



*Financing Strategy
for the
Macedonian enhanced Nationally Determined Contributions
to Climate Change*

Karen McClellan
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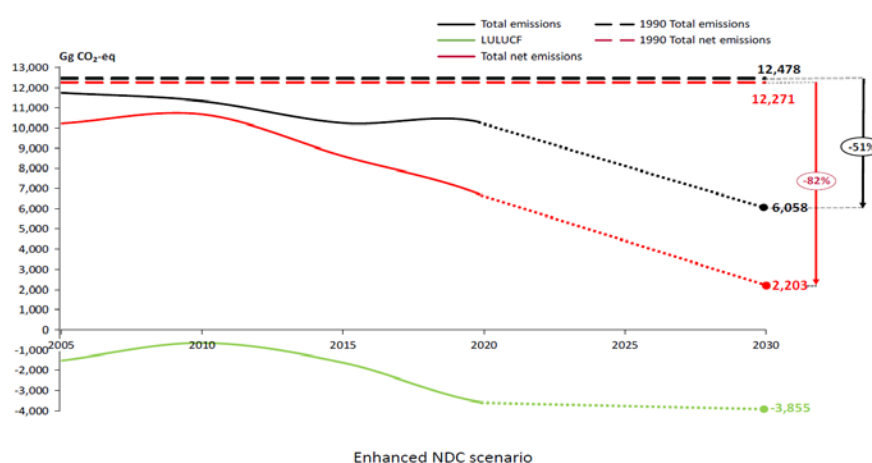
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Executive Summary

Financing requirements for the North Macedonia ENDC exceed EUR 20 billion of expenditure through 2030. The Enhanced Nationally Determined Contribution (NDC) Financing Strategy seeks to establish the most attainable financing scenario given current investment patterns and structures for the Country's largest emissions sector, energy, as well as the other sectors of waste, and forestry and agriculture. It also takes into account the fiscal implications of the COVID-19 pandemic and the need to rebuild the economy with a new source of green jobs, by prioritising those measures as part of the methodology.

North Macedonia is a non-Annex I country to the UNFCCC. Under the Paris Agreement and through its past NDCs, North Macedonia has voluntarily committed to greenhouse gas (GHG) emission reductions of 30% below 1990 levels by 2030. In its most recent Enhanced NDC, the reduction goal was raised to 51% (see Figure 1) by 2030¹. As the EU has now committed to a reduction of 55% by 2030, this ENDC – a reduction in 2030 of 7,603 kTCO₂eq/year – is compatible with the EU target.

Figure 1 Gross and Net Emission Reductions for the ENDC of North Macedonia



If GDP growth is to reach today's EU per capita GDP levels by 2040, as planned, a significant increase in energy demand can be expected. To de-couple anticipated economic growth from its emissions while transitioning to a low-emission, electricity-powered economy, an overhaul of core energy consumption and generation must take place. Accelerated development of utility scale renewable energy, grid balancing and modernisation and planning for storage as a baseload. Decoupling energy-related emissions from GDP growth poses the largest challenge and highest priority for the ENDC financing strategy.

Given limited resources, this financing strategy proposes an 8-point approach to prioritising measures, as described below.

¹<https://klimatskipromeni.mk/data/rest/file/download/93e8205fb7c315739bb8a1c732f02b6783d93b018e9c1c8fa7a0608e7a8ec184.pdf>

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

NDC measures are rated for compliance with these criteria and described in a matrix in Appendix B, which includes the relative urgency of each measure. The matrix includes mini-strategies for financing and/or implementing each measure, assessing options for private investment as well as the suitability and potential attractiveness of each action to the private sector.

Key findings on ENDC measures include the following:

- With transition from coal targeted starting in 2025, major capital investment in renewable energy and energy efficiency is unavoidable and urgent. Because such a large percentage of investment goes to energy and all its uses, this report focuses on a wide range of energy-related measures and financing approaches.
- The criteria screening indicates the need for an immediate focus on utility-scale hydro, wind and solar plants, as well as broad energy efficiency measures that offer rapid and relatively secure payback.
- The introduction of electric vehicles (EVs) will require significant fiscal and infrastructure support as well as international partnerships, as will the financing of railways.
- A cohesive approach to agriculture and afforestation using voluntary carbon markets as well as project finance structures will be critical to achieve the ENDC but is relatively less important.

Key findings on financing include the following:

- Most of the measures, except regulatory measures, can be financed through private capital.
- Sources include international blended capital structures, for-profit vehicles such as EBRD energy efficiency funds, or low-interest capital sourced from the international capital markets, such as green bonds.
- Private carbon funds and offset aggregators which develop zero emission projects in anticipation of sale of offsets and removal credits can also support these efforts, especially in the nature-based finance category.
- Large renewable energy projects already benefit from government guarantee mechanisms to offset payment risk.
- A national or regional green bank could act as a repository of capital and expertise to assist in accelerating transition.

- New technologies and projects need to be developed as “shovel ready” investor opportunities in order to create a long-term competitive advantage for North Macedonia.

The Energy sector represents the largest share of countrywide GHG emissions: fossil fuels, primarily coal, account for over 80% of the total energy supply, and create 70 pct of the national carbon footprint.² With transition away from coal targeted starting in 2025, major capital investment in renewable energy and energy efficiency is unavoidable and urgent. Because such a large percentage of investment goes to energy and all its uses, this financing strategy puts the most emphasis on a range of energy-related measures and financing approaches.

Using relevant criteria to optimise an ENDC implementation schedule yields an immediate focus on utility-scale hydro, wind and solar plants as well as broad energy efficiency measures which offer rapid and relatively secure payback. The introduction of EVs will require significant fiscal and infrastructure support as well as international partnerships, as will the financing of railways. In addition, a cohesive approach to agriculture and afforestation using the voluntary carbon markets as well as project finance, will be critical to achieving the ENDC.

Most of the measures can be financed through private capital, international blended capital structures, for-profit vehicles such as energy efficiency funds, or low interest capital sourced from the international capital markets, such as green bonds. Private carbon funds and offset aggregators which develop zero emission projects in anticipation of sale of offsets and removal credits can support these efforts, especially in the nature-based finance category. Projects should provide maximum carbon reductions while contributing to the SDGs. Further components of the strategy include large renewable energy projects which benefit from government or international guarantee mechanisms, as well as a national or regional green bank which could act as a repository of capital and expertise to assist in accelerating transition. New technologies need to be developed as “shovel ready” investor opportunities.

This financing strategy proposes a prioritisation of measures. In Section 3 we develop a methodology to implement ENDC measures according to their relative cost of carbon reductions, declining cost of technology, responsiveness to regulation, production of jobs, and other criteria. Each measure is rated for its compliance to these criteria and appears in a matrix in Appendix B. We then establish a mini strategy for the financing and/or implementation of each measure, including rating the relative urgency of each and assessing options for private investment. At a basic level, this is done by determining if the measure is likely to reduce emissions as well as generate a predictable future revenue stream, or if the government will pay private sector investors directly through a PPP concession. If annual net cash flows are insufficient or risky, a range of financial and non-financial interventions can be considered.

² In 2017, coal and natural gas-powered generation made up 69% of total electricity generation and constitutes the single largest share of GHG emissions among all major sectors.

1 Introduction

1.1 Background

North Macedonia's 3rd BUR details 46 investment actions to mitigate climate change, each of which may be implemented at an increasingly ambitious scale. The Macedonian enhanced NDC and the 3rd BUR details 46 investment actions to mitigate climate change, each of which may be implemented at an increasingly ambitious scale, WEM, WAM and WAM-e, with the basic WOM³ as a static scenario where there are no changes in current technology or economics, WEM is effectively the business as usual (BAU) scenario, and WAM is 'with additional Measures'. WAM-e implies even further cuts to emissions.

