative capacity and consistent enforcement practices. In this regard, challenges remain, particularly in ensuring full implementation of adopted legislation and effective interinstitutional coordination.

In conclusion, the legal framework for the mobilisation of green investment in Montenegro is normatively well-developed and increasingly aligned with EU standards. It operates through a combination of constitutional commitments, binding regulatory requirements, economic instruments, and strategic policies. Nevertheless, its practical effectiveness depends not only on the formal quality of legislation but also on the capacity of institutions to implement and enforce it, which remains a critical factor in the successful mobilisation of green investment.

2.3. Role of government institutions and ministries in shaping green investment policies

The role of government institutions and ministries in shaping green investment policies in Montenegro can be understood through their **regulatory, strategic, financial, and supervisory functio**ns. These roles are not exercised in isolation but form an interconnected governance framework that determines how effectively green investments are mobilised, directed, and implemented.

At the core of this framework is the central government, particularly the line ministries responsible for environmental protection, energy, finance, and economic development. The **Ministry** of E**cology, Sustainable Development and Development of the North** plays a normative and coordinative role, as it drafts environmental legislation, proposes policy measures, and ensures alignment with international and European standards. Through this function, it effectively defines the legal and policy boundaries within which green investments must operate. It also acts as the principal interface with the European Union in the process of harmonising national legislation with the EU environmental acquis, which is a key driver of green investment. It oversees climate governance through its Directorate for Climate Change and Nature Protection, which at the same time acts as the national focal point towards the UNFCCC and the Green Climate Fund. The Environmental Protection Agency (EPA) is part of the same Ministry, in charge of the GHG emissions inventory.

The Ministry of Energy and Mining has a sector-specific regulatory and developmental role, particularly in promoting renewable energy projects and energy transition initiatives. It designs support schemes, sets energy targets, and regulates market access, thereby directly influencing investment flows into sectors such as solar, wind, and hydropower. Its policies are typically guided by strategic documents such as national energy and climate plans, which provide long-term investment signals.

The Ministry of Finance performs a fiscal and enabling function. It shapes green investment indirectly through budgetary allocations, tax policies, and the design of financial incentives or disincentives. Environmental taxes, subsidies for renewable energy, and participation in international financing mechanisms are all instruments through which this ministry can steer capital towards sustainable projects. Moreover, it plays a central role in managing public debt and negotiating financial arrangements with international institutions, which are often critical sources of funding for large-scale green infrastructure. This Ministry manages a significant allocation of €383.5 million under the EU Reform and Growth Facility, depending on implementation of reforms in the area of green and digital transition.

Ministry of European Affairs plays a role in translating EU requirements into national investment obligations through its EU accession process management, but it does not directly implement green projects. It plays a strategic and financial role, especially concerning Chapter 27 (Environemnt and Climate Change) which headlines the green investments. In this regard, Montenegro's EU accession process and the achievement of the 2030 Agenda are deeply intertwined. Around two-thirds of SDG targets (i.e. 109 out of 169) are closely linked with EU acquis requirements. Specifically, if Chapter 27 obligations are fully met, around 40 SDG targets will be fulfilled (UNECE, 2025).

Ministry of Spatial Planning, Urbanism and State Property is relevant in this respect because of its role in determining land use for renewable energy and climate-resilient development, i.e. granting location permits and development consents for every solar, wind, hydropower and green infrastructure project in the country. This Ministry is part of the Montenegro Energy Growth and Acceleration (MEGA) project renewable energy siting study, which found high development potential sites for Montenegro's RES investments, which can help the country emerge as a

regional leader in accelerating RES development, especially in brownfield locations (Eco-Team and Nature Conservancy Europe, 2026).
Regulatory and executive agencies, particularly **the Environmental Protection Agency**, carry out implementation and enforcement functions. They are responsible for issuing permits (such as environmental impact assessment approvals and integrated pollution permits), monitoring compliance, and imposing sanctions where necessary. In this sense, they translate legislative and policy objectives into concrete administrative decisions that directly affect individual investment projects. Their effectiveness is crucial, as weak enforcement can undermine the credibility of the entire framework.

Environmental Protection Fund (Eco-Fund) plays an important role in the system as it creates an enabling environment for the business community, but also households, to adopt low-carbon innovations. It was established in 2020, and it finances a wide array of projects related to sustainable development and renewable energy.

In addition, **cross-sectoral coordination mechanisms** within the government ensure that green investment policies are not fragmented. Inter-ministerial cooperation is essential because green investments often cut across multiple sectors—energy, transport, agriculture, and urban development. Without such coordination, there is a risk of regulatory inconsistency or policy overlap, which can deter investors.

Local governments also play a significant, though more decentralised, role. They are involved in spatial planning, local permitting processes, and the implementation of environmental measures at the municipal level. As such, they can either facilitate or hinder green investments depending on their administrative capacity and alignment with national policies.

Finally, government institutions contribute to **strategic planning and policy signalling**, which are essential for reducing uncertainty and attracting long-term investment. By adopting strategies, action plans, and regulatory reforms, they provide a predictable policy environment that investors rely on when making decisions.

In conclusion, government institutions and ministries in Montenegro shape green investment policies through a combination of legislative drafting, regulatory enforcement, fiscal policy, and strategic planning. Their role is both direct—through regulation and permitting—and indirect—through incentives, coordination, and alignment with international frameworks. The overall effectiveness of green investment mobilisation depends on the coherence of these functions and the administrative capacity to implement them consistently.

2.4. Green banking initiatives, green bonds and sustainable finance frameworks

Montenegro's green transition is increasingly being underpinned by a new generation of financial instruments and regulatory frameworks that connect climate policy with capital markets. While strategies and plans define *where* the country wants to go, **green banking, green bonds, and sustainable finance frameworks** are beginning to shape *how* that transition will be financed. Together, they form an emerging ecosystem that links Montenegro's climate ambitions with commercial-bank practice, capital-market instruments, and EU-aligned disclosure regimes.

Montenegro's sustainable-finance ecosystem is anchored in two complementary frameworks: **macro-regulatory guidance** and **institutional cooperation**. At the regulatory level, the *Financial Sector Roadmap towards Sustainable Finance* of the Central Bank of Montenegro (CBCG) provides a multi-year agenda for the financial system, built around three pillars: integration of ESG factors into risk assessment and lending; climate- and nature-related risk management and supervision; and scaling up sustainable-finance flows via green lending and

potential green-bond instruments (Central Bank of Montenegro, 2025). The Roadmap was developed by an inter-institutional working group under the Financial Stability Council, bringing together the CBCG, Ministry of Finance, Capital Market Authority (CMA), Insurance Supervision Agency, Development Bank of Montenegro, the Association of Montenegrin Banks, and private-sector and academic experts.

Parallel to this, Montenegro's pursuit of EU membership creates strong incentives to adopt EU-style sustainable-finance tools. This includes aligning with the logic of the **EU Taxonomy**, even before full legal harmonisation, and gradually embedding climate-risk and ESG considerations into prudential and supervisory practice. The country also participates actively in cross-regional programmes such as the **EBRD SME Go Green initiative**, the **Green Economy Financing Facility (GEFF)**, and the **Western Balkans Green Growth Alliance** led by the International Finance Corporation (IFC), which provide technical assistance and blended-finance structures to support green projects and deepen the sustainable-finance ecosystem. Public-finance mechanisms such as the **Environmental Protection Fund (Eco-fund)** further support environmental projects, although deep-market instruments such as green bonds remain underdeveloped.

Montenegrin commercial banks are gradually moving from "green niche" products to more systematic ESG-based portfolios. Leading universal banks such as **Crnogorska komercijalna banka (CKB)** and **NLB Banka** have introduced dedicated green-lending lines, including:

- investment and working-capital loans for **energy-efficiency upgrades** (buildings, industry, SMEs), renewable-energy installations, and resource-saving technologies (Press and information team of the Delegation to Montenegro, 2025);
- **consumer loans** for solar-panel systems, heat pumps, thermal insulation, energy-efficient windows, and electric or hybrid vehicles; and
- **SME-focused lines** under international programmes such as the EBRD SME Go Green programme, where banks extend EBRD-backed credit supplemented by EU-financed cashback grants (up to 10–15% of the loan amount, depending on technology) (Vlajcic, 2025).

These initiatives are reinforced by co-financing facilities such as the **EBRD Green Economy Financing Facility (GEFF)**, which channels concessional loans to partner banks for on-lending to households and SMEs. As of 2025, the CBCG highlights that green-lending growth is one of its five strategic objectives, signalling a gradual shift toward material ESG-based segments within banks' portfolios. Parallel efforts by the **Association of Montenegrin Banks** to join global networks such as the **Sustainable Banking and Finance Network (SBFN)** deepen training and methodological support for ESG-based banking, helping banks build internal capacity for ESG-integration and risk-based pricing (The Sustainable Banking and Finance Network (SBFN), 2024).

So far, Montenegro has not yet issued a **sovereign or corporate green bond**, but regulatory momentum is evident through the *Draft Law on Green Bonds and Sustainable Bonds*. This draft establishes a comprehensive, EU-aligned framework that defines the conditions, instruments, and supervisory mechanisms necessary to launch and scale a domestic green-bond market. The law reflects Montenegro's broader integration into the EU sustainable-finance agenda and signals a clear political commitment to channeling capital toward climate- and environment-related objectives.

The draft law structures the market around **four core instruments**:

- **Green bonds** for environmentally sustainable activities;
- **European Green Bonds (EuGB)** eligible for the EU "EuGB" label;
- **Ecologically sustainable bonds** for broader environmental objectives; and

- **Sustainability-linked bonds** with strict use-of-proceeds rules tied to EU Taxonomy criteria.

In parallel, the law introduces **robust transparency and accountability requirements**: pre-issuance summary prospectuses, annual allocation reports, environmental-impact reporting, and mandatory external verification by registered third-party evaluators overseen by the Capital Markets Commission. Beyond the bonds themselves, the law extends into the broader sustainable-finance architecture by imposing **non-financial reporting obligations** on large entities, requiring full **taxonomy compliance**, and setting out portfolio-level approaches and exclusions for non-cooperative tax jurisdictions and fossil-fuel exposures (with limited DNSH exceptions) (Vlada Crne Gore, 2026). This legislative package completes Chapter 9 financial-services obligations under Montenegro's EU accession process, strengthening investor protection and transparency in line with EU-style capital-market standards.

Montenegro's sustainable-finance ecosystem is deeply embedded in the country's broader climate and energy-reform agenda, rather than operating as a standalone financial niche. The *National Climate Change Strategy (to 2030)*, the updated *Nationally Determined Contribution (NDC)*, the *Low Carbon Development Strategy (LCDS)*, and the *National Energy and Climate Plan (NECP)* jointly set clear, quantified targets, such as a **-55% emissions reduction by 2030** and **-60% by 2035** relative to 1990 levels, as well as a **≥50% share of renewable energy** in the power mix, and explicitly define priority sectors such as energy decarbonisation, sustainable transport, and industry transformation (UNDP Montenegro, 2025). These instruments create a coherent policy backbone that channels investment toward low-carbon and climate-resilient infrastructure, making it a natural reference for green-banking portfolios and potential green-bond frameworks.

The *National Adaptation Plan (NAP)* and the *Circular Economy Strategy* further extend the scope of the reform agenda beyond mitigation into **adaptation and resource-efficiency objectives**, addressing climate-related risks in sectors such as water, agriculture, health, and tourism (Ministry of Ecology, Sustainable Development, and Northern Region Development of Montenegro, 2025). At the same time, Montenegro's participation in the *Green Agenda for the Western Balkans*, launched by the European Commission as a regional growth strategy aligned with the European Green Deal, links national climate and environmental priorities to a regional framework covering climate and energy, circular economy, pollution reduction, sustainable agriculture, and biodiversity conservation (European Commission, 2020). This multilevel alignment ensures that sustainable-finance instruments, such as green lending, green bonds, and ESG-aligned investment products, are not only consistent with domestic policy but also with EU-style climate and environmental objectives, thereby strengthening their credibility with both domestic and international investors.

Figure 1: Timeline of Key Sustainable-Finance and Green-Bond Developments in Montenegro, 2016–2026

Source: Authors' own construction, drawing on official documents of the Government of Montenegro, Central Bank of Montenegro, UNDP Montenegro, and the European Commission, 2025–2026

The *Reform Agenda of Montenegro (2024–2027)*, supported by the EU's **€6 billion Growth Plan for the Western Balkans**, adds a critical **financial and enforcement layer (European Commission, 2025)**. It unlocks up to **€383 million** for Montenegro, with a substantial share directed toward energy-transition projects, grid modernisation, and private-sector development, disbursed on a **progress-based** model. This "money plus enforcement" mechanism creates strong incentives for adopting green-banking practices, establishing green-bond frameworks, and integrating taxonomy-compliant reporting. In parallel, the *National Strategy for Sustainable Development* and sectoral laws on waste, air quality, and energy markets provide the cross-cutting legal and institutional backbone, ensuring that environmental-protection objectives are embedded into sectoral planning rather than treated as add-ons (Ministry of Sustainable Development and Tourism, 2017).

The transition from strategy to finance is being driven in practice by a blended-finance architecture that combines grants, concessional loans, guarantees, and technical assistance. Donors such as the EU, EBRD, IFC, and multilateral development banks design instruments where international capital shares the risk with domestic banks, thereby de-risking green projects and improving their commercial viability. For example, an EBRD-backed green-lending line may involve:

- EBRD lending to a local bank in euros;
- the bank providing euro-denominated loans to SMEs and households; and
- an EU-supported cashback grant or guarantee component that reduces the bank's risk and improves the borrower's effective interest rate

This kind of structure is essential for overcoming thin margins, high perceived risk, and limited ESG-screening capacity in the early stages of market development. Over time, the goal is to gradually reduce grant dependence and move toward **market-based pricing**, where green-loan spreads are justified by underlying risk and not by donor subsidies.

Despite notable progress, several structural bottlenecks remain. Data and metrics on green-finance volumes and impacts are still **fragmented**, with banks often relying on manual project-based tracking and ad-hoc reporting. This hampers robust monitoring, cross-institutional comparability, and evidence-based policy design. Classification within the EU Taxonomy is still emerging, with many banks depending on donors or consultants to map projects to technical screening criteria instead of doing so in-house.

The CBCG is beginning to use **climate-stress-testing pilots** and qualitative expectations to guide banks toward better ESG-integration and improved risk-management practice. However, a full-fledged taxonomy-aligned reporting infrastructure and centralised **ESG-data registry** are still missing. Over the medium term, Montenegro could develop a unified platform, covering taxonomy-aligned project classification, green-loan stock, and climate-risk exposures, that would involve the CBCG, CMA, Ministry of Finance, and key donors. This would help align Montenegrin reporting with EU-style non-financial disclosure standards and improve transparency for investors.

Beyond corporate and project finance, sustainable-finance instruments are beginning to reach **households and micro-businesses**. Green-consumer loans for solar panels, heat pumps, insulation, and electric or hybrid vehicles are still early-stage but have high potential to reach a large share of the population. However, behavioural barriers such as limited awareness, perceived high upfront costs, and lack of technical knowledge mean that financial instruments must be combined with **education and information campaigns**.

Montenegro could deepen this channel through instruments such as **green-mortgages** or **energy-efficient-building incentives**, where lower interest rates or

preferential terms are linked to minimum energy-performance standards. Local municipalities could also co-design "green-home" campaigns with banks and donors, offering bundled packages of financing, technical support, and energy-audits. Such initiatives would help shift green finance from a corporate-driven niche to a mainstream, household-level practice.

To strengthen Montenegro's transition toward a credible green-bond market and a mature sustainable-finance ecosystem, policymakers and the financial sector should focus on the following priorities:

Short-term (1–3 years):

- Finalise the national Green Bond Framework, aligned with EU standards.
- Pilot at least one sovereign or quasi-sovereign green bond issuance.
- Scale up EBRD-GEFF and SME Go Green lines and expand retail- and SME-level green-banking products.
- Strengthen ESG-based prudential and disclosure expectations under the CBCG Financial Sector Roadmap.

Medium-term (3–7 years):

- Move selected green-financing instruments toward market-based pricing, reducing dependence on grants.
- Deepen taxonomy-aligned reporting across banks and large corporates.
- Integrate climate-risk metrics into prudential reporting and supervisory practice.

Long-term (7–15 years):

- Position Montenegro as a niche regional hub for green-bond issuances and green-project financing in the Western Balkans, plugged into EU-wide sustainable-finance infrastructures.
- Embed sustainable-finance instruments into core capital-market and banking-sector practice, so that climate-aligned financing becomes the default rather than a separate "green" segment.

Successful implementation of these steps would anchor Montenegro's green-transition ambitions in a transparent, EU-aligned, and investor-credible financial architecture, bridging the gap between climate strategy and tangible green-finance flows.

3. Challenges and Barriers

The mobilisation of green investment in Montenegro, despite a relatively well-developed legal and strategic framework, is constrained by a set of **structural, institutional, financial, and market-related challenges**. These barriers affect both the scale and efficiency of investment flows into sustainable sectors.

- **Institutional and administrative capacity constraints - a** central challenge lies in the limited administrative and technical capacity of public institutions. While ministries and agencies have clear legal mandates, their ability to: process complex green investment projects, enforce environmental regulations, and coordinate across sectors that remains uneven. This can lead to delays in permitting procedures, inconsistent application of rules, and reduced investor confidence.

- **Implementation gap between law and practice - a**lthough Montenegro has aligned much of its legislation with the standards of the European Union, there is a persistent implementation deficit. In practice: enforcement of environmental laws is not always consistent, monitoring mechanisms may be underdeveloped, sanctions are not always sufficiently deterrent. This weakens the credibility of the legal framework and creates **regulatory uncertainty**, which can discourage long-term green investments.

- **Limited access to finance and underdeveloped capital markets -** green investment projects—particularly in renewable energy, infrastructure, and circular economy sectors—are capital-intensive. Montenegro faces several financial constraints: limited availability of domestic financing instruments, underdeveloped capital markets, reliance on external financing (e.g. IFIs, EU funds), high perceived investment risk. The absence of a mature market for instruments such as **green bonds** and sustainable finance products further restricts capital mobilisation.

- **Regulatory and policy uncertainty -** frequent changes in legislation, secondary regulations, or support schemes—especially in the energy sector—can create **policy instability**. Investors require long-term predictability, particularly for projects with extended payback periods (e.g. renewable energy infrastructure). Unclear or evolving frameworks for: state aid, concessions, public-private partnerships can further complicate investment decisions.

- **Insufficient economic incentives -** although the legal framework incorporates the **polluter-pays principle** and environmental fees, **positive financial incentives** for green investment remain limited. Challenges include: insufficient subsidies or tax incentives for green technologies, limited use of fiscal instruments to stimulate private investment, and inadequate pricing of environmental externalities (e.g. carbon). This reduces the relative attractiveness of green investments compared to conventional alternatives.

- **Weak development of sustainable finance ecosystem -** the financial sector in Montenegro is still in the early stages of integrating **environmental, social, and governance (ESG)** criteria. Key issues include: lack of clear national taxonomy for green investments, limited regulatory guidance for banks on green lending, low availability of ESG-compliant financial products, limited expertise within financial institutions. As a result, financial intermediation does not yet fully support the green transition.

- **Dependence on external funding and EU support -** a significant portion of green investment in Montenegro is driven by **external sources**, particularly EU funds and international financial institutions. While this is beneficial, it also creates: dependency on donor priorities, vulnerability to changes in external funding flows, and limited domestic ownership of investment strategies.

- **Market size and structural economic limitations -** Montenegro's **small market size** and economic structure present inherent constraints: limited economies of scale for large green projects, narrow industrial base, and high dependence on sectors such as tourism and energy imports. These factors can reduce the attractiveness of large-scale private investment.

- **Local-level governance challenges -** municipalities play a role in spatial planning and project implementation, but often face: limited financial resources, insufficient technical expertise, weak project preparation capacity. This creates bottlenecks, particularly for **decentralised green investments** (e.g. waste management, local energy systems).

- **Social and political factors -** green investments may face **public resistance** or political sensitivity, especially in areas such as: hydropower development, land use changes, energy price reforms. In addition, political cycles can influence policy continuity, affecting long-term investment strategies.

To conclude, the key challenges and barriers to green investment mobilisation in Montenegro are not primarily related to the absence of a legal framework, but rather to its implementation, financial depth, and institutional effectiveness. Addressing these constraints requires: strengthening administrative capacity, enhancing financial instruments and market development, ensuring regulatory stability, and improving coordination across governance levels. Only through such systemic improvements can Montenegro fully leverage its legal and strategic framework to mobilise sustainable investment at scale.[32]

4. Analysis of the green financing in the state budget of Montenegro in 2023 budget year

The mobilisation of green investment in Montenegro is closely linked to the structure of public expenditure and to the way in which climate-relevant priorities are reflected in the national budget. While the legal and institutional framework analysed in the preceding sections defines the rules, the budget itself reveals the extent to which these rules translate into measurable financial commitments. The 2023 budget year is the most recent fiscal cycle for which a complete final account is available, and it therefore provides the most appropriate reference point for analysing the current scale, composition and sources of green financing in Montenegro. The analysis presented in this section applies the Climate Public Expenditure and Institutional Review (CPEIR) methodology together, adapted to the specificities of the Montenegrin public finance system.

4.1. Methodological framework

In the absence of an internationally agreed functional classification of climate-relevant public expenditure, the analysis of the 2023 budget relies on the UNDP CPEIR methodological guidance33 and the UNDP CBT toolkit34, adapted to the institutional setting of Montenegro. Two methodological observations are relevant for interpreting the figures presented below.

First, the Montenegrin budgetary classification, both economic and functional, does not yet recognise climate-relevant expenditure as a distinct category, meaning that such expenditure cannot be directly extracted from the existing budget information system. As an interim solution, the analysis relies on the expert manual mapping of activities and projects across the budget of relevant ministries, agencies, the capital budget, and major majority state-owned enterprises in the energy sector.

Second, climate-relevant expenditure is weighted according to its degree of climate relevance, following an adapted CPEIR relevance index. Four weights are applied: 1.00 for activities with primary climate objectives (environmental protection, ecology and nature in the capital budget, energy-sector investments by majority state-owned enterprises, and public safety – protection and rescue); 0.75 for activities with substantial co-benefits (construction and energy efficiency in the capital budget); 0.50 for activities with significant indirect climate effects (agriculture, water management and local road infrastructure); and 0.25 for activities with marginal but non-trivial climate relevance (capital budget of the Transport Directorate). Activities without identifiable climate relevance receive a weight of zero and are excluded.

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[32] According to the EC 2025 Report on Montenegro, European Environment Agency – Country Profile Montenegro, OECD – Green Finance Investment in Montenegro, EBRD – Transitional Report/Country Diagnostic, World Bank - Montenegro Country Climate and Development Report (CCDR), Balkan Green Energy News, UNECE Environmental Performance Review - Montenegro;

[33] UNDP (2015). *Methodological Guidebook: Climate Public Expenditure and Institutional Review (CPEIR)*. UNDP Bangkok Regional Hub.

[34] UNDP (2019). *Knowing What You Spend: A Guidance Note for Governments to Track Climate Change Finance in Their Budgets*. UNDP, New York.

In addition to the central budget, the analysis incorporates the capital investments of majority state-owned enterprises in the energy sector (EPCG, CGES, CEDIS)[35], as well as climate-relevant lending by the Investment and Development Fund of Montenegro (IDF). This broader scope reflects the fact that a substantial share of Montenegro's investment in climate-relevant infrastructure is channelled through state-owned enterprises rather than through the budget itself, and any narrow budget-only view would significantly understate the actual flow of green financing.

4.2. Climate-relevant expenditure in the capital budget

The capital budget is one of the most concentrated entry points for climate-relevant expenditure in Montenegro, since it covers infrastructure investments that have long-term implications for emissions, energy use and resilience. In 2023, the capital budget was implemented primarily through two institutions: the Directorate for Capital Projects (UzKP) and the Transport Directorate (UzS).

In 2023, the Directorate for Capital Projects planned a total of 276 projects with a combined value of €127.89 million, of which 211 projects (76.4%) had a clear climate-relevant component, with a planned value of €95.64 million. Project execution was considerably below plan in terms of number of projects: only 136 of the 276 planned projects (49%) were partially or fully executed during the year. In value terms, execution reached €107.08 million (84% of plan). Among the climate-relevant projects, 103 of the 211 (49%) recorded partial or full execution, with an executed value of €75.30 million (79% of plan).

The capital projects fall into three groups for the purpose of climate-relevance weighting: (i) ecology and nature projects (weight 1.00), with planned/executed values of €20.22 million / €12.83 million (63% execution); (ii) construction and energy efficiency projects (weight 0.75), with planned/executed values of €32.32 million / €29.46 million (91% execution); and (iii) local road infrastructure projects (weight 0.50), with planned/executed values of €43.09 million / €33.01 million (77% execution).

The Transport Directorate's capital budget for 2023 was planned at €72.77 million and executed at €81.94 million (113% of plan), reflecting supplementary appropriations during the year and faster execution of multi-year projects. Applying the 0.25 weight, €20.49 million of this amount is treated as climate-relevant. The aggregate weighted contribution of the capital budget (UzKP and UzS combined) to climate-relevant expenditure in 2023 thus amounts to approximately €71.9 million. Table 4 below summarises the structure of the 2023 capital budget and its sources of financing.

Three patterns emerge from these figures. Energy efficiency in public buildings and construction is the category with the highest execution rate (91%) and one of the largest absolute envelopes, reflecting the relatively mature project pipeline in this segment, including hospital and school energy retrofits supported by international financial institutions. Local road infrastructure shows strong absolute spending but modest climate relevance after weighting.

[35] EPCG (Elektroprivreda Crne Gore), CGES (Crnogorski elektroprenosni sistem) and CEDIS (Crnogorski elektrodistributivni sistem) are the three majority state-owned companies that, respectively, generate, transmit and distribute electricity in Montenegro.

Table 8. Capital Budget 2023 – Capital Projects Directorate and Transport Directorate, with weights

Climate-relevant expenditures in the capital budget of the Administration for Capital Projects - initial assessment, 2023	Planned	Executed	Execution of the capital budget (weight)	%
Total number of capital budget projects	276	136	49%	
The total value of UKP capital budget projects	127,887,071	107,076,222	84%	
Of these, climate-relevant projects	211	103	49%	
Value of climate-relevant projects, UKP	95,639,527	75,298,446	79%	
1) Ecology and nature	40	15	38%	
Value (1)	20,220,429	12,827,748	63%	
2) Construction and EE	96	38	40%	
Value (0.75)	32,324,554	29,464,366	91%	
3) Local road infrastructure	75	50	67%	
Value (0.50)	43,094,544	33,006,332	77%	
Weighted, investment structure by sources:				
a) Budget, UKP		65,365,030	43,576,453	85%
b) Donations		0	0	0%
c) IPA		8,481,531	6,763,821	13%
d) Credit		1,451,885	1,088,914	2%
Capital budget, traffic, Traffic Administration (71 projects planned / 39 projects partially or fully realized) Weighted (0.25), investment structure by sources:	72,769,459	81,943,341.44	113%	
a) Budget of the Traffic Administration, Capital			20,485,835	
b) Donations		62,623,075	15,655,769	76%
c) IPA		-	-	0%
d) Credit		19,111,686	4,777,922	23%
a) Budget of the Traffic Administration, Capital		208,980	52,245	0%

Source: authors' calculations based on the Law on the Final Account of the Budget of Montenegro for 2023 and annual reports of UzKP and UzS; weights applied following the adapted CPEIR / UNDP CBT methodology.

By contrast, ecology and nature projects, those carrying the highest climate-relevance weight of 1.00, record the lowest execution rate (63%), pointing to persistent absorption and project-preparation challenges in the segment with the most direct climate impact. From a sources-of-finance perspective, the capital budget of UzKP is overwhelmingly domestically funded (85% from the state budget), with IPA support contributing 13% and credits only 2%; donations played no recorded role in 2023.

4.3. Climate-relevant current expenditure across selected institutions

Beyond the capital budget, a meaningful share of climate-relevant expenditure flows through the current budget of ministries, agencies and other budget users with mandates relevant to climate and the environment. The mapping for 2023 covers nine core institutions, complemented by the Eco-Fund, the Public Enterprise National Parks of Montenegro, and PROCON d.o.o., which together executed climate-relevant current expenditure with a total weighted value of €31.56 million in 2023.

Table 9. Selected institutions and climate-relevant current expenditure of Montenegro, 2023 (€)

LOANS – current budget	MAFWM – IFAD project: consulting services, projects and studies; MIDAS 2 programme: consulting services, projects and studies; and Integrated Development Programme for the Sava and Drina River Corridors: consulting services, projects and studies	3,119,544
	Environmental Protection Agency – under the activity Monitoring, Analysis and Reporting; of which expenditures for land development amount to 5,635,954.65	6,442,767
DONATIONS – current budget	MONSTAT – for the activity Statistical Surveys, Analyses and Information: official travel, banking services and negative exchange-rate differences, and expenditures based on service contracts	36,899
	MAFWM – consulting services, projects and studies under the activities Administrative Support to Agriculture, Support to General Services in Agriculture, and Marine Fisheries	43,991
	Environmental Protection Agency – Monitoring, Analysis and Reporting: consulting services, projects and studies	324,157
	Ministry of Interior – under the activity Protection and Rescue Activities: consulting services, projects and studies; professional training services; and current maintenance expenditures	31,602
	Institute of Hydrometeorology and Seismology – under the activities Observation and Measurement of Meteorological, Hydrological, Environmental and Agrometeorological Parameters, and Seismic and Geodynamic Monitoring on the Territory of Montenegro, including analysis, processing and dissemination of earthquake data	68,644
	Ministry of Tourism, Ecology, Sustainable Development and Northern Region Development – under the activity Promotion of the Protection and Conservation of Nature and Natural Resources in the Coastal Area, Cooperation with the NGO Sector, International Cooperation, and Raising Public Awareness in the Field of Ecology and Nature	93,081
	Ministry of Spatial Planning, Urbanism and State Property – under the activity Promotion of the Protection and Conservation of Nature and Natural Resources in the Coastal Area and Cooperation with the NGO Sector	160,286
IPA – current budget	MONSTAT – for the activity Statistical Surveys, Analyses and Information: official travel, consulting services, projects and studies, professional training services, other services, expenditures based on service contracts, and capital expenditures	276,983
	MAFWM – IPARD II programme	868,104
42410 – MTEORRS	Ministry of Tourism, Ecology, Sustainable Development and Northern Region Development	387,133
41504 – EPA	Environmental Protection Agency	2,192,687
41510 – IHMS	Institute of Hydrometeorology and Seismology	1,852,471
40901 – MERT	Ministry of Economic Development and Tourism	44,989
41501 - MPPUDI	Ministry of Spatial Planning, Urbanism and State Property	800,318
40510 – MONSTAT	Statistical Office of Montenegro	3,301,460
40301 – MoI	Ministry of Interior	130,834
41101 – MAFWM	Ministry of Agriculture, Forestry and Water Management	5,536,526
41104 – Water Administration	Water Administration	511,451
41103 – Forest Administration	Administration for Forest and Hunting Ground Management	796,322
Eco-fund	Total payments to beneficiaries based on implemented projects	403,067
Public Enterprise National Parks of Montenegro	Revenues from budget subsidies – Report on the Implementation of the Annual Management Programme for 2023	750,000
PROCON	Project Consulting Ltd., National Unit for the Implementation of Projects in the Field of Municipal Services and Environmental Protection, providing expert support for the implementation of programmes in the field of municipal services and environmental protection adopted by the founder, i.e. local self-government. Total revenue in 2020	437,339
WBIF	• Preparation of the feasibility study and environmental protection study for the 400 kV Brezna–Crkvičko Polje–Sarajevo interconnection, up to the border with Bosnia and Herzegovina, as grid expansion for renewable energy development; • supervision of works for the Podgorica wastewater treatment plant under a design-and-build contract worth EUR 1.15 million	2,951,834 (grantovi)
Total		**31,562,491**

Source: authors' calculations based on the Law on the Final Account of the Budget of Montenegro for 2023, annual reports of the listed institutions, and Eco-Fund 2023 implementation report.

The single largest current-budget contribution comes from the Ministry of Agriculture, Forestry and Water Management (MPŠV) at €5.54 million, reflecting the breadth of its sectoral mandate, which covers land, water, forests and rural development. The Statistical Office (MONSTAT) at €3.30 million and the Environmental Protection Agency (AZPŽS) at €2.19 million also feature prominently, with their resource mix combining budget allocations with IPA and donation funding. The Institute for Hydrometeorology and Seismology (ZHMS) at €1.85 million plays a critical though comparatively modest role in monitoring and observation infrastructure. The Ministry of Spatial Planning, Urbanism and State Property (MPPUDI) contributed €0.80 million, almost entirely from budget sources. The Ministry of Tourism, Ecology, Sustainable Development and Northern Region Development (MTEORRS), although institutionally central to climate policy, recorded a relatively modest weighted current-budget contribution of €0.39 million; this is largely an artefact of how its line-budget activities are mapped to climate relevance, since many of its strategic and coordinating functions sit outside the spending lines captured here.

Two specialised entities deserve particular attention. The Eco-Fund, which is intended to operate as the main domestic financing vehicle for climate and environmental projects, recorded climate-relevant disbursements of €0.40 million in 2023, a comparatively modest figure relative to the Fund's mission and its expected role as the principal recipient of revenues from the EU Emissions Trading System and from environmental fees. WBIF grants routed through the budget totalled €2.95 million, including the feasibility study for the 400 kV Brezna–Crkvičko Polje–Sarajevo cross-border interconnection (a precondition for the integration of large new renewables) and supervision of works on the Podgorica wastewater treatment plant. The current-budget envelope is overall dominated by domestic budget resources, with a smaller contribution from IPA, credits (mainly IFAD and the MIDAS 2 programme in the agricultural sector), and donations.

4.4. Capital investments of state-owned energy enterprises and IDF lending

A defining feature of the Montenegrin green-financing landscape is the large weight of majority state-owned energy companies in actual climate-relevant capital formation. In 2023, the combined climate-relevant capital investments of EPCG, CGES and CEDIS amounted to €78.32 million, more than twice the size of all climate-relevant current expenditures of the central budget combined.