For most investment actions, the Government will not be the primary investor, but will be involved in the establishment of the frameworks for their implementation, and therefore needs a clear roadmap for prioritizing and sourcing financing. The list of activities stipulated in the TOR for this report represents a structured approach to identifying the financing mechanisms that will be essential to the implementation of emissions reductions as identified in both documents.

The Terms of Reference are as follows: 1) identify gaps in the funding which is required to deliver the Enhanced NDC; 2) provide an overview of anticipated sources of funds over time, including investment covered by donors as well as that which should come from the private sector, 3) propose criteria for prioritising measures; 4) summarize enabling incentives and policies which could make measures easier to finance, such as a carbon tax, green bond issuance, a strategic approach to carbon offsets, and other mechanisms; and 5) create a strategic plan leading to the identification of a financing 'roadmap', implying that some measures should be undertaken before others.

The strategy focuses on energy, transport, industry, waste and agriculture, forestry and land use change (AFOLU) in the context that accession talks between the EU and North Macedonia formally commenced in March 2020. It is assumed that Macedonia will align its policies with the EU and its recently renewed plans and budgets for a green economy, specifically in the targeted sectors. This Strategy for financing the Macedonian Enhanced NDC starts with a presentation of sources of financing in and of North Macedonia. It then assesses proposed initiatives in targeted sectors and subsectors as listed in the enhanced NDC before closing with more in-depth considerations regarding financing strategies.

³ WOM = Without Measures, WEM = With Existing Measures, WAM = With Additional Measures and WAM-e = WAM extended

1.2 International Policy Context

In 2015 the Paris Agreement brought together 191 Parties (195 countries) to the United Nations Framework Convention on Climate Change to focus on reducing greenhouse gas (GHG) emissions; adapting to the impacts of climate change; and providing financial assistance to developing countries for adaptation. The Paris Agreement also calls on each country to undertake emission reductions in the context of sustainable development and efforts to eradicate poverty, and, in the context of the Covid pandemic, to rebuild economies in which jobs have been lost and incomes reduced, with green infrastructure and employment. In aggregate, the success of the Agreement (and the planet's) existential climate targets will depend, in addition to designing enabling policies and projects, on Parties' adequately financing their NDCs.

1.3 Macedonia's Enhanced NDC

North Macedonia submitted an Enhanced NDC (ENDC) to reduce greenhouse gas emissions by 51% by 2030⁴ with an absolute emission reduction of 7,603 Gg CO₂-eq. Its mitigation policies and measures covering the entire economy and three greenhouse gases (CO₂, CH₄ and N₂O). The ENDC corresponds with the following sectoral non-GHG targets in 2030 stipulated in the draft National Energy and Climate Plan (NECP) (Figure 2). Prioritising the growth of carbon sinks, seeking alignment with EU market structures and regulations (including the EU's Emission Trading Scheme) and significantly ramping up solar, hydro and wind power generation capacity, in addition to retrofitting of buildings, are key to achieving ENDC goals.

Figure 2 Targeted GHG reductions in the North Macedonia ENDC by Sector

Sector	Change in Net Emissions	Direction of change
Energy ⁵	- 66%	Reduction
IPPU (Industrial processes) ⁶	+ 45%	Increase
Agriculture ⁷	- 29%	Reduction
Waste and Waste Treatment	- 21%	Reduction
Total Reduction in 2030 vs 1990	- 51%	Reduction

1.4 Impact of Covid Pandemic

COVID-19 has had a severe, negative impact on North Macedonia's economy, exceeding that of the 2007-2009 global financial crisis. Real GDP in 2020 is expected to decline by 4 percent due to a fall in domestic and external demand for goods and services, resulting in an emergency balance of

⁴ Compared to 1990 levels

⁵ Energy Supply, Residential and Non-specified, Industry, Transport. Reduction comes mainly through decommissioning of two coal-fired power plants: Oslomej in 2021 and Bitola in 2027.

⁶ Industrial processes and product use (IPPU) covers greenhouse gas emissions resulting from various industrial activities that produce emissions not directly the result of energy consumed during the process, and the use of man-made greenhouse gases in products.

⁷ Land Use, Land Use Change and Forestry (LULUCF).

payments deficit. The IMF disbursed EUR 176.5 million in emergency assistance under the Rapid Financing Instrument to help North Macedonia cope with the pandemic; this is now financing health and macroeconomic stabilization measures and enabling the country to meet urgent balance of payments needs. So far, aid has included direct support for companies and households through new spending, tax cuts or social security contributions moratoria, and public loans and capital injections and guarantees to firms in trouble. They affected fiscal accounts both partially and indirectly.

With the health, economic and employment consequences of the pandemic at centre stage, the government of North Macedonia is firmly focused on short-term recovery. Yet the recessionary crisis has created an unprecedented opportunity for public policy intervention and growth. Properly targeted, economic growth can be redirected on a more climate-friendly path.

At first analysis, COVID-19 recovery and NDCs have different goals — revitalizing economies vs setting targets and objectives to address climate change. COVID-19 recovery plans and enhanced NDCs are also complementary, however, with overlapping resources and benefits. Both play a critical role in cutting emissions, building resilience and progressing core economic and social objectives. The ENDC can thus be regarded as a template for a more prosperous future in North Macedonia, with recovery measures that catalyse climate transformation and support more ambitious NDCs in the future. Further reduction targets may emerge ahead of the UN climate talks at COP26 in late 2021.

2 Policy and Institutional Frameworks Supporting Financing

2.1 Policy Background

Raising nearly EUR 20 billion of financing will require the twin institutional engines of sectoral deregulation and commercial incentives, both indispensable when transitioning away from fossil fuels. Carbon pricing (e.g. the proposed carbon tax); integration of regional energy markets; strengthening of SMEs (particularly those involved in retrofitting, construction, and third party finance); access to international investment; support of research and innovation; and new regulations ranging from reducing car pollution from outdated vehicles to soil preservation on sloping land will all play a part in financing the ENDC.

Most measures in the ENDC involve infrastructure investment. As part of the EU Accession process and as a member of the Ministerial Council of the Energy Community (EnC), North Macedonia was the first to produce a national energy and climate plans (NECP) in the Energy Community, an organisation which integrates the EU and its neighbours to create a pan-European energy market. Its planned Law and Strategy on Climate Action is also informed by the EU's 2030 Climate and Energy Framework, the Strategy for Energy Development of North Macedonia until 2040 and the ENDC.

The ENDC reflects the “Green Scenario” from the National Strategy for Energy Development up to 2040, which integrates climate and environmental aspects into the recommended measures and enables overall energy sector modernisation and transformation. The ENDC complies with the

following sectoral policy targets (Figure 3), which constitute an institutional framework for a platform for green finance in North Macedonia.

Figure 3 Summary of Climate-related Policies and Commitments

Policy	Target
Renewable Energy	<ul style="list-style-type: none"> • 38% share in gross final energy consumption • 66% share in gross electricity production • 45% share in energy for heating and cooling • 10% in final energy consumption in transport
Energy Efficiency and Energy Performance of Buildings Directives and Regional Energy Efficiency Program (REEP Plus)	<ul style="list-style-type: none"> • 21% savings of energy consumption relative to BAU • 35% savings of primary energy consumption
Draft National Energy and Climate Plan (NECP) long term (2040) goals:	<ul style="list-style-type: none"> • 62 % reduction of GHG emissions vs. 2005: • 45 % of RES in gross final energy consumption: • 51.8% primary, 27.5% final drop in energy consumption
Energy Law Law on the Railway System	<ul style="list-style-type: none"> • Regulations on low carbon fuels • EV subsidies
Other Policies and Mitigation Action	<ul style="list-style-type: none"> • Carbon pricing • Pursuing regional energy markets integration • Strengthening the role of SMEs • Research and innovation and other measures.

These policies show the progress which is required to attract more foreign direct investment in infrastructure. Energy and transport are central to reducing North Macedonia's GHG emissions and constitute important areas of focus for EU Accession. Infrastructure investment must be rapidly accelerated, however, as over the past decade North Macedonia's investment in infrastructure as a percentage of its budget has been the smallest in the western Balkans, at 6.2% in 2018, down from 10.8% in 2008. This is important because EU funding will be targeting green infrastructure due to its Green Deal, a EUR 750 billion European recovery package and the EUR 1 trillion "Green Deal" budget, which will be spent only on projects that meet certain green criteria. Twenty five percent of all funding in the Green Deal will go specifically to climate change mitigation. Disbursements, taxonomy and grants are accelerating from this program.

General Incentives for Strategic Investment

North Macedonia's adoption of the Law on Strategic Investment (SIP) intends to encourage, attract and create conditions for conducting strategic investments and will be of great importance to its ability to attract capital for the energy transition.⁸ It defines investments as strategic if they are:

- at least EUR 100 million on the territory of at least two or more municipalities;
- at least EUR 50 million in the municipalities with seat in a city, municipalities in the City of Skopje, and the City of Skopje; and
- at least EUR 30 million in municipalities; or
- are conducted and financed in collaboration with the European Union, international financial institutions or the Ministerial Council of the Energy Community.

⁸ Law on Strategic Investments

Strategic investments must be in line with the strategic priorities of North Macedonia, including energy and infrastructure, transport and telecommunications, manufacturing, agriculture, forestry and water economy, and wastewater and waste management. Strategic investments will materialize through public calls for applications for determining the status of a strategic investment project enabling the Government to conclude an agreement with the strategic investor. The agreement with the Government, among others, should contain the assumed rights and obligations of the parties and deadlines for their realization including state aid, subsidies, tax breaks, and other benefits, all of which must be in accordance with the Law on State Aid Control.

With this instrument the Government is firmly in the position to create financial conditions for large scale infrastructure investment. It may devise, within limits, subsidies, write-off or takeover of debts, exemption, reduction or postponement of taxes, and granting loans and guarantees under favourable conditions. The Law on Strategic Investments optimises conditions for foreign investment, assuming it complies with environmental standards and strategic priorities.

Priority areas for the SIP are energy and infrastructure; potential investors in renewable energy will uniquely benefit from the SIP designation. With multiple, low-risk investment opportunities in sight, investors could initiate a large new investment cycle, positively impact the Country's competitive advantages and economic growth.

Appendix A contains a list of measures used around the globe to encourage green finance, and lists the Republic of North Macedonia's progress in the adoption of many of these regulations.

2.2 Policies supporting Investment in the Energy Sector

Renewable Energy Generation

As mentioned, investment in the Energy Sector (including Transport) comprises the large majority of the ENDC financing requirements. North Macedonia was the first among Western Balkan nations to begin phasing out coal,⁹ responsible for half of energy generation, and many of the required policies are in place to attract private capital to alternative energy generation. The Action Plan for Renewable Energy Sources and the National Energy Efficiency Action Plan (NEEAP) constitute a foundation for modernisation and competitiveness.

North Macedonia's energy policy aims to decrease the state-owned share of the market from 80% to 30% by 2025, igniting demand for IPPs which can compete in power generation with long term power purchase agreements. Similar regulations have stimulated a rapid transition to green energy in other countries in Europe.¹⁰ IPPs need not be entirely privately financed, owned or operated, as

⁹ State utility ESM will sideline the first unit of coal-fired REK Bitola within five years and convert it to a 250 MW natural gas power plant; lignite is to be phased out in North Macedonia – starting with REK Oslomej

¹⁰ Across the EU, the share of renewable energy in gross final energy consumption has increased over recent years from 9.6% in 2004 to 18.9% in 2018. The five EU countries with the largest share of their energy coming from renewable energy sources are Sweden, Finland, Latvia, Denmark and Austria. Moreover, according to the EU, renewables are currently the leading source of electricity generation in the EU.

North Macedonia is already taking advantage of long-term public financing from development banks such as the EBRD, and this will increase significantly in the future.

Energy Efficiency

In North Macedonia, up to half of a typical family's income can be spent on energy costs, according to Habitat Macedonia, which is helping to retrofit post war housing stock in the country. The Government is adopting a binding energy efficiency scheme to achieve savings in final energy consumption. The Energy Efficiency Directive, the Energy Performance of Buildings Directive and a framework for labelling of energy consumption appliances were all adopted in 2020, and preparation of secondary legislation on energy consumption labelling and eco design is underway with assistance from USAID.

Large scale energy efficiency financing can be kickstarted with State-sponsored tools such as energy audits for buildings, and industrial and commercial operations. UNOPS is providing grants for preparation of a rulebook for energy audits for large enterprises. Under the Regional Energy Efficiency Program (REEP Plus) the government has requested EBRD aid for preparation of a package by-laws for commercial buildings. Hence, significant aid has assisted these initiatives in the form of international grants and expertise, which should prime the well for private investment. Distribution system operators and/or suppliers will then implement these demand side measures. Technical assistance from HABITAT has been provided for a typology for buildings in accordance with the TABULA methodology, and this will become part of the Strategy to 2030 for the Reconstruction of Housing, Public and Commercial Buildings.

Transport

In line with economic development, fuel consumption per person is increasing. If proposed measures are not put in place, the sector could become an impediment to reaching the overall RES share in gross final energy consumption.¹¹ The share of renewables in transport remains negligible¹², but faces a steep target of 17% by 2030. Provisions related to the sustainability of biofuels are still underway and the legal framework remains non-compliant with Directive 2009/28/EC. However, this target could still be achieved as a result of biofuel additives as well as electrification of transport.

Clean transport regulations are dominated by improvement of fuel standards and public transport (electric buses and railways) as well as the renewal of the national fleet. The new Energy Law sets requirements for national standards for fuel quality and obliges the Ministry of Environment to adopt regulations on low carbon fuels. For light vehicle emissions, Regulation 443/2009 will establish a database of the vehicle fleet and its fuel economy. Increasingly tough fuel standards along with incentives for electric vehicles should accelerate the market for EVs, impacting fleet and individual purchase decisions. However, there is no immediate opportunity for private investors until EVs become more prevalent, as charging infrastructure represents a chicken and egg-type barrier to entry. This could be addressed through public private partnerships with large energy or engineering companies seeking EU market share in charging infrastructure.

¹¹ Austria has the highest share of RES in transport fuel in the EU, at 10%

¹² 0.12% in 2018

Public transport is also to be financed through fiscal mechanisms: rail transport is regulated by the Law on the Railway System, originating from the National Transport Strategy (2007 – 2017), and a new three-year national program for railway infrastructure financing has been adopted.

2.3 Policies supporting the Waste Sector

A coherent national policy promoting municipal waste recycling has not yet been developed and there are no investment programmes aimed at creating the necessary infrastructure at the municipal level. Most municipal disposal sites are not regulated or licensed, leading to a vast number of illegal dumpsites. Additionally, there are many industrially contaminated hotspots, as two thirds of waste is generated in the mining sector. No integrated regional waste management system, which would increase investments in waste separation and recycling, exists. Such a system is a priority and investments need to increase, particularly those focusing on waste separation and recycling.