Table 10. Climate-relevant capital investments of state-owned energy enterprises and IDF lending, 2023 (€)

Entity	Description of investment	Amount (€)
EPCG (Elektroprivreda Crne Gore)	FC Production (€15.27 m): ecological reconstruction of TPP Pljevlja; block-transformer 2T1 overhaul at HPP Piva; rehabilitation of small HPPs Rijeka Mušovića, Lijeva Rijeka, Šavnik, Rijeka Crnojevića and Podgor; cooling-system rehabilitation at HPP Perućica. Renewable Sources Directorate (€16.14 m): Solari 3000+ and Solari 500+ rooftop PV programmes. Development and Engineering Directorate (€11.19 m): modernisation of HPP Perućica and HPP Piva; technical documentation for VE Gvozd (wind), HPP Komarnica, HPP Kruševo, the Slano and Vrtac solar PV projects, the Vilusi solar PV project, and prospective gas-fired generation.	42,664,865
CEDIS (Crnogorski elektrodistributivni sistem)	Distribution-network investments executed at €14.52 m of the 2023 plan (39%), plus €4.76 m carried over from earlier plans, and €4.87 m for acquisition of existing infrastructure (2023 and prior years).	24,151,503
CGES (Crnogorski elektroprenosni sistem)	Transmission-grid investments: of 39 approved investments under the 2023–2025 Investment Plan (total approved value €31.08 m), execution reached €11.50 m (37%), supplemented by €0.73 m of carry-over from earlier periods.	11,503,000
IDF — Investment and Development Fund of Montenegro	First climate-tagged project of the Fund - a credit line for the tourism sector with explicit energy-efficiency conditionality. The amount is modest, but the precedent value is significant as the first ex-ante	10,000,000

	climate-tagged operation by a Montenegrin development finance institution.	
WBIF	Preparation of the feasibility study and environmental protection study for the 400 kV Brezna–Crkvičko Polje–Sarajevo interconnection, up to the border with Bosnia and Herzegovina, as grid expansion for renewable energy development.	1,806,000
WBIF	Supervision of works for the Podgorica wastewater treatment plant under a design-and-build contract worth EUR 1.15 million.	1,145,834
Total	**State-owned energy enterprises and IDF lending, 2023**	**191,796,882**

Source: EPCG, CGES and CEDIS annual reports for 2023; Investment and Development Fund of Montenegro, Annual Report 2023.

Within EPCG (€42.66 million), the largest 2023 investments related to (i) the ecological reconstruction of TPP Pljevlja, the country's only thermal power plant, and the rehabilitation of several hydro assets; (ii) the rooftop solar programmes Solari 3000+ and Solari 500+, run by the EPCG Renewable Sources Directorate; and (iii) preparatory work for new generation capacity, including technical documentation for VE Gvozd (wind), HPP Komarnica, HPP Kruševo, and the Slano, Vrtac and Vilusi solar PV projects. CEDIS invested €24.15 million in distribution-network reinforcement, capturing both 2023-planned and earlier-year-deferred investments. CGES executed €11.50 million out of €31.08 million planned (37%), reflecting the persistent gap between investment plans and actual execution in transmission infrastructure — a structural risk for the integration of new renewables.

In addition, the Investment and Development Fund of Montenegro (IDF) approved its first climate-tagged project [36], a €10 million facility in the tourism sector with explicit energy-efficiency conditionality. This is methodologically important: it marks the first occasion on which a Montenegrin development finance institution has identified, tagged and reported a project as climate-relevant ex ante. The €10 million amount is modest, but the precedent value is significant, since it can serve as a template for future climate-tagged lending lines.

Once these flows are added to the weighted budget expenditure, the total 2023 climate-relevant resource envelope of the Montenegrin public sector reaches approximately €191.8 million, of which approximately €103.5 million (54%) is delivered through the state budget and €88.3 million (46%) through state-owned enterprises and IDF lending.

4.5. Sectoral structure and sources of financing in 2023

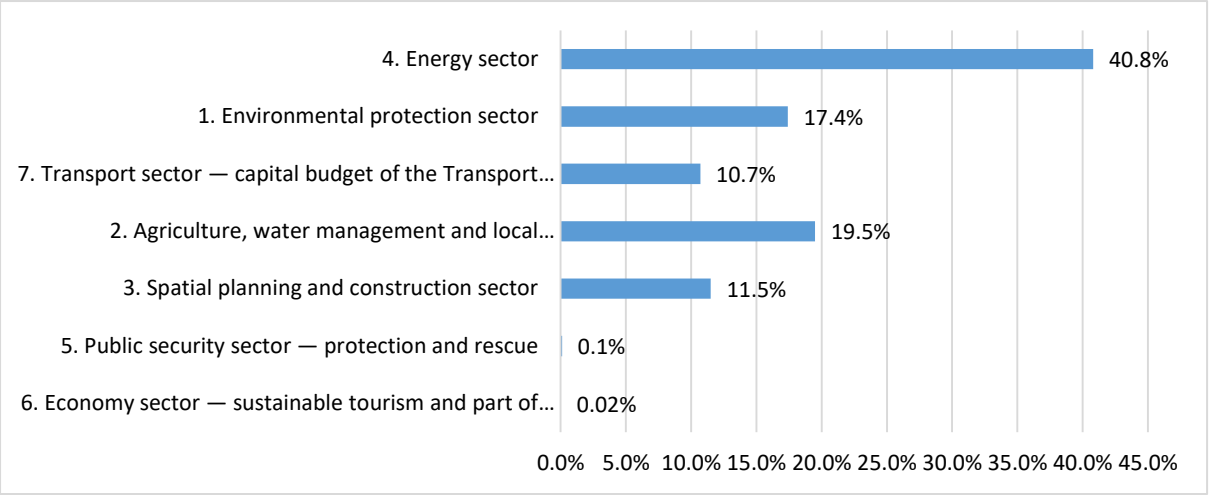
When all weighted climate-relevant expenditure for 2023 is mapped against the sector typology used in this analysis, the structure that emerges is sharply concentrated. Figure 1 illustrates the sectoral distribution, while Table 7 presents the full sectoral matrix cross-tabulated with sources of financing.

The energy sector is the single largest recipient at €78.3 million (40.8%), an outcome almost entirely driven by the capital investments of state-owned enterprises; the energy line of the central budget contributed nothing in weighted terms in 2023. The agriculture, water management and local road infrastructure sector accounts for €37.4 million (19.5%), supported by a mix of budget, IPA, credits (IFAD, MIDAS 2) and the first IDF climate-tagged loan. The environmental protection sector — methodologically the segment with the highest relevance weight — accounts for €33.3 million (17.4%), funded mostly from the budget but with the highest share of donation and IPA co-financing of any sector. Spatial planning and construction, which

[36] Investment and Development Fund of Montenegro (Investiciono-razvojni fond Crne Gore, IRF) - Annual Report 2023. The €10 million facility in the tourism sector with energy-efficiency conditionality is reported as IRF's first explicitly climate-tagged operation.

captures energy efficiency in public buildings, accounts for €22.1 million (11.5%), financed mostly through the budget with significant IPA support (23%). The transport sector (Transport Directorate capital budget, weight 0.25) accounts for €20.5 million (10.9%), financed by the budget (76%) and IPA (23%). The remaining segments, public safety (€0.16 million, 0.1%) and other economy (€0.04 million, 0.02%), make negligible contributions to the 2023 climate-relevant envelope.

Figure 14. Investment structure by sector in 2023



Looking at the structure by sources of financing, two complementary views are useful. In the aggregate view, which includes state-owned enterprises and IDF lending, the picture is dominated by state-owned enterprises (46%) and the state budget (40%), with credits at 8%, IPA at 4% and donations at 2% (Figure 3). When the analysis is restricted to central budget channels only (i.e. excluding state-owned enterprises and IDF lending), the structure changes markedly: the state budget itself covers 74%, credits contribute 15%, IPA 8%, and donations 4% (Figure 4). The total covered by these channels in 2023 is €103.5 million.

Table 11. Climate-relevant expenditure in Montenegro by sectors and sources of financing, 2023 (€ million)

Sector	Budget	Donations	Credits	IPA	SOEs & IDF	Total (share)
1. Environmental protection	21.34	3.63	6.44	1.89	—	33.31 (17.4%)
2. Agriculture, water mgmt and local roads	23.35	0.04	3.12	0.87	10.00	37.38 (19.5%)
3. Spatial planning and construction	15.86	0.00	1.09	5.15	0.00	22.10 (11.5%)
4. Energy	0.00	0.00	0.00	0.00	78.32	78.32 (40.8%)
5. Public safety (protection and rescue)	0.13	0.03	0.00	0.00	0.00	0.16 (0.1%)
6. Economy - other sectors	0.04	0.00	0.00	0.00	0.00	0.04 (0.02%)
7. Transport	15.66	0.05	4.78	0.00	0.00	20.49 (10.9%)
Total 2023(100%)	**76.38**	**3.76**	**15.43**	**7.91**	**88.32**	**191.80**
Structure, aggregate (incl. SOEs & IDF)	**40%**	**2%**	**8%**	**4%**	**46%**	**100%**
Structure, excl. SOEs & IDF (€103.5 m)	**74%**	**4%**	**15%**	**8%**	**—**	**100%**

Source: authors' calculations based on Law on the Final Account of the Budget of Montenegro for 2023, annual reports of EPCG, CGES, CEDIS and IDF, and CBIT project mapping. Note: column 'SOEs & IDF' aggregates the €78.32

Three implications follow. First, green investment in Montenegro remains heavily dependent on majority state-owned enterprises, particularly in the energy sector. The future trajectory of EPCG, CGES and CEDIS investment plans will therefore determine the bulk of climate-relevant capital formation, regardless of fiscal policy decisions. Second, the share of IPA and donations is low, both in absolute and relative terms, suggesting significant room to deepen the absorption of EU pre-accession resources and of the Reform and Growth Facility under the Growth Plan for the Western Balkans. Third, the role of credits has decreased in 2023 compared with the start of the analysed period, mostly reflecting the natural progression of completed IFI infrastructure projects (notably in transport) and the absence of comparably sized new lending operations within the year.

4.6. Summary of findings for 2023

The 2023 budget year confirms that climate-relevant expenditure in Montenegro is structurally significant but institutionally fragmented. The total weighted climate-relevant envelope of the public sector reached €191.8 million in 2023, of which €103.5 million (4.05% of total budget expenditure of €2.56 billion) flowed through the central budget [37]. This share is within the international range for comparable countries (0.8% to 8.4% of national budgets in selected emerging economies), but remains well below the level that the Updated Nationally Determined Contribution (55% emissions reduction by 2030) and the Low-Carbon Development Strategy targets imply over the medium term.

Three operational gaps are visible in the 2023 data: (i) persistent under-execution in the climate-relevant capital budget, especially in the highest-weight ecology-and-nature category, which executes consistently below 65% of plan; (ii) the modest role of dedicated climate-finance instruments such as the Eco-Fund, whose 2023 disbursements remained well below its institutional ambition; and (iii) the near-absence of climate-tagged lending from domestic development finance institutions — although the first IDF climate-tagged loan of 2023 marks an important precedent that should be scaled in the coming budget cycles.

Closing these gaps will require introducing climate budget tagging directly within the budget classification (so that climate-relevant expenditure can be identified ex ante rather than reconstructed through expert mapping); strengthening the project-preparation capacity of line ministries and the Eco-Fund; and scaling up IPA, WBIF and Reform and Growth Facility absorption in line with the chapter 27 (Environment and Climate Change) priorities of Montenegro's EU accession agenda. In policy terms, the 2023 budget year suggests that Montenegro has the institutional building blocks for credible green financing, but that the mobilisation of green investment will, in the short to medium term, continue to be carried primarily by the capital programmes of state-owned energy enterprises, with the central budget playing a complementary and increasingly explicit climate-tagged role.

5. EU membership perspectives and mobilisation of green investment

Montenegro’s green transition is no longer primarily a question of strategic orientation, since the country has already established an ambitious climate and sustainability framework through the National Energy and Climate Plan (NECP), the Low-Carbon Development Strategy (LCDS), the National Adaptation Plan (NAP), the Circular Transition Strategy, and the updated Nationally Determined Contribution (NDC 3.0). The central challenge now lies in implementation: mobilising sufficient financial resources, strengthening institutional capacity, and transforming policy commitments into bankable and scalable investment projects.

[37] Law on the Final Account of the Budget of Montenegro for 2023 (Zakon o završnom računu budžeta Crne Gore za 2023. godinu), Official Gazette of Montenegro; complemented by the annual reports of UzKP (Directorate for Capital Projects) and UzS (Transport Directorate).

The analysis presented in this chapter suggests that Montenegro's future success in green investment mobilisation will depend on the ability to combine EU accession dynamics, public-sector reforms, and private-sector participation into a coherent investment framework. In that context, several strategic policy recommendations emerge.

a) Strengthening institutional capacity for green investment implementation

One of the main constraints identified throughout the chapter is the limited administrative and technical capacity for preparing, coordinating, and implementing complex green investment projects. Although Montenegro has significantly advanced its strategic and legal alignment with EU climate and environmental acquis, implementation capacity remains fragmented across ministries, municipalities, agencies, and public enterprises.

Montenegro should therefore establish a stronger central coordination mechanism for green investment planning and implementation, particularly in relation to EU funding instruments such as IPA III, the Growth Plan for the Western Balkans, LIFE, WBIF, and Green Climate Fund mechanisms. This coordination function should integrate climate policy, public investment planning, energy transition priorities, and sustainable-finance objectives within a single operational framework.

Special attention should be devoted to strengthening project preparation capacity at the municipal level, where many investments in waste management, wastewater treatment, energy efficiency, sustainable mobility, and adaptation infrastructure are implemented. Municipalities often lack technical expertise, financial engineering skills, and project-development capacity necessary for accessing international financing instruments. Establishing national technical-assistance facilities and standardized project-preparation mechanisms could significantly improve absorption capacity and investment readiness.

In parallel, Montenegro should further strengthen the institutional role of the Eco-Fund as a specialised green-finance institution capable not only of distributing grants, but also of acting as a catalytic platform for blended finance, guarantees, revolving instruments, and co-financing mechanisms. The Eco-Fund could gradually evolve toward a national green investment platform aligned with EU sustainable-finance standards and taxonomy principles.

b) Developing a pipeline of bankable green projects

A recurring challenge identified in the chapter is the gap between strategic ambitions and the availability of mature, investment-ready projects. Montenegro possesses substantial renewable-energy, energy-efficiency, circular-economy, and adaptation potential, but project pipelines often remain fragmented, underprepared, or insufficiently standardized for international financiers and private investors.

To address this challenge, Montenegro should introduce a systematic national pipeline-development approach focused on pre-feasibility studies, environmental and climate impact assessments, technical documentation, financial structuring, and alignment with EU taxonomy criteria. Project pipelines should be developed across several priority sectors:

- renewable energy and energy storage;
- electricity-grid modernisation and digitalisation;
- public-building renovation and energy efficiency;
- sustainable transport and electromobility;
- circular economy and waste management;
- water infrastructure and climate adaptation;
- biodiversity and nature-based solutions.

Particular emphasis should be placed on aggregation mechanisms for smaller projects, especially in energy efficiency and municipal infrastructure. Aggregating projects into larger portfolios could improve bankability, reduce transaction costs, and facilitate future green-bond issuance or blended-finance structures.

At the same time, Montenegro should strengthen environmental, climate and financial data systems to improve transparency, project monitoring and investor confidence. Reliable climate-risk assessments, emissions inventories, adaptation indicators, and investment tracking systems will become increasingly important for attracting international capital and complying with EU sustainable-finance disclosure standards.

c) Expanding the role of blended finance and private-sector participation

Given Montenegro's limited fiscal space and substantial investment needs, public financing alone cannot support the scale of transformation required for climate neutrality and EU environmental convergence. The country therefore needs to significantly expand the use of blended-finance instruments that combine public resources, concessional loans, guarantees, EU grants, and private capital.

In this regard, Montenegro should further develop financial mechanisms capable of reducing investment risk in sectors with high upfront costs or longer payback periods, particularly renewable energy, energy efficiency, circular economy projects, and climate adaptation infrastructure. Public guarantees, concessional financing windows, first-loss mechanisms, and risk-sharing facilities can help mobilise commercial banks and institutional investors toward green investments.

The banking sector should also be encouraged to integrate environmental and climate-risk assessment into lending practices, while gradually expanding green-credit products for households, SMEs, agriculture, tourism, and municipalities. Cooperation between the Central Bank of Montenegro, commercial banks, IFIs, and development partners will be essential for building domestic green-finance capacity and improving access to sustainable-finance instruments.

Over time, Montenegro should also explore the possibility of sovereign or quasi-sovereign green-bond issuance, particularly for financing large-scale infrastructure aligned with the NECP and NDC priorities. Such instruments would require transparent reporting frameworks, credible project pipelines, and strong governance standards, but could significantly diversify financing sources and increase visibility within international sustainable-finance markets.

d) Integrating green budgeting into public financial management

The chapter highlights that Montenegro's environmental and climate-related revenues remain relatively modest and fragmented across multiple institutional channels. At the same time, public budgeting processes still insufficiently integrate climate and environmental objectives into fiscal planning and investment prioritisation.

Montenegro should therefore progressively introduce green budgeting methodologies within the annual budget cycle. This would involve identifying, classifying, tracking, and evaluating budget expenditures and revenues according to their environmental and climate impact. Green budgeting would improve transparency, strengthen policy coherence, and facilitate alignment between fiscal policy and long-term sustainability strategies.

Particular importance should be given to improving the effectiveness of environmental charges, emissions-related instruments, and earmarked climate revenues. As Montenegro gradually

develops emissions trading mechanisms and climate-related fiscal instruments aligned with EU rules, these revenues should increasingly support decarbonisation investments, adaptation measures, and just-transition policies.