Two pieces of regulation may help the sector forward: 1) a regulation that mandates flaring will create a baseline for landfill owners in terms of costs; and 2) landfill gas-based power production with a specific feed-in tariff. For the ENDC, no law yet provides for monitoring and reporting on waste measurement for GHG emissions, however, a Law on Waste Management is being drafted. Past targets for the reduction of biodegradable waste were as follows: 25 % reduction of biodegradable waste going to landfill by 2017, 50 % by 2020 and 65 % reduction by 2027. The Ministry of Environment and Physical Planning collects waste sector data on Solid Waste Disposal, Biological Treatment of Solid Waste, Incineration and Open Burning of Waste and Wastewater Treatment and Discharge. Compliance and enforcement are not adequately developed. Two Instrument for Pre-accession Assistance (IPA)-funded projects were started at the end of 2015, one related to a feasibility study, environmental impact assessment (EIA) and tender documentation for establishing a waste management infrastructure for the north and north-east regions, and the second related to the preparation of regional waste management plans, feasibility studies, EIA and tender documentation for establishing a waste management infrastructure for four waste management regions: Vardar, Pelagonia, Southwest and Skopje regions.¹³

Despite the lack of an institutional framework, it is possible to attract financing of landfill gas-to-energy projects with a concession as well as a PPA. The production of methane from anaerobic digestion, a very destructive GHG with 23 times the global warming potential of CO₂, can become the basis for projects which can be financed from carbon offsets as well as the sale of electricity.

The Macedonian government has recently approached the EBRD to support regional waste management investment in the area of EUR 50 million for 4 to 5 regional landfills.

2.4 Industrial Products and Processes Use (IPPU)

The IPPU sector is captured in energy efficiency measures, electric motors, lighting and smart commercial building measures. Yet there are many more technological innovations for industrial

¹³ <https://www.eea.europa.eu/themes/waste/waste-management/municipal-waste-management-country-profiles/north-macedonia-municipal-waste-factsheet-2018>

processes; output is expected to grow significantly, with emissions from sectors such as metal production continuing to rise. Decarbonisation of the industrial sector has been one of the harder areas to impact around the world; significant R&D is now being applied to low carbon building materials; green cement and steel; heat capture, methane flaring and other processes.

In North Macedonia, a CO₂ tax is planned for introduction in 2027, with an increase of 68% in 2040 compared to 2027. For the calculations of the NDC, it is envisioned that the CO₂ tax could be introduced much earlier, i.e. in 2023, with aggressive increase of four times in 2040. This will affect the scope 1 and 2, and to some extent scope 3 emissions of local producers, who will also be governed by emission caps under the EU ETS at some point. Investment into the reduction of industrial emissions is likely to be made by the companies themselves, including in reaction to the Law on the Environment, which regulates industrial plants and installations.

2.5 Policies Around Forestry and Other Land Use

With ownership of 90% of the forest lands, the State represents the biggest driver of change in national forestry practices, which determine whether forests and forest lands are developed to capture more carbon, offsetting emissions from other productive sectors of the economy. Forests and forest lands are the main CO₂ sinks in Macedonia, except during forest fires. Forests are characterised by a high level of species diversity but low quality and levels of annual growth. The total wood reserve is estimated at around 70 million m³, with forests covering 40% of land mass.

North Macedonia has established a sound legal framework for nature protection that is aligned to the EU legislation. As an EU candidate it has ratified all relevant international agreements for nature, participates in the most pertinent meetings and complies with the relevant international reporting obligations. The Government has committed to providing the regulatory, institutional and economic frameworks for sustainable forest management and ensuring permanent financial mechanisms to improve the status of forests and the development of the forestry sector. These regulations must be combined with technology to increase the sequestration of carbon in the country's forests.

3 Sources of Investment Funding for the ENDC

3.1 Analysis of Past Flow of Funds

In this section we outline the sources of climate finance to date in North Macedonia, both over the last decade and the most recent reporting years of 2018 and 2019. We analyse climate finance from all international sources to assess the presence of donors in the region and their priorities. These sources include the EU as well as bilateral and multilateral financial institutions and funds.

Current vehicles and mechanisms to support blended finance related to climate in North Macedonia and Southeast Europe to create a snapshot of current and near- to medium-term options are reviewed. These include debt finance (senior loans and bonds), equity financing and loan guarantees, plus third-party financing. Finally, we look at opportunities for foreign direct investments by sector in North Macedonia and Southeast Europe.

3.2 Recent Emergency Aid

COVID-19 has taken a major toll on the North Macedonian economy. Its economic outlook deteriorated substantially in 2020, with real GDP expected to decline by 4 percent due to a fall in both domestic and external demand for goods and services, resulting in an urgent balance of payments deficit. As a result, the IMF disbursed € 176.53 million in emergency financial assistance for help with the pandemic. Classified as immediate disbursement aid under the Rapid Financing, this support is financing health and macroeconomic stabilization measures and meet the urgent balance of payments needs arising from the COVID-19 pandemic. It is hoped that this will also catalyze support from the international community, especially donors to Southeast Europe.

3.3 Climate-related Aid

North Macedonia is a candidate country for accession to the EU; its draft negotiating framework was presented to Member States in July 2020. It is of no surprise therefore that the EU has been the largest provider of financial assistance, including €1.25 billion in EU pre-accession funds from 2007-2020, €749 million in European Investment Bank loans since 1999, and €180.1 million provided since 2009 in the form of Western Balkans Investment Framework grants, leveraging investments of an overall estimated €2.1 billion.¹⁴ Of this assistance, the largest expenditure has been for environmental improvements and energy generation and distribution.

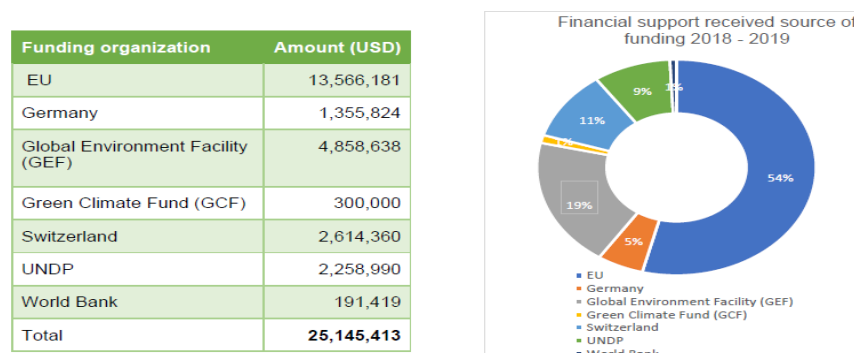
In the period from 2015 to 2020, 297 climate-related projects in North Macedonia were funded with international support to beneficiary institutions estimated at USD 127 million, for 103 climate-related projects. (Total international support with national co-financing received during this period is estimated at USD 719.6 million, for 182 climate-related projects under IPA I, III, CBC, Balkan Med and H2020). Of these 297 climate-related projects, 198 projects are climate specific (CS) projects, accounting for as much as USD \$661.3 million, or nearly 79% of the total support received. The

¹⁴ https://wbc-rti.info/mobile/object_view/20241 EU Archives: North Macedonia Funding overview including H2020

remaining \$185.4 million, or 21 %, relates to climate relevant (CR) projects. ¹⁵ North Macedonia is a beneficiary of funds from the EU Instrument for Pre-Accession Assistance. For these EU IPA funded projects, which relate to funding two or more countries, the amount committed / spent for each project is estimated.