Furthermore, green budgeting could strengthen Montenegro's credibility in negotiations with EU institutions, IFIs, and climate-finance facilities by demonstrating a systematic approach to climate-related public finance management.

e) Ensuring a socially balanced and regionally inclusive green transition

The success of Montenegro's green transition will ultimately depend not only on environmental performance, but also on social acceptance and territorial cohesion. Decarbonisation measures, particularly in the energy sector, may generate adjustment costs for certain regions, industries, and vulnerable households. The transition away from coal-based energy production in Pljevlja represents the clearest example of this challenge.

Montenegro should therefore integrate just-transition principles more explicitly into climate and investment planning. This includes targeted support for reskilling and labour-market transition programmes, economic diversification in coal-dependent regions, social protection measures for vulnerable households, and investments in local infrastructure and SMEs.

Energy poverty should become a central component of energy-efficiency and housing-renovation programmes, particularly in northern municipalities and rural areas. Investments in building renovation, district heating modernisation, and renewable-energy access can simultaneously reduce emissions, improve living conditions, and strengthen social resilience.

At the same time, adaptation investments should prioritise vulnerable sectors and communities exposed to floods, droughts, heatwaves, coastal erosion, and biodiversity loss. Climate adaptation should not be treated as a secondary policy area, but as an integral part of economic resilience, territorial development, and public-health protection.

f) Operational and sector-specific policy priorities

In addition to broader institutional and financial reforms, Montenegro should accelerate several operational and sector-specific measures necessary for the effective implementation of its green transition agenda.

First, Montenegro should strengthen institutional capacities for monitoring, reporting and verification (MRV) of greenhouse-gas emissions and climate-policy implementation. Developing a more robust transparency framework aligned with the EU Monitoring Mechanism Regulation, EU Emissions Trading System (ETS), and Energy Community obligations would improve policy credibility, facilitate access to climate finance, and support future participation in EU carbon-market mechanisms.

Second, Montenegro should further streamline its strategic and reporting architecture by integrating the National Energy and Climate Plan (NECP), Energy Development Strategy, Energy Efficiency Action Plan, Renewable Energy Action Plan, Climate Action Plan, NDC implementation framework and related sectoral strategies into a more coherent governance structure. Such integration would reduce institutional fragmentation, improve policy coordination, and minimize duplicative reporting obligations toward the UNFCCC, European Commission and Energy Community Secretariat.

Third, stronger support should be provided for private-sector-led green transition initiatives. In this regard, approaches similar to the "Growing Green Business in Montenegro" initiative should

be expanded through a combination of policy de-risking instruments (stable regulatory frameworks, technical assistance, business-support services) and financial de-risking mechanisms (credit guarantees, concessional lending, blended finance, and improved SME access to green finance). Particular attention should be devoted to agriculture, tourism, energy efficiency and circular-economy activities.

Montenegro should also consider sovereign or quasi-sovereign green-bond issuance as an additional mechanism for financing large-scale green infrastructure and climate-transition priorities. Such instruments would align Montenegro with broader international sustainable-finance trends, particularly given the increasing climate-finance orientation of institutions such as the EIB, EBRD and other multilateral development banks.

At the sectoral level, Montenegro should continue updating environment-related strategic documents while ensuring regular implementation monitoring and public reporting. Priority areas include modernization of environmental monitoring networks, establishment of an integrated national environmental information system, mainstreaming climate adaptation into all major sectoral policies, adoption of a comprehensive national air-quality strategy, acceleration of wastewater infrastructure investments, strengthening biodiversity monitoring systems, and expansion of environmentally sustainable transport solutions in tourism destinations.

Finally, Montenegro should accelerate implementation of circular-economy and resource-efficiency policies through stronger green public procurement frameworks, promotion of resource-efficient industrial production, sustainable mining policies aligned with EU environmental standards, and broader forest certification efforts. These measures would support both environmental sustainability and the competitiveness of Montenegro's export-oriented sectors within the context of future EU membership.

Final considerations

Montenegro possesses several important comparative advantages for green investment mobilisation, including abundant renewable-energy potential, relatively low-carbon electricity production, strong alignment with EU climate policy, and growing access to international climate and development financing. However, the scale of the transition required by the NECP, NDC 3.0, and Chapter 27 obligations demands a much more operational and investment-oriented governance model.

The transition toward a climate-neutral and resource-efficient economy will require moving beyond strategic declarations toward implementation mechanisms capable of mobilising long-term capital, strengthening institutional coordination, and delivering measurable environmental and socio-economic outcomes. In this context, green investment should not be viewed solely as an environmental policy instrument, but as a broader development strategy aimed at improving competitiveness, reducing external vulnerabilities, modernising infrastructure, and accelerating Montenegro's convergence with the European Union.

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IV. MOBILISATION OF GREEN INVESTMENT OF MOLDOVA IN THE CONTEXT OF THE EUROPEAN INTEGRATION PROCESS

Mobilisation of green investment of Moldova in the context of the European integration process

Iordanca-Rodica IORDANOV[38]

Natalia GURANDA[39]

Irina PUNGA[39]

Abstract

This chapter analyses the development of green investment and sustainable finance frameworks in the Republic of Moldova within the broader context of European Union accession, climate governance reforms, and economic modernization. The analysis focuses on institutional arrangements, regulatory frameworks, financing mechanisms, and implementation practices that shape the mobilisation of environmentally sustainable investments and climate-related finance in the country. Rather than assessing environmental policy objectives themselves, the chapter examines the operational architecture of green investment governance, including sustainable finance regulation, climate and energy policy frameworks, institutional coordination mechanisms, and emerging sustainable financial instruments. Moldova represents a particularly relevant case due to its structurally vulnerable economy, high dependence on imported energy resources, climate-sensitive agricultural sector, and ongoing alignment with European Union environmental, climate, and financial acquis. The chapter places particular emphasis on sectors where energy security, climate resilience, infrastructure modernization, and sustainable development objectives intersect, especially renewable energy, energy efficiency, sustainable transport, circular economy development, and sustainable agriculture. These sectors illustrate how green investments may simultaneously support decarbonization objectives, economic resilience, environmental compliance, and long-term competitiveness.

The analysis identifies key enabling factors supporting green investment mobilisation, including the adoption of the Integrated National Energy and Climate Plan (NECP) 2025–2030, the Law on Climate Action, development of the National Sustainable Finance Taxonomy aligned with Regulation (EU) 2020/852, and the implementation of the Moldova Sustainable Finance Roadmap 2024–2028. Particular attention is also devoted to the role of international financial institutions and development partners in supporting sustainable finance reforms, climate-related investments, ESG integration, and institutional capacity building. At the same time, the chapter highlights several structural barriers constraining sustainable finance development and green investment mobilisation in Moldova. These include incomplete regulatory harmonization with EU sustainable finance acquis, limited depth of domestic capital markets, insufficient ESG reporting and climate-related data systems, institutional and technical capacity constraints, and continued dependence on external concessional financing and technical assistance. The analysis also underlines the broader macroeconomic, geopolitical, and climate-related risks affecting investment predictability and long-term financing conditions.

Finally, the chapter discusses the strategic importance of Moldova's European Union accession process for accelerating sustainable finance reforms and mobilizing green investment. The

[38] EcoContact – Aarhus Center for Information and Consultation, Chisinau, Moldova;

gradual alignment with EU climate, environmental, and financial governance frameworks is expected to improve regulatory predictability, strengthen investor confidence, and facilitate access to European climate finance instruments and sustainable investment mechanisms. In this context, the chapter identifies broader lessons regarding the role of sustainable finance in supporting economic transformation, climate resilience, and integration into European green transition frameworks within enlargement and candidate countries.

***Keywords**: Republic of Moldova; sustainable finance; green investment; green transition; climate finance; ESG integration; EU accession; European Green Deal; sustainable development; renewable energy; energy efficiency; climate governance; sustainable finance taxonomy; green bonds; climate resilience; decarbonization; environmental policy; circular economy; sustainable infrastructure; energy transition; environmental governance; prudential supervision; sustainable banking; climate adaptation; EU acquis alignment.*

1. Country Context

The Republic of Moldova (herein referred to as Moldova) has a small, open, and structurally vulnerable economy, characterized by a high dependence on external markets (by 2024, the EU accounted for approximatelly 67 % of Moldova's exports and slightly more than 50 % of its imports), (Hagemejer & Dąbrowski, 2025), remittances representing approximately 10.5% of GDP (World Bank, n.d.), imported energy resources, and climate-sensitive sectors such as agriculture. The country imports almost 100% of its fossil energy resources and approximately 70% of its electricity demand, which significantly increases exposure to geopolitical and energy market shocks (UNECE, n.d.). This structural dependence increases the country's exposure to external economic shocks, energy price volatility, and geopolitical instability, particularly in the context of regional energy and security crises. Over the past decade, the country has pursued gradual economic modernization and closer integration with the European Union through the implementation of the EU–Moldova Association Agreement and alignment with the European Green Deal objectives (OECD, 2022; World Bank Group, 2024).

Agriculture remains one of the most important sectors of the Moldovan economy, both economically and socially. Agriculture contributes approximately 7–8% of Moldova's GDP, while rural areas continue to host more than half of the country's population (World Bank, 2024). The sector continues to employ a substantial share of the rural population, with agriculture accounting for approximately 21–23% of total employment in recent years, while in many rural areas it remains one of the primary sources of income and economic activity (World Bank Group, 2024). The importance of agriculture is also reflected in Moldova's export structure. Agri-food products consistently represent one of the country's largest export categories, including cereals, oilseeds, fruits, vegetables, wine products, nuts, and processed food products. According to national and international assessments, agri-food exports account for roughly 40–45% of Moldova's total merchandise exports, demonstrating the economy's strong dependence on climate-sensitive agricultural value chains (National Comprehensive Green Transition Assessment Report, 2025). The high concentration of exports in climate-sensitive agricultural commodities further amplifies Moldova's macroeconomic vulnerability to droughts, extreme weather events, and fluctuations in global agricultural markets. However, Moldova's economic structure remains insufficiently diversified and highly exposed to external shocks, including climatic variability, geopolitical instability, and energy price fluctuations. The country's industrial base is relatively limited and concentrated in agro-processing, food production, light manufacturing, and small-scale industrial activities (UNECE, 2021).

In recent years, the information and communication technology (ICT) sector has emerged as one of the most dynamic segments of the Moldovan economy, supported by digitalization initiatives, innovation policies, and the development of innovation ecosystems such as Tekwill and Moldova IT Park. The ICT sector currently contributes approximately 6% of Moldova's GDP and generated more than USD 1.15 billion in revenues in 2022, while ICT exports exceeded USD 512 million during the same year. The expansion of the ICT sector has significantly contributed to increasing productivity, export diversification, and the creation of high-skilled employment opportunities. Between 2017 and 2022, the number of ICT companies increased from approximately 2,200 to 3,300, while sector employment grew from around 23,000 to over 32,600 employees (Invest Moldova Agency, 2024). The sector's rapid expansion has been supported by preferential tax policies, digital transformation reforms, growing foreign investment, and increasing integration into European and global IT outsourcing markets. At the same time, the development of the ICT sector is increasingly recognized as an important enabling factor for the green transition, particularly through digital innovation, smart energy systems, environmental monitoring technologies, and sustainable business solutions. Nevertheless, despite the strong growth dynamics of the ICT sector, the broader economy continues to experience relatively low levels of innovation commercialization and limited research and development expenditure (UNECE, 2021).

At the same time, Moldova faces major environmental and climate-related challenges that threaten long-term economic resilience and sustainable development. According to the ND-GAIN[39] Index, Moldova ranks 74th globally, with a score of 52.3, reflecting moderate climate vulnerability and relatively strong readiness for climate adaptation compared to countries with similar income levels. Moldova is considered among the most climate-vulnerable countries in Europe due to increasing temperatures, recurrent droughts, soil degradation, water scarcity, and extreme weather events affecting agricultural productivity and rural livelihoods. According to the World Bank, floods and droughts caused approximately US$1.2 billion in damage over the past decade, while the country has experienced at least one significant climate-related event every three years since 2000. These climate-related losses generate substantial fiscal pressure and increase the urgency for climate adaptation financing, resilient infrastructure investments, and climate risk integration into national economic planning. The agricultural sector has been particularly affected by climate variability. The severe drought of 2020 caused a 26% decline in agricultural production and generated significant socioeconomic impacts, including nearly 20% of total job losses in the agricultural sector. Furthermore, the 2022 drought reduced cereal output to 46% below the five-year average, representing the lowest production volume on record. Climate projections indicate that Moldova could experience an increase in average temperatures exceeding 2°C by mid-century, accompanied by declining precipitation levels and more frequent extreme weather events, further intensifying risks to food security, water availability, and rural livelihoods. The World Bank also estimates that the annual cost of inaction on climate adaptation could increase from approximately US$600 million today to US$1.3 billion by 2050 (World Bank, 2024).

The energy sector constitutes another critical challenge. Moldova has historically depended heavily on imported fossil fuels, particularly natural gas and electricity imports, making the country highly vulnerable to external supply disruptions and energy price shocks. Energy imports have historically represented one of the country's largest structural economic vulnerabilities, exposing Moldova to substantial price fluctuations and supply disruptions during regional crises. The energy crisis triggered by regional geopolitical instability and the war in Ukraine exposed the fragility of Moldova's energy security system and accelerated policy efforts toward renewable energy deployment, energy efficiency, and diversification of energy supply sources (OECD, 2022;

[39] The ND-GAIN (Notre Dame Global Adaptation Initiative) Index measures a country's vulnerability to climate change and readiness to improve resilience through adaptation investments and governance capacity.

UNDP Moldova & European Union, 2023). As a result, energy security has become increasingly interconnected with climate policy and sustainable finance priorities, positioning renewable energy investments as both an economic and strategic national priority. Renewable electricity generation increased more than sixfold during the regional energy crisis response period, reflecting accelerated diversification efforts within the national energy system.

The country has committed to ambitious decarbonization objectives through its Integrated National Energy and Climate Plan and the Law on Climate Action, including targets for greenhouse gas emission reduction, increased renewable energy generation, and climate neutrality by 2050 (UNDP Moldova, 2025). Nevertheless, the transition requires substantial investments in renewable infrastructure, electricity interconnections, energy storage, and modernization of residential and industrial energy systems. According to international and national assessments, Moldova will require several billion euros in investments over the next decade to implement decarbonization, climate adaptation, and energy transition objectives. Air pollution also remains an important environmental and public health concern. The principal sources of air pollution include transport emissions, residential heating based on fossil fuels and biomass, industrial activities, and inefficient energy consumption patterns. According to OECD assessments, Moldova continues to experience high welfare costs associated with premature mortality linked to fine particulate matter (PM2.5) pollution, while urban air quality monitoring and enforcement capacities remain limited (OECD, 2022).

Environmental degradation extends beyond air pollution and includes soil erosion, deforestation, inefficient waste management, and water resource contamination. Moldova has one of the lowest forest cover rates in Europe, increasing vulnerability to biodiversity loss, land degradation, and climate impacts. Waste management infrastructure remains underdeveloped, with limited recycling capacity and persistent reliance on landfilling practices (EU4Environment, 2021). Moldova continues to rely predominantly on landfill disposal, while recycling rates remain significantly below European Union averages.

Biodiversity conservation represents another strategic challenge in the context of EU accession and alignment with European environmental acquis. Moldova is undertaking significant efforts to strengthen protected area management, ecological restoration, and ecosystem conservation through the gradual transition from the Emerald Network toward Natura 2000[40]-compatible frameworks. However, habitat fragmentation, agricultural intensification, pollution, and insufficient financing continue to threaten biodiversity and ecosystem services (National Comprehensive Green Transition Assessment Report, 2025).

Overall, Moldova's development trajectory increasingly depends on its capacity to reconcile economic modernization with climate resilience, environmental protection, and green transition objectives. The country's future competitiveness and socio-economic stability will largely depend on successful implementation of sustainable finance mechanisms, green infrastructure investments, energy transition reforms, and environmentally sustainable economic policies.

In response to increasing climate vulnerabilities, energy security concerns, and the European integration agenda, the Republic of Moldova has progressively strengthened its national policy and regulatory frameworks supporting green investment and sustainable development. The country's strategic orientation toward a low-carbon and climate-resilient economy is closely linked to the implementation of the EU–Moldova Association Agreement and the gradual alignment with the European Green Deal objectives (OECD, 2022). This alignment process has become increasingly important within the broader EU accession framework, where climate and environmental governance are treated as strategic pillars of economic modernization and

[40] Natura 2000 is the European Union's ecological network of protected areas established under the Habitats Directive and Birds Directive to ensure long-term conservation of biodiversity and ecosystems.

institutional reform. One of the central strategic documents guiding Moldova's sustainable development trajectory is the National Development Strategy "Moldova 2030," which integrates the Sustainable Development Goals (SDGs) into national planning and establishes long-term priorities related to climate resilience, environmental protection, energy efficiency, and green economic transformation. The strategy emphasizes the transition toward a sustainable and resource-efficient economy while promoting social inclusion and economic competitiveness (UNDP Moldova, 2025).

Climate governance in the Republic of Moldova has been further strengthened through the adoption of the Law on Climate Action (Law No. 74/2024), which establishes the regulatory framework for climate action aimed at achieving climate neutrality by 2050[41], in line with the objectives of the Paris Agreement. The law also provides the legal basis for greenhouse gas (GHG) emissions reduction, climate adaptation measures, monitoring and reporting mechanisms, and the application of the "polluter pays" principle (Government of the Republic of Moldova, 2024). The adoption of the law represents an important step toward aligning Moldova's climate governance framework with EU climate acquis and international climate governance standards.