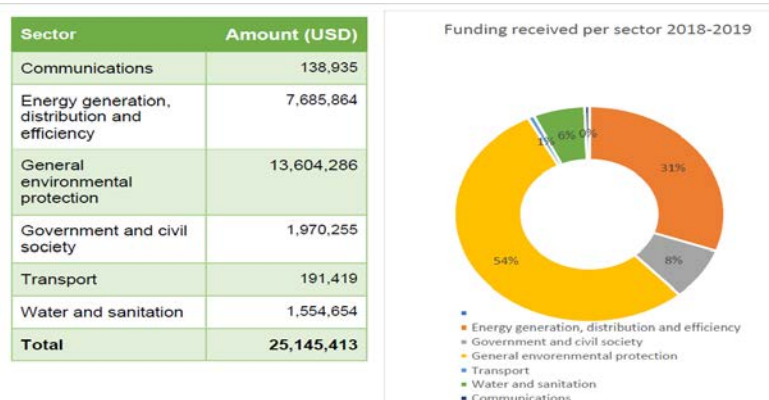
Most of the support received has been for financing at project level, and the data covers all active and ongoing projects, most by the amounts received and spent in this two-year reporting period. Below is the financial support received in 2018-2019. As shown in Figure 4, the largest share, 54%, is the support received from IPA cross-border cooperation funds, known as the Regional Development Operational Programme, which concentrates on the transport and environment sectors. The second largest provider is the Global Environment Facility (GEF) of 19%, followed by Switzerland at 11%.

Figure 4 Financial Support Received per Source of Funding, 2018-2019



The uses of these funds is shown in Figure 5 below. The vast majority (85%) goes to general environmental protection and energy (distribution and efficiency).

Figure 5 Uses of Green Finance in Northern Macedonia, 2018-2019



¹⁵ The Republic of North Macedonia is a beneficiary of funds from the EU Instrument for Pre-Accession Assistance. For these EU IPA funded projects, which relate to funding two or more countries, the amount committed / spent for each project is estimated.

Figure 6 shows an aggregation (not complete) of specific funding programs for climate change mitigation and adaptation purposes.

Figure 6 Sources of Funding for Green Finance in North Macedonia¹⁶

Sources	Uses	Indicative Amounts (million)
Domestic Sources		
City of Skopje	City of Skopje - Climate finance for 2018 and 2019 (37 Climate Change projects.)	US \$5.6 ml
International Sources 2018-2019		
<i>Support to the RNM committed/received 2018 – 2019 (98.8% grants)</i>		
EU		13.566
Germany		1.355
GEF		4.859
GCF		.3
Switzerland		2.614
UNDP		2.259
World Bank		1.914
Total		US\$ 25.14 ml
Bilateral Banks		
EBRD	Loan to public utility ESM for implementing a 30 MW solar photovoltaic ("PV") project. ¹⁷	€ 25 ml
EBRD loans to home-owners for insulation, boilers, windows and lighting:	Loan to Ohridska for residential energy efficiency, 2020, under GEF.	€ 2.5 ml
Kreditanstalt fuer Wiederaufbau (KfW):	Loans to JSC Power for 2 projects: Distrt Heating of Bitola, Mogila, Novaci Bogdanci Wind Park phase II	€ 39 ml € 18 ml
GEF, GCF, Adaptation Fund		€ 70 ml
GEF ¹⁸	National projects Regional Projects : \$ 1.5 ml, bio-diversity \$2.0ml,climate, \$2.6 ml, land degradatn	\$25.3 ml \$125.9 ml
	Total funding of GEF projects (grants) Levering co-financing of:	US\$ 39.5 million US\$ 322.4 million.
GCF	Green Cities Facility, nine countries	
Other multilateral Aid		
USAID 2012-16 Municipal Climate Change Strategies Project	Milieukontakt Macedonia Adaptation to Climate Change in Agric. Rural Development Network of RNM	\$2.8 ml \$1.6 ml
FDI and private investment		
Foreign Direct Investment ¹⁹ manufacturing and greenfield projects	2017 2018 2019	\$205 ml \$725 ml \$365 ml

¹⁶ Climate specific (62%), 21 projects or climate relevant (38%), 17 projects.

¹⁷ Loan consisting of: (i) a 10MW "Oslomej" expansion (currently under construction) on the exhausted coal mine of TPP Oslomej, and (ii) a 20MW "Bitola" expansion adjacent to TPP Bitola.

¹⁸ The GEF Small Grants Programme is active in North Macedonia by providing financial and technical support with small grants that conserve and restore the environment in sustainable development areas.

The financial mechanism under the UNFCCC Convention provides financial resources (grants and lending instruments) to assist countries in transition to meet the objectives of the international environmental conventions and agreements. There are two operating entities of the financial mechanism:

Global Environment Facility (GEF)

North Macedonia received grants of US\$ 154.2 million from the GEF since its inception and co-financing of US\$799.3 for 23 national projects, 14 regional and 4 global projects. For 2014-2020, 5 national, 3 regional and 1 global projects were approved under the GEF-6, managed under implementing agencies UNDP, UNEP and EBRD and 1 regional project under the GEF-7 (2018-2022) under implementing agency EBRD. These include 4 projects in climate change, 2 in biodiversity, 2 in land degradation, 1 in chemical and waste and 1 in multi-focal areas. The country has an indicative allocation of US\$ 6.1 million to execute projects: US\$ 1.5 million in biodiversity, US\$ 2.0 million in climate change and US\$ 2.6 million in land degradation.

Green Climate Fund (GCF)

GCF is currently active in North Macedonia through just one regional project, the Green Cities Facility, with nine beneficiary countries. The project main goal is to enable the transition of the cities, urban areas with about 70% of the global energy consumption and about 75% of emission, to low-carbon, climate-resilient urban development with minimized environmental impact and maximized support to natural environment through including energy efficiency in building, transport, waste reduction, water management and green planning. The project realization framework is October 2018-September 2034. The total value of this worldwide project is \$585 million, with the EBRD acting as accredited entity for technical assistance, and includes total GCF financing of \$95.9 million, a \$24.3 million grant and \$71.6 million loan. GCF is seeking to fund further climate change adaptation and mitigation projects. It recently submitted an open call for project ideas through its website (greendevlopment.mk) as a key communication tool for knowledge and information sharing on the GCF activities in North Macedonia. Its priority areas include energy, transport, water resources, agriculture, waste, biodiversity, health, forestry, and cultural heritage.

Economic and Investment Plan for the Western Balkans

The European Commission has now approved the Economic and Investment Plan for the Western Balkans, which aims to accelerate the long-term economic recovery of the region, promote a green and digital transition and enable regional and EU integration. The EU has announced that it will mobilise up to €9 billion of funding for investment flagships in the areas of transport, energy, green and digital transition, to create sustainable growth and jobs. The Plan also offers a path for a successful regional economic integration to help accelerate converge with the EU and close the development gap between regions, ultimately speeding up the process of EU integration.

The Green Agenda for the Western Balkans

The Green Agenda for the Western Balkans will inform the Investment Plan. It was included in the Communication on an Economic and Investment Plan for the Western Balkans adopted by the European Commission. It details the five pillars of the Green Agenda for Western Balkan countries,

¹⁹ UNCTAD [2020 World Investment Report](#).

including (1) climate action, ie decarbonisation, energy and mobility, (2) circular economy, addressing in particular waste, recycling, sustainable production and efficient use of resources, (3) biodiversity, aiming to protect and restore the natural wealth of the region, (4) fighting pollution of air, water and soil and (5) sustainable food systems and rural areas. Digitalisation will be a key enabler for the above five pillars in line with the concept of the dual green and digital transition.

Assistance from these sources is a key source of financing for the Enhanced NDC.

R&D Support

EU Competitive Programmes, one of the EU funding mechanisms, are financed directly from the EU's budget in the form of grants and are managed centrally by the European Commission. Participants are from Programme Countries (28 Member States and EFTA/EEA Countries) and partner countries (third countries and pre-accessing EU candidate and potential candidate countries). EU mechanisms fund projects in line with the EU's focus of research, development, innovation and technology transfer related to climate change: Horizon 2020, COSME, CEF, LIFE, Erasmus+, IPA. Follow sections of the Report will give overview of EU financial mechanisms and key funding opportunities to support research, development, innovation and technology transfer projects related to climate change, available for accession phase countries such as North Macedonia.

3.4 Financing Gaps

Resources currently available from the EU and other international/bilateral sources are far from sufficient to accelerate GHG reduction measures in North Macedonia, yet much of the EUR 20 billion will have to come from international aid organisations and banks, for example, with loans and grants for energy and energy efficiency infrastructure from the EBRD, renewable energy finance from the EIB and natural capital projects from the FAO.

To achieve a climate-neutral Europe by 2050, the EU has adopted new financing tools in the form of equity and debt investment, credit enhancement programs and sector-specific funds blending infrastructure debt, as well as targeted and start-up and growth equity. The proposed Carbon Border Adjustment Mechanism will help reduce the risk of carbon leakage and ensure a level-playing field by encouraging EU partners to raise their climate ambition. In addition, the EU is proposing measures to implement a circular economy action plan and biodiversity strategy. Significant funds will be made available to North Macedonia for these initiatives.

A large part of the total budget is anticipated to come from the private sector (see Figure 7), but this will not happen on its own. Climate change mitigation is challenging as it requires systemic change, ie disruption of business as usual practices in many parts of the economy. It requires not only an alteration of existing infrastructure due to widespread introduction of zero carbon technology, but also adaptation and extension of traditional financial markets and financing tools.

Figure 7 Expected Sources of Funding for ENDC

Source of Funding		Total amount (ml EURO)	%
Energy	All	24,863	100%
	Government ONLY	925	4%
	Other source of financing ONLY (No government)	10,527	42%
	Mixed financing (government +private sector, donors, consumer)	13,411	54%
Agriculture	All	110	100%
	Government ONLY	0	0%
	Other source of financing ONLY (No government)	110	100%
	Mixed financing (government +private sector, donors, consumer)	0	0%
Waste	All	58.6	100%
	Government ONLY	0	0%
	Other source of financing ONLY (No government)	58.6	100%
	Mixed financing (government + private sector, donors, consumer)	0	0%
Total	All	25,031	100%
	Government ONLY	925	4%
	Other source of financing ONLY (No government)	10,696	43%
	Mixed financing (government + other (private sector, donors, consumer)	13,411	54%

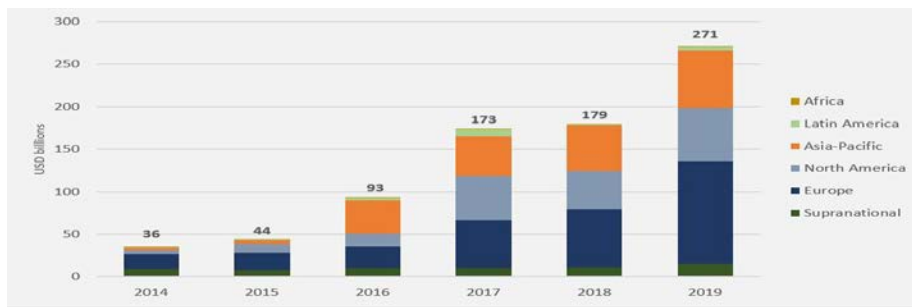
3.5 Climate Finance from Green Bonds

North Macedonia can benefit from a growing, global determination among institutional investors to invest the world’s capital to work for climate change mitigation. One way to tap into this opportunity is through the green bond market, which started a little over a decade ago with the EIB’s first issuance of a Climate Awareness Bond in 2007. EUR 600 million was allocated to 14 renewable energy and energy efficiency projects. Since then, the market has grown substantially (Figure 8), particularly in the past 5 years. It offers significant growth potential to transitioning countries like North Macedonia.

By bridging the gap between providers of capital and green assets, green bonds help to reduce the cost of finance to meet climate targets. Like conventional bonds, green bonds allow the bond issuer to raise funds for projects or ongoing businesses; the “green” label indicates that the capital raised will be used to finance environmentally beneficial projects, and this is closely monitored.

Along with the growing amount of capital raised, the market has expanded to include a growing variety of issuers – the majority from Europe, then North America, and increasingly from Asia-Pacific, Latin America and Africa. Issuers and currencies in which green bonds are offered have also seen diversification. Green bonds are now issued by public and private institutions, including governments, government agencies, private corporations and financial institutions. In North Macedonia, green bonds could be used to raise long term, low interest rate capital with which to finance renewable energy, natural capital solutions such as carbon sequestration, etc. Structuring green bond exchange risk, monitoring and transparency will receive support from international aid.

Figure 8 Annual Green Bond Issuance 2014-19 USD billions



Source: IRENA analysis, based on data from the Environmental Finance Bond database (subscription required)

An example of a potential green bond project is hydropower. New certification tools are available to developers and operators that want to raise funds via green bonds. The International Hydropower Association (IHA) has stated that the hydropower criteria introduced by the Climate Bonds Initiative under the International Climate Bonds Standard clears the way for significant green investment in sustainable hydropower projects. Planned and finished hydropower projects of all sizes will be eligible for financing provided they meet strict qualifying criteria. According to the IHA,

“CBI’s new climate bonds standard criteria now clears the way for significant additional investment in sustainable hydropower. It provides the clarity and assurance that investors, governments, the industry, as well as local communities, have demanded for years. To qualify, new and existing projects must now assess their environmental, social and governance (ESG) performance and report a low carbon footprint.”²⁰

This is a good model for financing other types of low-risk renewable energy projects. A number of debt issuers have already sold green bonds to finance or refinance hydropower projects.

3.6 International Climate Finance

The ENDC assumes access to a large amount of international climate funding. A limited number of international funds allow direct access, including the Green Climate Fund, the Adaptation Fund, the Global Environment Fund and the European Commission Directorate-General for International Cooperation and Development. Direct access involves national or subnational institutions directly receiving finance from funding sources and disbursing them to relevant projects, i.e. without an international agency managing and overseeing the funds as an intermediary. Each fund has different accreditation requirements for institutions seeking direct access, including demonstrating capacities such as financial and administrative management, monitoring and evaluation (M&E), project management, gender mainstreaming and equity, and environmental and social management.

North Macedonia should screen a selection of national and subnational institutions against the accreditation requirements for the relevant fund or funds, to identify potential eligible institutions and establish what is required to fully meet the accreditation requirements. The next step is to develop a project pipeline and put forward funding proposals so that finance can be accessed.