An essential component of Moldova's green transition architecture is the Integrated National Energy and Climate Plan (NECP) 2030, which serves as the principal policy framework for decarbonization, energy transition, and climate action. The NECP establishes sectoral targets and investment priorities related to renewable energy deployment, energy efficiency improvements, reduction of fossil fuel dependency, and modernization of the national energy infrastructure. The plan aims to increase the share of renewable energy while improving energy efficiency and strengthening electricity interconnections with the European market. It also promotes the diversification of energy sources, development of smart and resilient energy systems, electrification of end-use sectors, and gradual integration of EU energy and climate acquis. In addition, the NECP emphasizes energy security, reduction of greenhouse gas emissions, support for low-carbon technologies, and the mobilization of public and private green investments necessary to support Moldova's long-term transition toward a climate-neutral and sustainable economy (Government of the Republic of Moldova, 2025). The NECP therefore functions not only as a climate policy instrument, but also as an investment-oriented framework designed to support structural transformation of the national energy system.

The energy transition agenda has gained particular importance following the regional energy crisis and geopolitical instability caused by the war in Ukraine. Moldova's heavy dependence on imported energy resources exposed major structural vulnerabilities in the national energy system, accelerating reforms focused on diversification of energy supply sources, integration into the European energy market, and expansion of domestic renewable energy generation capacities (National Bank of Moldova, 2024). To facilitate these objectives, Moldova has introduced several renewable energy support mechanisms, including competitive auctions for solar and wind projects. The first large-scale renewable energy auctions launched in 2024 attracted strong investor interest and generated significant planned investments in green energy infrastructure, demonstrating increasing market confidence in Moldova's clean energy transition (UNDP Moldova, 2025). At the same time, the expansion of renewable energy is increasingly viewed as a strategic instrument for strengthening national energy independence and long-term economic resilience.

At the institutional level, the National Bank of Moldova (NBM) has initiated important steps toward integrating sustainability considerations into the financial sector. The "Moldova Sustainable Finance Roadmap 2024–2028" outlines priorities for developing sustainable finance instruments, strengthening environmental and social risk management systems (ESMS),

[41] Climate neutrality refers to achieving net-zero greenhouse gas emissions by balancing emissions produced and emissions removed or offset.

promoting ESG[42] integration, and aligning national financial practices with EU sustainable finance regulations and taxonomy principles (National Bank of Moldova, 2024). An important recent development was the governmental approval of the Sustainable Finance Taxonomy, which establishes a national framework for defining environmentally sustainable economic activities in line with the EU Taxonomy Regulation (EU) 2020/852[43]. The Taxonomy aims to facilitate the transition toward a green and circular economy[44], stimulate green investments, prevent greenwashing[45], and support the development of a transparent sustainable finance market. The framework identifies six environmental objectives, including climate change mitigation and adaptation, sustainable water use, circular economy transition, pollution prevention, and biodiversity protection (Government of the Republic of Moldova, 2025b). The adoption of the Taxonomy represents a major institutional step toward harmonizing Moldova's financial sector with EU sustainable finance architecture and improving transparency in green investment classification. Despite recent progress, the sustainable finance market in Moldova remains at an early stage of development, with limited availability of green financial instruments and relatively low ESG reporting capacity among financial institutions and SMEs.

In parallel, Moldova has advanced broader green economy and circular economy policy frameworks. Strategic documents such as the Environmental Strategy, the Green Economy Promotion Programme identify priority sectors for sustainable investment, including renewable energy, energy-efficient buildings, sustainable agriculture, waste management, circular economy solutions, transport decarbonization, biodiversity conservation, and water resource management (EU4Environment, 2021). International financial institutions and development partners, including the European Union, World Bank, EBRD, EIB, UNDP, IFC, and bilateral donors, continue to play a central role in supporting Moldova's green transition through technical assistance, concessional financing, guarantees, and investment support mechanisms.

Despite the existence of comprehensive policy frameworks, Moldova continues to face a substantial financing gap for implementing climate and green transition objectives. Significant investments are required for renewable energy deployment, modernization of transport and energy infrastructure, energy efficiency improvements, climate adaptation, and environmental protection. Given limited domestic public resources, mobilization of private capital, international climate finance, and blended finance instruments will be essential for achieving Moldova's long-term decarbonization and resilience targets.

Several strategic sectors have been identified as priorities for green finance mobilization in order to support the transition toward a low-carbon, climate-resilient, and resource-efficient economy. These sectors are closely linked to the country's climate commitments, energy security objectives, EU integration process, and sustainable development priorities. National strategies, donor programs, and sustainable finance initiatives increasingly emphasize investments in renewable energy, energy efficiency, sustainable transport, circular economy solutions, sustainable agriculture, and environmental infrastructure (National Bank of Moldova, 2024).

[42] ESG refers to Environmental, Social, and Governance criteria used to assess sustainability-related risks and impacts in investment and financial decision-making.
[43] The EU Taxonomy Regulation establishes a classification system for environmentally sustainable economic activities and serves as a core element of the EU sustainable finance framework.
[44] A circular economy aims to minimize waste generation and resource consumption through reuse, recycling, repair, and sustainable production models.
[45] Greenwashing refers to misleading claims regarding the environmental sustainability or climate benefits of products, services, or investments.

Renewable Energy

Renewable energy represents one of the most important sectors targeted for green investment in Moldova. Historically dependent on imported fossil fuels and external electricity supplies, the country has accelerated efforts to diversify its energy mix and strengthen domestic renewable energy generation capacities. National priorities focus particularly on solar photovoltaic (PV) systems, wind energy, biomass, and decentralized renewable energy solutions (World Bank Group, 2024). The government has introduced renewable energy auctions and support mechanisms to stimulate private sector participation in green energy infrastructure. According to the Moldova SDG Investor Map, renewable energy projects attracted strong investor interest, especially utility-scale solar and wind developments, waste-to-energy initiatives, and small-scale decentralized solar systems (UNDP Moldova, 2025).

Renewable energy investments are expected to contribute simultaneously to greenhouse gas emission reduction, energy security enhancement, and alignment with EU climate and energy policies. Moldova's NECP 2030 establishes ambitious renewable energy targets and identifies significant financing needs for expanding generation capacity, grid modernization, and energy storage systems (National Comprehensive Green Transition Assessment Report, 2025). In addition to climate-related benefits, renewable energy investments are expected to improve energy affordability, reduce import dependency, and increase resilience of the national energy system.

Energy Efficiency

Energy efficiency is another major priority area for green finance due to Moldova's high energy intensity and aging infrastructure. Residential buildings, public institutions, district heating systems, and industrial facilities often suffer from poor insulation, inefficient heating technologies, and excessive energy losses. Consequently, investments in building renovation, energy-efficient technologies, smart energy management systems, and modernization of heating infrastructure are considered critical for reducing energy consumption and improving economic competitiveness (World Bank Group, 2024).

The residential sector is particularly important because it represents one of the largest consumers of energy in Moldova. Policy frameworks increasingly support thermal rehabilitation of buildings, replacement of inefficient heating systems, deployment of heat pumps, and integration of renewable energy technologies into residential and commercial buildings (National Comprehensive Green Transition Assessment Report, 2025).

Financial institutions and international donors have also begun promoting green credit lines and sustainable financing mechanisms targeting energy efficiency improvements for households and SMEs. These initiatives aim to reduce energy poverty, lower operational costs, and support climate mitigation objectives. Energy efficiency improvements are also increasingly recognized as one of the most cost-effective pathways for reducing greenhouse gas emissions while simultaneously improving social welfare and household resilience.

Sustainable Transport and Mobility

Transport decarbonization constitutes another strategic area for green finance mobilization. Moldova's transport sector remains heavily dependent on fossil fuels and contributes significantly to greenhouse gas emissions and air pollution. The modernization of transport infrastructure and transition toward sustainable mobility solutions are increasingly prioritized within national green transition strategies (EU4Environment, 2021). The transport sector is also among the largest consumers of imported energy resources, further strengthening the strategic

importance of sustainable mobility investments for national energy security and climate mitigation objectives.

Priority investments include modernization of public transport systems, development of electric mobility infrastructure, promotion of low-emission vehicles, railway rehabilitation, and improvement of cross-border transport connectivity with the European Union. The Moldova SDG Investor Map specifically identifies manufacturing technologies for electric vehicle transport and sustainable transport infrastructure among emerging investment opportunity areas (UNDP Moldova, 2025). Additional priorities include the development of charging infrastructure, urban mobility planning, and increased integration of low-carbon transport solutions into municipal development strategies.

The transport sector is also closely linked to broader objectives related to energy efficiency, reduction of urban air pollution, and integration into European transport corridors. Consequently, investments in sustainable mobility are increasingly viewed not only as environmental measures, but also as instruments for improving urban quality of life, regional connectivity, and economic competitiveness.

Circular Economy and Waste Management

The transition toward a circular economy is increasingly recognized as an important pillar of Moldova's sustainable development agenda. The country continues to face major challenges related to waste generation, low recycling rates, inefficient resource use, and heavy reliance on landfilling practices. As a result, circular economy investments are becoming a growing priority for both public policy and international financial support (EU4Environment, 2021). The transition toward circular economy models is also increasingly viewed as a mechanism for reducing resource dependency, improving industrial competitiveness, and aligning Moldovan production systems with EU sustainability standards and market requirements.

Green finance in this sector targets investments in:

- waste sorting and recycling infrastructure;
- waste-to-energy technologies;
- sustainable packaging;
- industrial resource efficiency;
- water reuse systems;
- eco-innovation and cleaner production technologies.

The National Comprehensive Green Transition Assessment identifies industrial modernization and circular economy development as essential components for improving resource productivity and reducing environmental pressures (National Comprehensive Green Transition Assessment Report, 2025). At the same time, investments in waste management infrastructure are increasingly necessary for compliance with EU environmental acquis and for reducing environmental and public health risks associated with uncontrolled waste disposal practices.
At the same time, sustainable finance policies increasingly encourage Moldovan SMEs to adopt environmentally sustainable production methods and circular business models. This transition is considered necessary both for environmental protection and for improving access to EU markets and sustainable value chains (Iordachi, 2024). The growing emphasis on circular business models also reflects broader European trends related to sustainable consumption, industrial decarbonization, and resource efficiency.

Sustainable Agriculture and Green Rural Development

Given the importance of agriculture for Moldova's economy, sustainable agriculture also represents a major target for green investment. Climate-smart agriculture, efficient irrigation

systems, soil conservation, sustainable land management, organic farming, and renewable energy use in agriculture are increasingly promoted within national adaptation and green growth policies (World Bank Group, 2024). The agricultural sector is particularly important for Moldova due to its strong contribution to employment, exports, and rural livelihoods, while simultaneously remaining highly vulnerable to climate-related risks.

Green finance instruments are expected to support:

- climate-resilient agricultural technologies;
- sustainable water management;
- precision agriculture;
- agroforestry;
- low-carbon food processing;
- sustainable agri-food value chains.

The sector is particularly important because climate-related risks such as droughts and soil degradation continue to threaten productivity, rural incomes, and food security. Consequently, sustainable agriculture investments are increasingly considered essential not only for environmental resilience, but also for maintaining social stability, rural economic development, and long-term food security.

Overall, Moldova's green finance priorities reflect the country's broader objective of combining economic modernization, climate resilience, environmental sustainability, and EU integration into a coherent long-term development pathway. In this context, green finance is increasingly emerging as a strategic instrument for supporting structural economic transformation, improving resilience to climate and external shocks, and facilitating Moldova's alignment with European sustainability and decarbonization objectives.

2. Institutional and Financial Mechanisms for green investments

2.1. Legal and Institutional Framework

The development of institutional and financial mechanisms for green investments has become an increasingly important component of the Republic of Moldova's economic modernization, climate governance, and European integration agenda. In recent years, Moldova has accelerated efforts to align national regulatory and institutional frameworks with European Union acquis related to sustainable finance, climate policy, energy transition, environmental governance, and sustainable connectivity. According to the European Commission's 2025 Enlargement Report, Moldova has made progress under Cluster 4: The Green Agenda and Sustainable Connectivity, particularly in the fields of energy, environment, climate governance, and sustainable finance-related reforms (European Commission, 2025). The report highlights important developments including adoption of the National Energy and Climate Plan (NECP) 2025–2030, progress in electricity and gas sector reforms, implementation of renewable energy and storage auction mechanisms, strengthening of environmental governance systems, and initial efforts related to development of a national Sustainable Finance Taxonomy aligned with EU standards.

The European Commission also emphasizes the need for Moldova to continue strengthening institutional capacities, financial market governance, and regulatory alignment with EU acquis, particularly regarding sustainable finance, capital market development, climate-related financial supervision, and green investment frameworks (European Commission, 2025). In this context, green investments are increasingly viewed not only as environmental or climate-related instruments, but also as strategic mechanisms for enhancing energy security, economic resilience, infrastructure modernization, and long-term competitiveness. Against this background, Moldova has progressively developed a broader framework for green investment governance, involving

climate legislation, energy transition policies, sustainable finance initiatives, environmental regulatory reforms, and institutional cooperation mechanisms. Particular attention has been given to the role of public authorities, financial regulators, international financial institutions, and development partners in supporting sustainable finance reforms, ESG integration, renewable energy investments, and development of environmentally sustainable financial instruments.

The implementation of climate, energy, environmental, and sustainable finance policies in the Republic of Moldova is supported by a multi-level institutional governance framework involving central public authorities, financial regulators, sectoral agencies, and international development partners. At the policy coordination level, the Government of the Republic of Moldova and the State Chancellery ensure strategic coordination of national climate, energy, and EU accession priorities. The Ministry of Environment serves as the lead authority responsible for climate policy, biodiversity conservation, environmental protection, adaptation planning, and implementation of the Climate Action Law and environmental acquis approximation process. The Ministry of Energy is responsible for implementation of national energy policies, renewable energy deployment, energy efficiency measures, and NECP implementation. Sectoral implementation is further supported by specialized institutions, including the National Agency for Energy Regulation (ANRE) and energy market operators. The National Bank of Moldova (NBM) and the National Commission for Financial Markets (NCFM) play a central role in advancing sustainable finance reforms, ESG integration, prudential supervision related to climate risks, and development of sustainable financial instruments. Their role is reinforced through the Moldova Sustainable Finance Roadmap and related interinstitutional cooperation mechanisms. The Organization for Entrepreneurship Development (ODA) and other national financing institutions contribute to implementation of green investment support schemes targeting SMEs, energy efficiency, renewable energy, and sustainable business development. Environmental implementation and permitting functions are supported by institutions such as the Environmental Agency, Environmental Inspectorate, Moldsilva, and the Agency "Apele Moldovei", particularly in areas related to biodiversity conservation, natural resource management, environmental authorizations, and ecosystem restoration. The institutional framework is further complemented by extensive cooperation with international development partners and financial institutions, including the European Union, UNDP, World Bank, EBRD, EIB, IFC, IMF, KfW, and bilateral cooperation agencies supporting climate transition, sustainable finance, and green infrastructure investments.

The legal foundation for climate and green investment governance is established through several strategic and regulatory instruments, including the Law on Climate Action (Law No. 74/2024). The law represents a major step in strengthening Moldova's climate governance framework by establishing the legal basis for achieving climate neutrality by 2050, in line with the Paris Agreement and the country's EU integration objectives. From the perspective of green and sustainable financing, the law is particularly important because it creates the regulatory and institutional conditions necessary for mobilizing climate-related investments and integrating sustainability into national economic planning. The law establishes mechanisms for greenhouse gas (GHG) emissions reduction, climate adaptation, monitoring and reporting systems, and application of the "polluter pays" principle. These provisions improve policy predictability and create a more stable framework for investors, financial institutions, and development partners supporting low-carbon and climate-resilient investments. The law also provides the legal basis for developing emissions monitoring, reporting, and verification (MRV) systems and future carbon pricing instruments, including potential emissions trading or carbon taxation mechanisms. This is particularly relevant for sustainable finance, as such mechanisms encourage cleaner production processes, support decarbonization, and improve alignment with EU climate and sustainable finance frameworks, including the Carbon Border Adjustment Mechanism (CBAM). Together with the Sustainable Finance Taxonomy aligned with EU Taxonomy principles,

the law contributes to the development of a more transparent and structured green finance market in Moldova (Government of the Republic of Moldova, 2024a).

Following the Law on Climate Action, another key strategic instrument shaping Moldova's green investment and sustainable financing framework is the Government Decision No. 86/2025 approving the NECP for the period 2025–2030. The NECP constitutes the principal national policy framework for energy transition, decarbonization, climate mitigation, and sustainable energy investments, while also reflecting Moldova's commitments related to European Union energy and climate governance frameworks (Government of the Republic of Moldova, 2025b). The Plan was adopted pursuant to the Law on Energy No. 174/2017, the Law on Promotion of Energy from Renewable Sources No. 10/2016, the Law on Climate Action No. 74/2024, and Government Decision No. 10/2024 concerning the governance mechanism for energy and climate action. This demonstrates the increasing integration of climate, energy, and sustainable development policies within Moldova's regulatory framework for green transition and investment governance. From the perspective of green and sustainable financing, the NECP is particularly important because it establishes national investment priorities and sectoral policy directions for renewable energy deployment, energy efficiency improvements, decarbonization of the energy sector, and modernization of national energy infrastructure. The document creates a strategic framework for mobilization of both public and private investments in renewable energy sources, electricity interconnections, balancing capacities, energy storage, and energy efficiency measures.

The NECP also plays a significant role in improving long-term investment predictability and policy stability for green investments. By establishing medium-term national objectives and implementation priorities for the period 2025–2030, the Plan contributes to reducing regulatory uncertainty and strengthening investor confidence in low-carbon and climate-resilient sectors. In addition, the Plan supports alignment with European Union energy market integration objectives and implementation of reforms necessary for future electricity market coupling with the EU.