²⁰ <https://balkangreenenergynews.com/climate-bonds-initiative-rolls-out-criteria-for-sustainable-hydropower/>

3.7 Attracting Private Capital

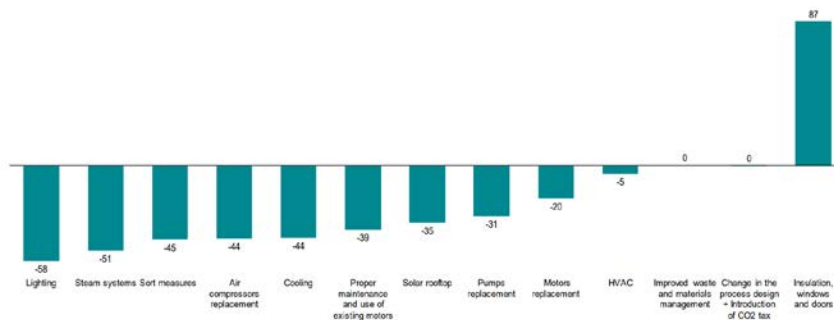
The requirement for new renewable power projects is €5.6 billion through 2030, a huge increase over what has been invested to date. Additional funding will need to augment national budget allocations, buy down technology risk, access low-cost infrastructure capital, pay for grid balancing and storage, finance energy efficiency vehicles, and guarantee long term PPAs from energy companies. While North Macedonia is behind in its conversion to renewable energy, its late arrival can work to its favour, as the declining cost of technology, the availability of international “green capital,”²¹ and a coming carbon tax will reduce or eliminate the fiscal burden of on-grid feed in tariffs. These factors have already contributed to new international and private sector investment. Section 4.3, coupled with the recommendations in Section 5, include ways of attracting private capital to fund the ENDC.

4 Funding the ENDC

4.1 Evaluating and Prioritising Mitigation measures: Methodology

To create a useful financing strategy, it is necessary to prioritize ENDC measures. Initial criteria for prioritisation should include their affordability, ie cost in Euros per tonne of CO₂-equivalent, as well as contribution to reduction targets. It is estimated that 70% of reductions can be achieved with negative costs, or “win-win” actions.²² An additional 20% of the reductions are realized by measures with specific costs in a range from 0-5 Euros per tonne of CO₂-equivalent.²³ Specific costs for carbon avoidance are shown in Figure 9.

Figure 9 Specific Costs projected for 2030 (€/t)



Yet targeting lowest cost abatement technologies is not the same as choosing the most viable mix of measures for the reduction targets. *How can a financing strategy be developed which maximises the chances of success of reaching abatement targets in each sector?* One approach would be to decide on criteria to evaluate and prioritise measures, forming a methodology to optimise national

²¹ According to Moody’s Investor Services ESG group, global sustainable finance volumes will approach \$ 425 billion in 2020, with \$ 250 billion in green bonds alone.

²² I.e. measures reduce emissions by negative specific costs, meaning that expenditures cause an immediate cost savings.

²³ GHG emission reduction does not include the impact of a future CO₂ tax, which may fuel measures for RES, energy efficiency, fuel switching etc.) that will become viable when greenhouse gases are priced according to their damage to the environment.

development policy, promote investment attractiveness to the private sector, accelerate investment, and attract finance, including carbon finance. Eight possible criteria are described below:

1. Invest first in those sectors which contribute the most to NDC emission targets

Measures have been developed in the following sectors, Energy (Energy Supply, Residential and Non-specified, Industry, Transport) Agriculture, Land Use, Land Use Change and Forestry, (LULUCF) and Waste. Emissions coverage represent is economy-wide, and covers GHGs CO₂, CH₄ and N₂O. These should be prioritised based on their potential contribution to the ENDC target.

First Principle. given the short time (less than a decade) available to meet the Paris target, invest first where the highest reduction of emissions can be achieved the soonest.

2. Invest in high-return technologies

“Lowest hanging fruit” technologies and projects should be prioritised for emission abatement. All else being equal, capital should flow to measures which offer the shortest payback periods and can be structured to be made commercially profitable. Projects which have short paybacks (ie a high net present value) due to immediate cost savings can attract investment from private funds, as well as for-profit entities such as energy service companies, but they must have a reasonable risk profile.

Yet marginal abatement cost curves alone cannot determine a financing strategy. First, the costs of environmental technologies trend at different rates, so innovation curves are quickly out of date. Second, technology costs alone do not reflect relative project risks, such as technology performance risk, counterparty risk and resource risk. Risks can be mitigated through data collection, capacity building, guarantees, etc. Finally, since mitigation of GHG requires system-wide planning, measures involve combinations of technologies are not easily represented in an abatement curve. Hence the principle of an abatement curve is necessary for a financing strategy, but it’s only a beginning.

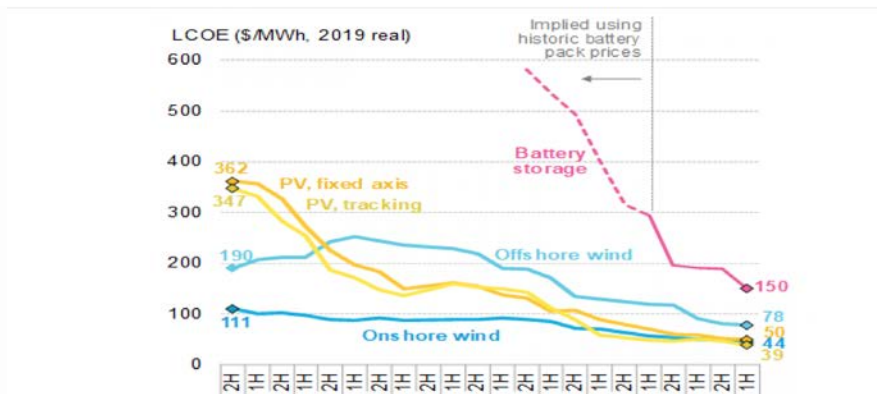
Second Principle: Invest in projects with the most rapid returns (paybacks) to attract private capital.

3. Target infrastructure technologies with rapidly decreasing costs

Climate technology costs are plummeting, a major factor in the widespread adoption of zero carbon infrastructure. In 2019, the average cost of energy from onshore wind in the EU was already lower than that of coal, gas and nuclear.²⁴ The average cost of solar panels has dropped by more than 80% since 2010 and is projected to decrease further. In particular, the cost of lithium-ion batteries for EVs, solar PV and solar thermal (heating/cooling) is plummeting, as shown in Figure 10 below.

²⁴ https://ec.europa.eu/info/news/focus-renewable-energy-europe-2020-mar-18_en

Figure 10 Technology Cost Reductions



Investors are attracted to technologies with declining costs, although governments have responded by gradually withdrawing subsidies in compensation. This can be seen in the budgeted non-subsidised renewable energy investments in North Macedonia, particularly after 2030. Renewables are cheaper than new fossil fuel plants in most parts of the world, and soon will be cheaper than existing fossil fuel-produced energy. Lower cost projects mean easier access to finance and higher levels of debt, as well as more security for lenders.

As an EU accession country, North Macedonia is likely to face strict curbs on allowable subsidies later in the decade. As a result, the country should strive to attract capital through attractive feed-in tariff and premia, as it is competing with many other destinations in Europe for that capital.

Third Principle: promote infrastructure projects with a rapidly declining cost of capital.

4. Maximise green infrastructure jobs

A central aspect of rebuilding post Covid is to create green jobs. All measures should be weighted by the jobs which can be expected to be created above and beyond business as usual. In the 3BUR, measures and policies are analyzed by potential for such job creation. Scenario analysis shows almost a doubling of job creation by 2030 if the ENDC measures are adapted, vs staying with existing policies and measures (5309 vs 9895 jobs in 2030). This quantifies the synergies between restarting the post-Covid economy and changing its underlying drivers to low carbon technologies.