The importance of the NECP for sustainable finance is further reflected in its connection with renewable energy auctions, energy market reforms, and climate-related investment mechanisms. According to the European Commission's 2025 Enlargement Report, Moldova developed an action plan supporting renewable energy and storage auctions and accelerated reforms in the electricity and gas sectors despite the regional energy crisis (European Commission, 2025c).

Another important strategic document supporting Moldova's transition toward sustainable development and green investment is the National Development Strategy "European Moldova 2030" approved by Government Decision No. 377/2022 (Government of the Republic of Moldova, 2022). The Strategy establishes the country's long-term development vision and serves as the overarching national policy framework guiding economic modernization, institutional reforms, environmental sustainability, and alignment with European Union standards. From the perspective of green and sustainable financing, "European Moldova 2030" is particularly significant because it integrates climate resilience, sustainable resource management, energy security, and green economic growth into national development planning. The Strategy recognizes the need to strengthen investments in renewable energy, sustainable infrastructure, energy efficiency, climate adaptation, circular economy practices, and environmentally sustainable economic activities. It also emphasizes the importance of reducing environmental degradation, improving air and water quality, strengthening resilience to climate change impacts, and supporting sustainable use of natural resources. These priorities contribute to creating a broader policy environment favorable for mobilization of public and private green investments.
In addition, "European Moldova 2030" supports the gradual integration of environmental and climate considerations into sectoral economic policies and public investment planning. The Strategy promotes modernization of infrastructure, digital transformation, sustainable agricultural development, and increased competitiveness through innovation and resource efficiency, all of which are closely linked to sustainable finance objectives. From an investment

governance perspective, the Strategy contributes to improving long-term policy predictability and reinforcing Moldova's strategic orientation toward a low-carbon and climate-resilient economy aligned with European Green Deal priorities and EU accession commitments (Government of the Republic of Moldova, 2022).

The Environmental Strategy of the Republic of Moldova for 2024–2030 represents another fundamental policy framework shaping the country's transition toward sustainable development and green investment. The Strategy establishes the long-term vision for environmental governance, climate resilience, sustainable resource management, and ecological modernization, while supporting Moldova's alignment with European Union environmental acquis and Green Deal objectives. The Strategy identifies environmental protection and climate action as essential preconditions for sustainable economic growth and improved quality of life. It emphasizes the need to strengthen investments in pollution reduction, sustainable waste management, biodiversity conservation, climate adaptation, water resource protection, energy efficiency, and circular economy measures. These strategic priorities directly support the development of green finance mechanisms and the mobilization of environmentally sustainable investments across multiple sectors of the economy.

A key component of the Strategy is the promotion of green economic transformation through the integration of environmental considerations into national planning and sectoral development policies. The document highlights the importance of increasing resource efficiency, reducing greenhouse gas emissions, improving environmental monitoring systems, and encouraging the adoption of sustainable production and consumption patterns. In this context, the Environmental Strategy contributes to strengthening the enabling environment for sustainable finance by promoting investments compatible with climate neutrality and environmental sustainability objectives (Government of the Republic of Moldova, 2024c). The Strategy also places strong emphasis on institutional strengthening, environmental governance reforms, and the implementation of European environmental standards. These reforms are expected to improve regulatory predictability, increase investor confidence, and facilitate access to international climate and green finance instruments. Furthermore, the Strategy supports the development of climate-resilient infrastructure and ecosystem-based approaches, which are increasingly relevant for sustainable financial planning and long-term economic resilience in Moldova. In the broader context of Moldova's European integration process, the Environmental Strategy serves as an important policy instrument for aligning national environmental and climate objectives with EU accession commitments. As a result, it contributes not only to environmental protection goals but also to the establishment of a more favorable framework for sustainable investment and green economic development.

Moldova's climate and emissions reduction agenda is also guided by a series of strategic mitigation and decarbonization frameworks designed to support the country's transition toward climate neutrality and alignment with European climate policy objectives. In recent years, the Republic of Moldova has significantly strengthened its commitments under international climate agreements, including the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Agreement, and the Global Methane Pledge. The country's updated Nationally Determined Contribution (NDC.3) establishes an unconditional target to reduce greenhouse gas (GHG) emissions by 70% below 1990 levels by 2030, with the possibility of increasing this reduction to 88% conditional upon international financial and technical support. Sector-specific targets include reductions in industrial processes, agriculture, waste management, transport, and energy systems, while also promoting increased carbon sequestration through land use and forestry measures. To operationalize these commitments, Moldova adopted the Low Emission Development Program (LEDP) 2030, which systematizes national mitigation policies and sectoral action plans. The Program establishes emission reduction pathways across key sectors of the economy, targeting reductions of approximately 81% in the energy sector, 52% in transport, 74%

in buildings, 27% in industry, 44% in agriculture, and 14% in waste management by 2030 compared to 1990 levels. These targets illustrate the scale of transformation required across Moldova's economy and underline the importance of mobilizing both domestic and international green finance mechanisms (Government of the Republic of Moldova, 2023).

A central component of Moldova's green investment architecture is represented by the legal and institutional framework governing the energy transition, renewable energy development, and modernization of national energy infrastructure. Energy-related legislation constitutes one of the primary drivers for mobilization of green investments in the Republic of Moldova, particularly in the context of energy security challenges, decarbonization objectives, and alignment with European Union energy and climate acquis.

An important legal basis for Moldova's energy governance framework is established through the Law No. 174/2017 on Energy. The law regulates the organization and functioning of the energy sector, establishes principles related to energy security, market functioning, sustainability, and consumer protection, and defines responsibilities of public authorities involved in energy governance (Government of the Republic of Moldova, 2017). From the perspective of green investments, the law is particularly significant because it creates the legal framework for development of national energy planning mechanisms, implementation of energy market reforms, and integration of renewable energy and energy efficiency objectives into national energy policies.

The transition toward renewable energy is further supported by Law No. 10/2016 on the Promotion of Energy from Renewable Sources, which represents one of the key legal instruments regulating renewable energy development in Moldova. The law establishes support mechanisms for electricity produced from renewable energy sources, including support schemes, guarantees of origin, and market integration measures for renewable electricity producers (Government of the Republic of Moldova, 2016). The legislation aims to promote increased use of renewable energy sources, reduce dependence on imported fossil fuels, and support achievement of national renewable energy targets. From a sustainable finance perspective, the law is important because it creates the regulatory conditions necessary for attracting investments in renewable energy generation, including solar, wind, biomass, and other low-carbon technologies.

The governance framework for implementation and monitoring of energy and climate policies was further strengthened through Government Decision No. 10/2024 approving the Regulation regarding the Energy Governance and Climate Action Mechanism. The Decision establishes institutional arrangements and coordination mechanisms necessary for implementation, monitoring, and reporting of national energy and climate policies in accordance with European governance principles (Government of the Republic of Moldova, 2024d). The framework contributes to improving policy coordination between climate and energy sectors and supports implementation of the NECP and Moldova's broader climate commitments. From the perspective of green investments, the mechanism is particularly relevant because it improves regulatory predictability, strengthens institutional coordination, and supports monitoring of progress toward decarbonization and energy transition objectives.

Renewable energy auctions and support schemes have also emerged as important instruments for stimulating green investments in Moldova's energy sector. According to the European Commission's 2025 Enlargement Report, Moldova developed an action plan supporting renewable energy and energy storage auctions and accelerated reforms in the electricity and gas sectors despite the regional energy crisis (European Commission, 2025c). These mechanisms are designed to facilitate investments in renewable energy generation capacities, balancing capacities, and energy storage infrastructure while supporting integration of renewable electricity into the national energy system. Renewable energy auctions are particularly important

for improving investment certainty, increasing competitiveness of renewable energy projects, and attracting private capital into low-carbon infrastructure development.

The development of sustainable transport infrastructure also forms part of Moldova's broader green transition framework. According to the European Commission (2025c), Moldova has made progress in the transport sector through the entry into force of the new Railway Code, implementation of infrastructure feasibility studies, and advancement of projects linked to the Trans-European Transport Network (TEN-T). National transport and mobility policies increasingly support investments in sustainable mobility, railway modernization, electric mobility infrastructure, and transport decarbonization measures. These reforms are particularly relevant for green financing because the transport sector remains one of the major contributors to greenhouse gas emissions and fossil fuel consumption in Moldova. Investments in sustainable transport infrastructure therefore represent an important component of Moldova's long-term decarbonization and climate resilience strategy.

After the climate and energy framework, Moldova's green investment architecture is further supported by the emerging sustainable finance framework led by the National Bank of Moldova (NBM). The main strategic document in this area is the Moldova Sustainable Finance Roadmap 2024–2028, developed as a guiding document for the NBM, financial institutions and other stakeholders in developing and promoting sustainable finance in the country. The Roadmap aims to establish a clear strategic vision for sustainable finance, introduce basic sustainable finance terminology into Moldova's financial legal framework, and define priorities and actions for sustainable finance policy development (National Bank of Moldova, 2024). The Roadmap is particularly relevant for green investment because it recognizes that Moldova's financial system needs to integrate sustainability considerations in order to support a transition toward a low-GHG and more circular economy. It also states that financial institutions should manage environmental, climate-related and social risks, apply the principle of double materiality, introduce sustainable financial instruments such as green bonds and green loans, and prevent greenwashing (National Bank of Moldova, 2024). A central component of the Roadmap is the development of sustainable finance flows. The Roadmap also foresees the development of practical instruments for the financial market, including guidelines on green bonds, guidelines on green loans, capacity building for financial institutions on these instruments, and the exploration of incentives and regulations to stimulate sustainable finance flows. It further indicates that the NBM intends to include the assessment and selection of sustainable finance projects within prudential supervision and monitoring. From the ESG perspective, the Roadmap identifies environmental, social and governance factors as an indispensable part of sustainable finance. It foresees integrating ESG considerations into corporate governance regulations for financial institutions, adopting regulation requiring financial institutions to manage environmental, including climate, and social risks, and including ESG risk identification and management in prudential supervision. These provisions are relevant for green investment because they connect lending and investment decisions with environmental and climate risk management. The Roadmap also includes a transparency and market discipline pillar. Under this pillar, the NBM plans to develop ESG/sustainability reporting and disclosure guidelines for financial institutions, support awareness raising and capacity building on ESG reporting, and publish ESG/sustainability reports through a Sustainable Finance Information Hub. This is important for sustainable finance governance because transparency and disclosure are explicitly linked to market discipline and prevention of greenwashing (National Bank of Moldova, 2024).

In institutional terms, the Roadmap foresees the creation of a Sustainable Finance Working Group involving senior representatives of relevant ministries, public institutions, financial institutions and other stakeholders. This working group is intended to support implementation of the Roadmap, promote the Sustainable Finance Taxonomy, exchange information on ongoing sustainable finance actions, and clarify roles and responsibilities under the Roadmap.

Beyond climate and energy transition policies, Moldova's green investment framework increasingly incorporates circular economy, waste management, biodiversity conservation, and ecosystem restoration objectives. These sectors are particularly relevant for sustainable finance because they combine environmental protection priorities with opportunities for long-term infrastructure investments, resource efficiency improvements, and development of nature-based economic activities. An important policy direction in this regard is the promotion of a green and circular economy through resource efficiency and environmentally sustainable production models. Moldova's policy framework increasingly recognizes the need to reduce pressure on natural resources, improve waste management systems, encourage sustainable consumption and production patterns, and stimulate investments in eco-innovation and cleaner technologies. These priorities are reflected in national environmental and development strategies and are closely connected to European Union circular economy objectives (Government of the Republic of Moldova, 2024; European Commission, 2025c). From the perspective of sustainable finance, circular economy measures create investment opportunities related to recycling infrastructure, sustainable packaging, industrial resource efficiency, water reuse systems, cleaner production technologies, and environmentally sustainable business models.

The National Waste Management Strategy represents one of the central policy instruments supporting the transition toward circular economy principles and sustainable environmental infrastructure. The Strategy identifies persistent challenges related to low recycling rates, heavy reliance on landfilling, insufficient waste collection systems, and limited waste treatment infrastructure (Government of the Republic of Moldova, 2024d). In this context, the document supports investments in waste sorting systems, recycling facilities, waste treatment infrastructure, and environmentally sound waste management practices. These investments are particularly important from a green finance perspective because they contribute to pollution reduction, resource recovery, greenhouse gas emission reductions, and improved environmental performance of local infrastructure systems. The transition toward sustainable environmental governance also includes increasing attention to biodiversity conservation and ecosystem restoration. Moldova's biodiversity policy framework is closely linked to the Emerald Network and the country's long-term transition toward the Natura 2000 system in the context of European Union accession (Government of the Republic of Moldova, 2025c). These processes aim to strengthen protection and management of valuable ecosystems, habitats, and species while improving integration of biodiversity considerations into national development planning.

From the perspective of green investments and sustainable finance, biodiversity and ecosystem restoration frameworks are important because they create opportunities for financing nature-based solutions, ecological restoration, sustainable forestry, wetland restoration, climate adaptation measures, and biodiversity-friendly land management practices. Such investments are increasingly recognized internationally as essential components of climate resilience and sustainable economic development (European Commission, 2025c). In addition, Moldova's transition toward the Natura 2000 framework requires significant investments in biodiversity data collection, ecological monitoring, site management planning, institutional capacity building, and implementation of conservation measures. These processes therefore contribute to the development of a broader environmental investment framework linked to ecosystem services, natural capital preservation, and sustainable territorial development. Overall, circular economy, waste management, and biodiversity governance frameworks further expand Moldova's green investment architecture beyond the energy sector and reinforce the country's transition toward a more resource-efficient, climate-resilient, and environmentally sustainable development model aligned with European Union environmental objectives.

The green investment and sustainable finance framework of the Republic of Moldova is also shaped by the country's broader EU accession process. In this context, the National Programme for Accession to the European Union 2025–2029 represents an important strategic planning

document, as it sets out Moldova's commitments for legal approximation with the EU acquis across multiple policy areas, including financial services, sustainable finance, climate policy, energy, environment, and green transition. From the perspective of sustainable finance, the Programme is particularly relevant because it includes commitments related to the transposition of the EU sustainable finance acquis, including Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment and its delegated acts. This creates the basis for developing a national Sustainable Finance Taxonomy aligned with the EU Taxonomy framework and for improving transparency in the classification of environmentally sustainable economic activities (Government of the Republic of Moldova, 2025e). The Programme also supports institutional capacity building in the field of sustainable finance. It foresees activities such as training and awareness-raising for relevant stakeholders, as well as the development of administrative capacities needed to implement the sustainable finance framework. These measures are important because the effective implementation of taxonomy rules, ESG-related requirements, and sustainable finance instruments depends not only on legal transposition, but also on the capacity of public authorities, financial regulators, and market participants to apply the new framework in practice. At the same time, the Programme links Moldova's sustainable finance reforms with the country's broader alignment with the European Green Deal, climate neutrality objectives, and EU financial market standards. This is particularly important for green investment because EU approximation can improve regulatory predictability, reduce greenwashing risks, and support access to European and international climate finance. It also creates a more coherent framework for banks, investors, companies, and public authorities to identify, assess, and finance environmentally sustainable projects. The National Programme for Accession to the European Union 2025–2029 therefore functions as a bridge between Moldova's domestic green investment priorities and the EU sustainable finance architecture. By linking taxonomy development, ESG integration, climate policy, and financial sector reforms, it strengthens the foundation for a more transparent and credible sustainable finance market in Moldova.

2.2. Sustainable Finance Frameworks and Green Banking Initiatives

Moldova's sustainable finance framework remains at an early stage of development but has advanced considerably in recent years. One of the most important milestones was the approval of the "*Moldova Sustainable Finance Roadmap 2024–2028*" by the National Bank of Moldova in cooperation with the International Finance Corporation (IFC). Academic literature on sustainable finance suggests that ESG-oriented investments may demonstrate stronger resilience during periods of economic instability while simultaneously contributing to long-term environmental and social objectives (Ziolo et al., 2021). Sustainable finance encompasses a broad range of financial instruments and approaches, including green bonds, sustainability-linked loans, climate finance mechanisms, and ESG-integrated investment strategies. These instruments are increasingly used to mobilize capital toward low-carbon development, climate adaptation, renewable energy, energy efficiency, and sustainable infrastructure projects.

Studies in the field of sustainable finance further highlight that integrating environmental, social, and governance considerations into financial decision-making can improve risk management, enhance transparency, and strengthen institutional resilience. International experience also demonstrates that sustainable finance frameworks can support the transition toward climate-neutral and resource-efficient economies while stimulating innovation and green investment flows (Ziolo et al., 2021). These international sustainable finance trends are increasingly reflected in Moldova's financial sector reforms and regulatory approximation efforts, particularly through the development of sustainable finance policies, the strengthening of ESG-related practices in the banking sector, and ongoing alignment with European Union climate and taxonomy frameworks.

An important institutional development was the governmental approval of the Sustainable Finance Taxonomy, which establishes a national framework for defining environmentally sustainable economic activities in line with the EU Taxonomy Regulation (EU) 2020/852. The Taxonomy aims to facilitate the transition toward a green and circular economy, stimulate green investments, prevent greenwashing, and support the development of a transparent sustainable finance market.

The framework identifies six environmental objectives:

- climate change mitigation;
- climate change adaptation;
- sustainable use and protection of water resources;
- transition toward a circular economy;
- pollution prevention and control;
- protection and restoration of biodiversity and ecosystems.

International sustainable finance practice also emphasizes the role of innovative green financial instruments, including green bonds, transition bonds, sustainability-linked loans, climate bonds, renewable energy credits, green investment funds, and sustainable infrastructure financing mechanisms (Ziolo et al., 2021). These instruments are increasingly viewed as important mechanisms for mobilizing capital toward environmentally sustainable economic activities and supporting decarbonization objectives.

In November 2023, the National Bank of Moldova joined the Sustainable Banking and Finance Network (SBFN), an international platform supporting capacity-building and regulatory cooperation related to sustainable finance and climate-related financial risk management (SBFN, 2023).[4] This step reflects Moldova's increasing engagement with international sustainable finance initiatives and strengthens institutional capacities related to climate risk supervision and ESG integration within the banking sector.

According to the Memorandum on Economic and Financial Policies agreed with the International Monetary Fund (IMF), including reforms implemented under the Resilience and Sustainability Facility (RSF), the National Bank of Moldova committed to developing and implementing a national sustainable finance framework aligned with EU and international best practices (International Monetary Fund, 2023).[5] These reforms are intended to strengthen climate resilience within the financial sector, improve sustainable investment governance, and support mobilization of climate-related financing. The National Bank of Moldova also benefits from technical assistance provided by the International Finance Corporation (IFC) for the development of sustainable finance regulations, ESG supervisory frameworks, and other instruments necessary for the transition toward sustainable finance models within the Moldovan financial sector (IFC, 2024).

In parallel, national authorities plan to strengthen administrative capacities through organization of trainings and workshops dedicated to sustainable finance implementation and awareness-raising activities for relevant stakeholders (Government of the Republic of Moldova, 2025c). In order to improve transparency and public access to information, the National Bank of Moldova established a dedicated sustainable finance section on its official website, containing information regarding the Sustainable Finance Roadmap and related implementation activities. At the institutional cooperation level, a Memorandum of Understanding was signed between the Government of the Republic of Moldova, the National Bank of Moldova, and the National Commission for Financial Markets regarding the development of a sustainable and environmentally responsible finance framework. The Memorandum establishes mechanisms for interinstitutional cooperation aimed at integrating sustainable finance principles into the national financial system (Government of the Republic of Moldova, 2024).

Furthermore, on 3 July 2025, the National Bank of Moldova and the International Finance Corporation signed a Cooperation Agreement on sustainable finance, establishing the framework for technical assistance related to implementation of the Sustainable Finance Roadmap 2024–2028. The agreement focuses on two major dimensions: development of sustainable finance policies and regulations, and strengthening institutional capacities for implementation and supervision (IFC, 2025). According to official estimates, the costs associated with development of the sustainable finance regulatory framework amount to approximately MDL 770.7 thousand, of which MDL 562.7 thousand are expected to be covered by the budgets of the National Bank of Moldova and the National Commission for Financial Markets, while approximately MDL 208 thousand are expected to be financed from the state budget (Government of the Republic of Moldova, 2025c). Additional implementation costs associated with sustainable finance reforms and occupational pension-related measures are currently not fully covered and are expected to rely significantly on external financial assistance and international development support. These developments demonstrate the gradual institutionalization of sustainable finance governance in Moldova and reflect increasing convergence with international and European sustainable finance standards. At the same time, they indicate growing recognition of climate-related financial risks as an important dimension of financial sector stability, investment governance, and long-term economic resilience.

2.3. Green Bonds and Climate Finance Opportunities

Although Moldova has not yet developed a mature domestic green bond market, policy discussions regarding sustainable capital market instruments have intensified in recent years. Green bonds are increasingly viewed as potential mechanisms for mobilizing long-term financing for renewable energy, sustainable infrastructure, climate adaptation, and environmental projects.[6] The development of green bond frameworks may become particularly relevant in the context of Moldova's growing investment needs associated with decarbonization, infrastructure modernization, and EU accession-related environmental obligations. International experience demonstrates that green bonds can facilitate access to climate finance while improving transparency and accountability regarding environmental outcomes of financed projects.

At the same time, Moldova continues to rely heavily on international climate finance, concessional financing, technical assistance programs, and blended finance mechanisms provided by international financial institutions and development partners. International financial institutions and development partners, including the European Union, EBRD, EIB, IFC, World Bank, KfW, and UNDP, continue to play a central role in supporting Moldova's green transition through technical assistance, concessional financing, guarantees, and investment support mechanisms.
Consequently, strengthening domestic financial market capacity, ESG reporting systems, sustainable finance regulation, and green investment pipelines will be essential for increasing the country's ability to absorb and mobilize climate-related investments in the coming years.

3. Challenges and Barriers

Despite the growing political and institutional attention dedicated to sustainable finance and climate-related investments, Moldova continues to face a number of structural, regulatory, institutional, and market-related barriers that constrain the development of green finance mechanisms and limit the country's capacity to mobilize large-scale climate investments.

One of the main challenges remains the relatively early stage of development of the national sustainable finance framework. Although important progress has been achieved through the approval of the Sustainable Finance Roadmap 2024–2028 and the National Capital Market Development Strategy 2025–2030, Moldova still lacks a fully operational and comprehensive regulatory ecosystem for sustainable finance. Several EU regulations and directives relevant to sustainable finance, prudential supervision, ESG disclosures, sustainable investment governance,

and green financial instruments remain only partially transposed or not yet transposed into national legislation. The absence of fully developed national taxonomy rules, operational green bond standards, and standardized ESG reporting requirements continues to create regulatory uncertainty for financial institutions and investors.

The domestic capital market also remains relatively shallow and underdeveloped, limiting the availability of long-term financing instruments and reducing the capacity to mobilize domestic private capital for climate-related investments. Moldova's financial system continues to rely predominantly on traditional bank lending, while the market for sustainable investment products, green bonds, sustainability-linked instruments, and institutional climate finance remains largely undeveloped. Limited market liquidity, a relatively small institutional investor base, and the low diversification of financial instruments reduce opportunities for scaling sustainable investments. Another important barrier concerns the limited institutional and technical capacity among financial institutions, public authorities, businesses, and investors regarding sustainable finance implementation and ESG integration. Financial institutions are still in the process of developing expertise related to climate risk assessment, taxonomy alignment, ESG due diligence, and climate-related financial disclosures. At the same time, many companies, particularly small and medium-sized enterprises, face difficulties in understanding sustainable finance requirements, environmental reporting obligations, and green investment criteria. These limitations reduce the availability of bankable green projects and constrain the effective absorption of climate finance opportunities.

The lack of reliable, standardized, and accessible ESG and climate-related data also represents a major obstacle for sustainable finance development. Environmental and climate-related information remains fragmented across institutions and sectors, while methodologies for assessing climate risks, carbon footprints, environmental performance, and sustainability impacts are still evolving. The absence of harmonized ESG reporting frameworks and centralized sustainability data systems complicates risk assessment processes for financial institutions and investors and may weaken investor confidence in green financial products.

Moldova also faces broader macroeconomic and geopolitical risks that affect long-term investment predictability and increase financing costs. The country's economy remains highly vulnerable to external shocks, energy market volatility, regional instability, inflationary pressures, and climate-related risks. At the same time, the substantial investment needs associated with energy transition, climate adaptation, infrastructure modernization, and EU environmental acquis implementation considerably exceed current domestic financing capacities. Another challenge concerns the limited administrative capacity within public institutions responsible for sustainable finance governance and EU acquis transposition. The official documents indicate that only a limited number of specialists are currently directly involved in sustainable finance implementation processes, while the scale of legislative harmonization and supervisory reforms required remains substantial. Capacity constraints within regulatory institutions may therefore affect the pace and effectiveness of sustainable finance reforms.

Coordination challenges between financial regulators, environmental authorities, ministries, development partners, and private sector actors further complicate the implementation of sustainable finance policies. Sustainable finance governance in Moldova still requires stronger inter-institutional cooperation, clearer distribution of responsibilities, and more integrated policy implementation mechanisms capable of linking climate objectives with financial sector reforms and investment planning.

Finally, Moldova continues to depend heavily on international financial institutions, concessional financing, donor-supported programmes, and external technical assistance for the implementation of climate-related investments and sustainable finance reforms. While international support has played a crucial role in advancing the sustainable finance agenda, long-

term sustainability will require stronger domestic financial market development, improved institutional self-sufficiency, and greater mobilization of private capital for green and climate-resilient investments.

4. EU membership perspectives and mobilisation of green investment

Moldova's European Union accession process represents one of the most important drivers for the development of sustainable finance, climate-related investments, and green economic transformation in the country. The gradual alignment with the EU acquis, including environmental, climate, energy, financial, and sustainability-related legislation, is expected to significantly influence Moldova's investment environment, regulatory architecture, and access to international green finance mechanisms in the coming years.

The EU accession agenda is already accelerating reforms related to sustainable finance governance, ESG integration, prudential supervision, climate policy implementation, and capital market modernization. In particular, Moldova has committed to aligning its national framework with Regulation (EU) 2020/852 on environmentally sustainable economic activities, as well as with broader EU sustainable finance requirements concerning ESG disclosures, financial sector transparency, prudential risk management, and sustainable investment governance. These reforms are expected to improve regulatory predictability, strengthen investor confidence, and facilitate the integration of Moldova into the European sustainable finance ecosystem.

EU accession also creates important opportunities for increasing access to European financial instruments, climate finance facilities, and investment programmes linked to the European Green Deal and EU external financing mechanisms. As Moldova advances in the accession process, the country is expected to benefit from increased financial and technical assistance aimed at supporting energy transition, climate adaptation, infrastructure modernization, environmental compliance, biodiversity conservation, and economic resilience. In this context, EU membership perspectives may significantly improve Moldova's attractiveness for green investments by reducing perceived political and regulatory risks and strengthening alignment with European market standards.

The approximation of Moldova's environmental and climate legislation with EU requirements will also generate substantial investment needs across multiple sectors. Compliance with EU environmental acquis, including climate mitigation obligations, renewable energy targets, circular economy principles, water management standards, waste management requirements, industrial emissions regulations, biodiversity conservation measures, and sustainable transport objectives, will require considerable long-term investments. These financing needs may stimulate the development of sustainable finance instruments and increase demand for green investment mechanisms capable of supporting large-scale economic transformation.

The banking and financial sector is also expected to play a progressively more important role in supporting Moldova's green transition in the context of EU integration. The ongoing alignment of prudential regulation, ESG governance requirements, disclosure obligations, and financial supervision practices with EU standards will encourage financial institutions to increasingly integrate climate-related risks and sustainability considerations into lending and investment decisions. In parallel, the development of sustainable finance frameworks may facilitate the future expansion of green bonds, sustainability-linked lending, blended finance instruments, and climate-oriented investment products within the domestic financial market.

EU accession prospects may also contribute to improving Moldova's ability to mobilize private sector investments for climate-related projects. Greater regulatory stability, improved governance standards, stronger institutional frameworks, and enhanced transparency associated with EU integration could increase investor confidence and support the participation of

international investors, development finance institutions, and private financial actors in Moldova's green transition.

At the same time, Moldova's integration into EU sustainable finance frameworks will require significant institutional, administrative, and technical efforts. The transposition and implementation of EU sustainable finance acquis, climate-related disclosure requirements, prudential regulations, and taxonomy-related obligations will require strengthened institutional capacities, enhanced coordination between public authorities, and continued technical support from international partners. Ensuring effective implementation will therefore remain essential for translating EU accession opportunities into concrete green investment mobilization outcomes. Overall, Moldova's EU membership perspective constitutes a major strategic opportunity for accelerating sustainable finance development and mobilizing green investment. The accession process is expected to support not only legislative and institutional reforms, but also broader economic modernization, climate resilience, energy security, and long-term sustainable development. In this context, sustainable finance and green investment mechanisms are likely to become increasingly important components of Moldova's European integration trajectory and future economic transformation model.

5. Policy recommendations

To address the remaining regulatory and policy gaps, Moldova should accelerate the development of a coherent national sustainable finance framework aligned with the EU acquis. Priority should be given to the adoption of the national sustainable finance taxonomy, the full transposition of Regulation (EU) 2020/852 and related delegated acts by the planned 2026 deadline, and the development of practical guidance for financial institutions, issuers, and investors. This would help create a common understanding of what qualifies as a green or sustainable investment and reduce the risk of greenwashing.

Moldova should also continue the harmonization of banking, prudential supervision, investment, and capital market legislation with EU financial services acquis, particularly in areas related to ESG risks, sustainability disclosures, prudential governance, and sustainable investment supervision. The gradual alignment of the national regulatory framework with EU standards would strengthen financial stability, improve market transparency, and facilitate integration into the European sustainable finance ecosystem.

A dedicated regulatory framework for green bonds and other sustainable capital market instruments should also be developed. This should include eligibility criteria for green projects, reporting and disclosure requirements, external review mechanisms, and alignment with EU Green Bond standards and international best practices. Given that the National Capital Market Development Strategy already identifies green bonds as a future instrument, the next step should be the preparation of operational rules and guidance for potential issuers.

To improve market transparency and investor confidence, Moldova should progressively introduce standardized ESG and climate-related disclosure requirements for financial institutions and large companies. Such requirements should be aligned with evolving EU sustainability reporting frameworks and should support the integration of climate-related financial risks into investment and lending decisions.

Institutional capacities within the National Bank of Moldova, the Ministry of Finance, the National Commission for Financial Markets, and other relevant authorities should also be strengthened. The current level of administrative capacity remains limited considering the scale of EU acquis transposition and implementation processes required in the sustainable finance sector. Increasing the number of specialized staff, strengthening technical expertise, and establishing

dedicated sustainable finance coordination mechanisms would improve the effectiveness of regulatory implementation and supervision.

To overcome limited awareness and capacity among investors, banks, businesses, and public authorities, Moldova should establish a national capacity-building programme on sustainable finance. This programme should include training on ESG risk assessment, climate-related financial disclosure, taxonomy alignment, green project preparation, and green bond issuance. The existing plans to organize trainings and workshops on sustainable finance should therefore be expanded into a continuous institutional learning mechanism.

A stronger pipeline of bankable green projects should also be developed. Public authorities, development partners, and financial institutions should work together to identify priority investment areas, including renewable energy, energy efficiency, climate-resilient infrastructure, sustainable agriculture, water management, circular economy, biodiversity conservation, and waste management. Project preparation support, feasibility studies, and blended finance mechanisms would be essential to make these projects attractive to investors.

To diversify financing opportunities for climate-related investments, Moldova should encourage the development of additional sustainable financial instruments beyond traditional bank lending. This may include sustainability-linked loans, green credit lines, blended finance facilities, transition finance instruments, and sustainable investment funds capable of mobilizing both domestic and international capital.

To address market risks and the lack of reliable data, Moldova should create a centralized ESG and climate finance data system. This could support the collection of information on climate risks, environmental performance, emissions reduction potential, green investment needs, and project-level sustainability indicators. Better data would improve risk assessment, strengthen investor confidence, and support future green bond verification and reporting.

At the same time, Moldova should develop standardized methodologies for assessing climate-related financial risks, carbon footprints, environmental performance, and sustainability impacts across sectors. The development of reliable and harmonized ESG assessment methodologies would support financial institutions in integrating climate risks into lending and investment decisions.

Given the significant implementation costs associated with sustainable finance reforms and financial sector modernization, Moldova should continue mobilizing external financial and technical assistance from international financial institutions and development partners. Cooperation with organizations such as IFC, EBRD, EIB, World Bank, KfW, UNDP, and the European Union will remain essential for supporting regulatory reforms, institutional strengthening, capacity development, and climate investment mobilization.

Finally, institutional coordination should be strengthened between the National Bank of Moldova, the National Commission for Financial Markets, the Ministry of Finance, environmental authorities, and development partners. The existing Memorandum of Understanding between the Government, NBM and NCFM provides an important basis for this cooperation, but implementation should be supported by a clear inter-institutional action plan, defined responsibilities, and regular monitoring of progress. Sustainable finance development should therefore be approached not only as a financial sector reform, but also as an integral component of Moldova's broader EU accession process, climate transition, economic modernization, and long-term resilience strategy.

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V. CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations

The conducted research is devoted to the analysis of policy frameworks, financial mechanisms, institutional arrangements, and practical experiences related to the mobilisation of green investment in the participating countries – EU Member States Czechia, Hungary, Poland and Slovakia, and candidate countries Montenegro and Moldova. It aims to identify successful approaches, transferable lessons, and policy recommendations that can support Montenegro and Moldova in accelerating their green transition and advancing their alignment with EU environmental and climate objectives.

As it is previously noted, the project has regional relevance since its focus is on strengthening cooperation and knowledge exchange between EU Member States and Candidate Countries facing similar environmental and climate challenges. By promoting the transfer of experience from the Visegrad Group and encouraging dialogue among policymakers, experts, academia, civil society, and the private sector, the project contributes to the mobilisation of green investment, sustainable economic development, and the broader process of European integration in Montenegro and Moldova.

Recommendations from Czech Republic:

The Czech experience demonstrates that successful mobilisation of green investment depends not only on the availability of funding, but also on the quality of policy design, institutional capacity, and implementation arrangements. Stable regulatory frameworks, clear investment priorities, effective project preparation, and a combination of public and private financing instruments have proven essential for delivering measurable environmental and economic benefits. The Czech case also highlights the importance of administrative simplicity, technical assistance, and strong cooperation between national and local authorities in ensuring effective absorption of green finance.

For Montenegro and Moldova, these lessons suggest that the mobilisation of green investment should be approached as part of a broader economic modernisation and EU integration strategy. Priority should be given to building mature project pipelines, strengthening institutional and administrative capacities, and developing financing mechanisms that leverage private capital alongside national and EU resources. While solutions must be adapted to local circumstances, the Czech experience provides practical guidance on how to translate environmental and climate objectives into bankable projects, sustainable investments, and long-term development outcomes.

Pre-accession lessons learned from Hungary:

Hungary's experience demonstrates that rapid growth in green investment can be achieved when clear market incentives are combined with predictable regulation, adequate grid infrastructure, and long-term policy commitment. The transformation of Hungary into one of Europe's leading solar energy markets provides several practical lessons for Montenegro and Moldova as they advance their green transition and alignment with EU climate and energy policies.

A key lesson is that renewable energy development requires differentiated policy approaches. Residential, corporate, municipal, and utility-scale renewable energy projects operate under different economic and financing conditions and should therefore be supported through separate regulatory and financial frameworks. While households benefit from simplified procedures and targeted incentives, larger projects require transparent auction systems and long-term revenue certainty to attract private investment.

Hungary's experience also highlights the importance of creating bankable investment conditions. Competitive renewable energy auctions, market-premium mechanisms, and the gradual development of corporate power purchase agreements (cPPAs) can significantly reduce investment risk and mobilise private capital. Both Montenegro and Moldova should focus on developing transparent and predictable support schemes that provide confidence to investors, financial institutions, and project developers.

Another critical lesson is that renewable energy deployment must be accompanied by investments in electricity networks, storage, and system flexibility. The rapid expansion of solar power in Hungary demonstrated that grid infrastructure can become a major bottleneck if investments in transmission, distribution, digitalisation, and storage do not keep pace with new generation capacity. For both countries, a "grid-first" approach should therefore accompany renewable energy expansion, supported by simplified connection procedures and transparent capacity allocation rules.

Hungary also illustrates the importance of maintaining a balanced renewable energy mix. While solar energy offers substantial opportunities, long-term energy security requires complementary investments in wind energy, storage technologies, demand-side flexibility, and smart-grid solutions. Technology-neutral policies that focus on system performance rather than individual technologies can help reduce risks and improve overall resilience.

Targeted support measures should prioritise energy efficiency alongside renewable energy deployment. Rather than focusing exclusively on solar installations, public support programmes should encourage integrated solutions combining building renovation, insulation, clean heating technologies, and renewable generation. Such approaches deliver larger energy savings, reduce energy poverty, and improve the overall effectiveness of public expenditure.

The Hungarian case further demonstrates the value of predictable policy roadmaps and scenario-based planning. Governments should communicate clear medium-term policy objectives and establish transparent implementation schedules. Predictability reduces regulatory risk, lowers financing costs, and improves investor confidence.

Particularly relevant for Montenegro is Hungary's experience in managing the transition of coal-dependent regions. The transformation of the Mátra region shows that successful transition requires early planning, stakeholder participation, dedicated financing mechanisms, and a strong focus on social impacts. Montenegro could draw on these lessons when preparing the long-term transition of the Pljevlja region, including the establishment of dedicated green investment mechanisms, enhanced local participation, and the future use of ETS-related revenues to support regional development and economic diversification.

Overall, Hungary's experience demonstrates that successful mobilisation of green investment depends on a combination of predictable regulation, strong infrastructure, diversified financing instruments, and effective governance. For Montenegro, the priority is to combine renewable energy expansion with a credible coal transition and strengthened grid infrastructure. For Moldova, the priority is to integrate renewable energy deployment, energy security, and market reform into a coherent investment strategy that supports both decarbonisation and EU integration objectives.

Recommendations from Poland:

Poland's experience demonstrates that successful mobilisation of green investment depends not only on access to funding, but also on stable institutions, predictable regulation, credible strategic

planning, reliable data, and strong local participation. The Polish transition highlights both the opportunities created by EU integration and the costs of delayed structural reforms.

First, both Montenegro and Moldova should establish stable and predictable policy frameworks. Long-term investor confidence requires clear policy signals, credible implementation of National Energy and Climate Plans (NECPs), and alignment between climate, energy, and EU integration objectives. Regulatory uncertainty increases investment risk and slows the deployment of green technologies.

Second, stronger institutions are needed to prepare, finance, and monitor green investments. Poland's experience shows that dedicated public institutions and investment vehicles play a crucial role in mobilising public and private capital. Montenegro and Moldova should strengthen project preparation capacity, improve inter-institutional coordination, and develop transparent pipelines of bankable green projects.

Third, sustainable finance should be viewed as a development tool rather than merely a compliance requirement. Both countries should develop sustainable finance frameworks, strengthen climate-risk assessment capacities within financial institutions, and promote green lending, energy-efficiency financing, and municipal green investment mechanisms. Sustainable finance can help attract private capital while reducing investment risks.

Fourth, investment in climate and ESG data systems should be prioritised. Reliable information on emissions, energy use, renewable energy generation, climate risks, and project performance is essential for policy credibility, access to international finance, and effective monitoring of transition outcomes.

Fifth, energy efficiency should be treated as the most cost-effective energy resource. Building renovation, energy-efficient public infrastructure, and modern heating systems can reduce energy costs, improve competitiveness, and strengthen energy security. For Moldova, energy efficiency is particularly important for reducing import dependence, while Montenegro can use it to improve the sustainability of tourism, housing, and public services.

Sixth, both countries should accelerate the deployment of distributed renewable energy systems. Poland's experience with prosumers demonstrates the potential of decentralised renewable energy, provided that grid modernisation, storage, and system flexibility develop in parallel. Renewable energy should be viewed not only as a climate objective but also as a source of economic resilience and energy security.

Seventh, governments should avoid carbon lock-in and ensure a gradual but credible transition away from high-emission energy systems. Montenegro should prepare a clear pathway for reducing dependence on coal and support a just transition for affected workers and regions. Moldova should continue reducing dependence on imported fossil fuels through renewable energy, efficiency improvements, and stronger regional interconnections.

Eighth, climate policy should be linked to broader economic development objectives. Green investments are more likely to gain public support when they are presented as instruments for improving competitiveness, creating jobs, reducing energy costs, strengthening energy security, protecting public health, and supporting regional development.

Finally, local governments must play a central role in the transition. Municipalities are key actors in building renovation, renewable energy deployment, climate adaptation, waste management, and public engagement. Dedicated access to climate finance, technical assistance, and local project preparation support should therefore be strengthened in both countries.

Overall, the main lesson from Poland is that green investment mobilisation requires a combination of strategic vision, institutional capacity, predictable regulation, and effective implementation mechanisms. For Montenegro, the priority is to use the EU accession process to accelerate coal phase-out, renewable energy deployment, and environmental investment. For Moldova, the priority is to ensure that energy security and decarbonisation reinforce one another through greater efficiency, renewable energy development, interconnections, and social resilience measures.

Recommendations from Slovakia:

Slovakia's experience demonstrates that the success of green investment mobilisation depends not only on the availability of financial resources, but also on institutional capacity, effective governance, and the ability to convert funding into mature, implementable projects. While Slovakia has benefited from substantial EU funding, its experience highlights several lessons that are highly relevant for Montenegro and Moldova as candidate countries advancing towards EU membership.

A first lesson is the importance of strengthening energy efficiency and building renovation programmes. Residential buildings remain one of the most challenging sectors for decarbonisation, while also offering some of the largest opportunities for reducing emissions, lowering energy costs, and improving living standards. Both Montenegro and Moldova should prioritise comprehensive renovation programmes that combine energy-efficiency measures, renewable heating systems, and targeted support for vulnerable households. Financial support should combine grants with subsidised loans in order to maximise investment volumes while maintaining fiscal sustainability.

A second recommendation is to introduce policy measures that gradually prepare households and businesses for future carbon pricing. As the EU expands carbon pricing to sectors such as buildings and transport through the EU ETS II, both countries should strengthen energy-efficiency standards, improve energy performance certification systems, and provide incentives for low-carbon technologies. Early preparation can reduce future adjustment costs and increase public acceptance of climate policies.

The Slovak case also highlights the importance of simplifying administrative procedures. Experience shows that demand for green investment programmes increases significantly when application procedures are transparent, predictable, and easy to access. Reducing bureaucratic barriers, accelerating permitting processes, and strengthening project-preparation support can often generate greater results than increasing subsidy levels alone.

Institutional capacity represents another critical factor. Green investment programmes require competent public institutions capable of planning, managing, monitoring, and evaluating investments. Both Montenegro and Moldova should invest in administrative capacity at national and local levels, strengthen coordination among ministries responsible for energy, environment, climate, transport, and housing, and improve project pipeline management. Administrative investment should precede large-scale financial deployment to ensure effective implementation.
A further lesson concerns local governance. Slovakia's experience demonstrates that fragmented local government structures can limit investment capacity and reduce programme effectiveness. Both countries should strengthen inter-municipal cooperation, support regional project-development platforms, and provide municipalities with technical assistance for project preparation, implementation, and monitoring. Local governments will play a crucial role in building renovation, climate adaptation, sustainable mobility, and local renewable energy deployment.

The Slovak experience also underlines the need to move gradually from grant-based financing towards blended finance instruments. Public grants remain important, particularly in the early stages of the transition, but long-term climate and energy targets cannot be achieved through public funding alone. Montenegro and Moldova should therefore develop financing mechanisms that combine grants, subsidised loans, guarantees, energy-performance contracting, and private-sector participation. Such instruments can significantly increase investment volumes while reducing pressure on public budgets.

Finally, reliable data and monitoring systems are essential for mobilising private capital and improving policy effectiveness. Standardised energy performance data, transparent project databases, and credible monitoring systems improve risk assessment, strengthen investor confidence, and support evidence-based policymaking. Investment in data infrastructure should therefore be considered a strategic component of green transition policies.

Overall, Slovakia's experience demonstrates that the effectiveness of green investment frameworks depends less on the volume of available funding than on the quality of institutions, administrative capacity, project preparation, and financing mechanisms. For Montenegro and Moldova, the key priority is to build strong implementation systems that can transform available EU, international, and national resources into a stable pipeline of high-quality green investments. Sustainable progress towards EU climate objectives will depend not only on financial support, but also on governance capacity, policy continuity, and effective delivery mechanisms.

State of Play of Green Investment Mobilisation in Montenegro

Montenegro has made significant progress in establishing the strategic, legal and institutional foundations necessary for the mobilisation of green investment. As an EU candidate country and a contracting party to the Energy Community, Montenegro has aligned a substantial part of its climate, energy and environmental framework with European policies and international commitments. Recent adoption of the National Energy and Climate Plan (NECP), the Climate Change Law, the National Adaptation Plan and the updated Nationally Determined Contribution (NDC) has created a coherent policy framework that supports the transition towards a low-carbon, climate-resilient and resource-efficient economy.

Green investment priorities are concentrated in renewable energy, energy efficiency, sustainable transport, circular economy, climate adaptation, and environmental infrastructure. Renewable energy remains the largest investment area, supported by substantial solar, wind, hydropower, storage and grid modernisation projects. Energy efficiency investments in buildings, public infrastructure and enterprises offer important opportunities to reduce energy consumption, improve competitiveness and address energy poverty. At the same time, significant investment needs remain in waste management, wastewater treatment, biodiversity protection, climate adaptation and sustainable mobility.

Montenegro has also strengthened the financial architecture supporting green investment. Environmental and climate-related revenues are increasingly channelled through the Eco-Fund, while EU instruments, IPA funds, the Western Balkans Investment Framework, international financial institutions and bilateral donors provide important sources of financing. The country is gradually moving towards more sophisticated financing mechanisms, including emissions trading, blended finance structures, and sustainable finance initiatives designed to attract private capital alongside public resources.

Despite this progress, important challenges remain. The scale of investment needs significantly exceeds currently available public resources, requiring stronger mobilisation of private finance and more extensive use of blended financing instruments. Project preparation capacity,

administrative coordination and implementation mechanisms require further strengthening to ensure that strategic objectives are translated into mature, bankable projects. The challenge is therefore no longer primarily one of policy design, but of implementation, absorption capacity and effective investment delivery.

Montenegro has already established most of the strategic and regulatory foundations required for the mobilisation of green investment. The next phase of the transition will depend less on the adoption of new strategies and more on the ability to transform existing priorities into mature investment pipelines capable of attracting public, private and international financing. If effectively implemented, green investment can become not only a tool for environmental protection and climate action, but also a driver of economic modernisation, energy security and successful EU integration.

State of Play of Green Investment Mobilisation in Montenegro

Moldova has made significant progress in establishing the strategic, regulatory and institutional foundations necessary for mobilising green investment, despite facing substantial structural, economic and geopolitical challenges. The country's green transition is closely linked to its European Union accession process, energy security objectives, and broader efforts to modernise the economy and strengthen climate resilience. Recent reforms have accelerated the alignment of national legislation and institutions with EU climate, environmental, energy and sustainable finance frameworks, creating a more predictable environment for green investment and sustainable development.

The country's green investment agenda is driven by several interrelated challenges. Moldova remains heavily dependent on imported energy resources, with high exposure to energy price volatility and external geopolitical shocks. At the same time, climate change poses growing risks to agriculture, water resources, infrastructure and rural livelihoods. As one of the most climate-vulnerable countries in Europe, Moldova faces increasing costs associated with droughts, floods and extreme weather events, making investments in climate adaptation and resilience an economic as well as environmental necessity.

In response, Moldova has adopted a comprehensive policy framework supporting green investment. Key milestones include the adoption of the Law on Climate Action, the Integrated National Energy and Climate Plan (NECP) 2025–2030, the Environmental Strategy 2024–2030, the National Development Strategy "European Moldova 2030", and the Moldova Sustainable Finance Roadmap 2024–2028. Together, these frameworks establish long-term objectives for decarbonisation, renewable energy deployment, energy efficiency, climate adaptation, sustainable infrastructure, and environmental protection, while providing greater certainty for investors and development partners.

A particularly important development has been the emergence of a national sustainable finance architecture. The National Bank of Moldova has taken a leading role through the Sustainable Finance Roadmap, while the government has approved a Sustainable Finance Taxonomy aligned with the EU Taxonomy Regulation. These reforms are gradually introducing ESG principles, climate-risk management, sustainability reporting, and green finance standards into the financial sector. Although Moldova's sustainable finance market remains at an early stage, the institutional foundations for future development of green loans, green bonds, sustainable investment funds and climate-finance instruments are increasingly being established.

Green investment priorities are concentrated in renewable energy, energy efficiency, sustainable transport, circular economy, sustainable agriculture and environmental infrastructure. Renewable energy has become particularly important following the regional energy crisis, with solar and wind energy projects, electricity interconnections, storage facilities and grid

modernisation attracting growing investor interest. Energy efficiency investments in buildings and public infrastructure offer significant opportunities to reduce energy consumption, lower household costs and improve energy security. Sustainable agriculture, climate-resilient water management, waste management and biodiversity protection are also emerging as key areas for future investment.

Despite these achievements, Moldova continues to face significant constraints. Domestic capital markets remain underdeveloped, ESG reporting systems are still evolving, and institutional capacities for project preparation, implementation and supervision require further strengthening. The scale of investment needs for decarbonisation, climate adaptation, environmental compliance and infrastructure modernisation substantially exceeds available domestic resources. Consequently, Moldova remains heavily reliant on international financial institutions, development partners, concessional finance and technical assistance to support its green transition.

Overall, Moldova has established a solid strategic foundation for mobilising green investment and integrating sustainable finance into its development model. The next phase will depend on strengthening implementation capacity, developing a stronger pipeline of bankable green projects, expanding sustainable finance instruments, and increasing the mobilisation of private capital alongside public and international resources. If these reforms continue successfully, green investment can become a key driver of energy security, climate resilience, economic modernisation and successful integration into the European Union.

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This research demonstrates that **the mobilisation of green investment is not simply a matter of increasing financial resources**. The experiences of Czechia, Hungary, Poland and Slovakia show that successful green transitions depend on a combination of strategic vision, predictable regulation, strong institutions, effective project preparation, reliable data systems, and the capacity to attract private capital alongside public funding. While each country followed a different pathway, the common lesson is that **green investment becomes transformative only when climate, energy, environmental and economic objectives are integrated into coherent long-term development strategies**.

The comparative analysis also confirms that the experiences of EU Member States provide **valuable practical guidance for candidate countries**. Montenegro and Moldova have already established many of the strategic and regulatory foundations required for a successful green transition. However, both countries are now entering a more demanding phase in which implementation capacity, project maturity, sustainable finance frameworks, and investment absorption become more important than the adoption of new policy documents. The state-of-play assessments presented in this volume demonstrate that both countries possess significant opportunities to leverage the EU accession process as a catalyst for green investment, economic modernisation, energy security, and climate resilience.

Ultimately, the value of this research lies in its **combination of practical Member State experience and candidate-country perspectives**. By bringing together lessons from the Visegrad countries and the current realities of Montenegro and Moldova, it offers a bridge between policy ambition and implementation practice. The findings suggest that green investment should not be viewed solely as an environmental objective, but as a strategic instrument for strengthening competitiveness, resilience, social cohesion, and European integration. If the lessons presented in this volume are successfully adapted to national circumstances, both Montenegro and Moldova will be better positioned to accelerate their green transition and advance their path towards full integration into the European Union

Visegrad Fund

MONTENEGRIN PANEUROPEAN UNION

CRNOGORSKA PANEVROPSKA UNIJA

Montenegrin Pan-European Office
Moskovska 89/15, 81000 Podgorica
Montenegro
Tel: +382 (0)20 510 499
E-mail: cpaneu1@gmail.com
http://panevropa.me/
http://international-paneuropean-union.eu

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