Fourth Principle: Favour employment-intensive green investment.

5. Finance measures which maximise EU and other investment sources

When deciding on which mitigation measures to finance, policy makers should map them against EU priorities, including strategic objectives. Access to sizeable EU funds to support green transition in the early 2020s could be a game changer for North Macedonia, and tapping funds to meet accession requirements will be essential. In July 2020, European leaders launched Next Generation EU, a €750

billion EU recovery fund consisting of grants and loans. It has been proposed that 37% of Next Generation EU funds be directly spent on European Green Deal objectives.

This is on top of a €1.074 trillion Multiannual Financial Framework package, the EU's long-term budget covering the years 2021-2027. Of this combined €1.826 trillion, some €550 billion, or 30% of the full recovery-plus-budget package, is earmarked for climate objectives. Current and future members are beginning to present their own national recovery and resilience plans. North Macedonia's ENDC aligns with the EU's climate law and net-zero emissions target for 2050; specific measures need to be evaluated using the EU Green Deal objectives.

Fifth Principle: Promote measures which map against the priorities of largest donors.

6. Choose measures which can be highly leveraged by existing and planned regulation

As it has already demonstrated through national auctions for renewable energy investment, the Government can promote financing of ENDC measures most quickly through adopting a progressive regulatory environment. Energy generation, energy efficiency, new building, low emission vehicles, and other regulations are a potent tool to achieve long term ENDC goals and allow related measures to be prioritised. This logic can be applied throughout the portfolio of actions.

Renewable energy auctions are a powerful tool for launching the RES infrastructure investment market. Two types of support measures are available: feed-in tariffs (FiT) and premia (FiP) are granted on a competitive basis. The market operator is obliged to purchase electricity produced by the green energy producers, as an increasing fraction of total energy produced. Premium payments are set at EURO 15 per MWh delivered, with no capacity payments and cap of 100MW installed capacity per project. North Macedonia has a 37 MW wind farm, Bogdanci, and further permitted farms will bring total wind installed capacity to around 86 MW. Solar potential is hardly tapped, but with the feed-in premium auctions, installed capacity will increase significantly. In 2020 21 MW of premium contracts for electricity generated by PV plants were signed with investors. Two solar power units (100 MW) are being built at a coal mine in Oslomej with ESM -- bids were valued at around € 80 million. Consequently, it is expected that installed PV solar will soon reach 200 MW.

This level of tariff support is relatively low – calibrating the FiT level to the ever-decreasing cost of renewable energy capital equipment will be a key determinant of significant future investment. Importantly, given the fact that in many parts of Europe subsidies have been all but eliminated due to the decreasing costs of capital and technology, FiTs need not have such a significant fiscal impact.

Net-metering can create investment among residential end-users in small-scale renewables, principally roof-top PV, as residents pay for solar systems by selling unused energy back to the grid. To exploit this win-win opportunity, the government and private sector will need to offset financial constraints to purchasing the solar systems through a dedicated supply of affordable and long-term consumer financing options. There is a case for using public financing to build a technology-specific rooftop solar fund using concessional loans issued through a network of financial intermediaries.

This would overcome a large barrier to market entry and could be offered in combination with a credit guarantee fund, to reduce risk to local financial intermediaries and subsidize interest rates for residential consumers.

Sixth Principle: Promote measures which best leverage the existing regulatory environment.

7. Leverage funds made available from a national carbon tax

In recent years, countries have reduced carbon emissions and bolstered national budgets using carbon taxes. Since Finland introduced the first carbon tax in 1990, 15 European countries have implemented carbon taxes, ranging from less than EUR 1 per ton of carbon emissions (in Ukraine and Poland) to EUR 112.08 in Sweden.²⁵ Carbon taxes accelerate the introduction of carbon-reducing technologies by increasing the cost of fossil fuel alternatives, and can be levied on different types of greenhouse gases, such as carbon dioxide, methane, nitrous oxide, and fluorinated gases.²⁶

North Macedonia would start at the lower end of the carbon price spectrum, but a carbon tax would be one of the best ways to deal with industrial emissions, which are otherwise difficult to reduce. Putting a national price on carbon offers a source of additional cash flow for the proposed NDC measures, as well as a source of revenue for the national budget. Western Balkans coal plants account for 45 million tCO₂ eq annually, and if emitters purchased CO₂ allowances, countries in the region would collect at least EUR 1 billion per year.

A carbon tax should be aligned with and accelerate North Macedonia's carbon neutrality goals. Taxing imports of electricity based on their carbon content could create revenues to offset costs of project development, finance feed-in tariffs, monitor and verify emissions, and even reduce project risk. Some measures will respond more dynamically to a carbon tax than others, specifically those which are competing directly with fossil fuel infrastructure.

Seventh Principle: Promote projects which stand the most to gain from a carbon tax.

8. Maximise impact and benefits of the voluntary carbon markets

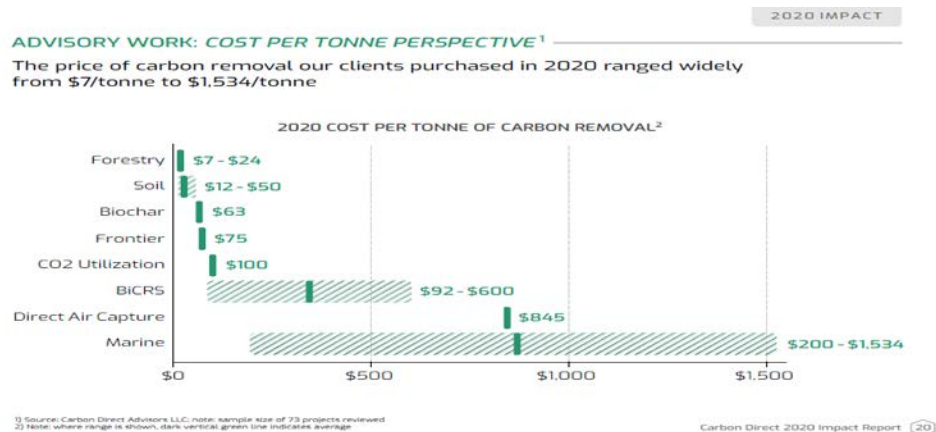
The global carbon offset markets are growing rapidly and once again becoming a significant source of finance – driven mainly by corporate demand. When carbon prices in North Macedonia are harmonized with the EU ETS in 2027, local companies will seek offsets or create their own reductions commensurate with the cap and trade system. North Macedonia can monetize projected revenues from the sale of certified offsets to the voluntary market, especially those which have co-benefits

²⁵ This is followed by Switzerland (€83.17) and Finland (€62.00). The lowest carbon tax rates in Europe are in Poland (€0.07), Ukraine (€0.33), and Estonia (€2.00).

²⁶ The scope of each country's carbon tax differs, resulting in varying shares of greenhouse gas emissions covered by the tax. For example, Spain's carbon tax only applies to fluorinated gases, taxing only 3 percent of the country's total greenhouse gas emissions. Norway, by contrast, recently abolished most exemptions and reduced rates, now covering over 60 percent of its emissions.

which reflect the SDGs. Partnerships to supply offsets to multinational companies or to countries could enable it to monetize carbon offsets at a centralised level. Carbon delivery contracts, representing a forward sale of revenues, can be used to finance gaps in emission reduction projects. A carbon offset plan should strengthen any climate investment plans. Demand for a variety of carbon offsets in the voluntary markets has grown rapidly over the past few years, as shown in Figure 11 below.

Figure 11 Cost per Tonne of Carbon Removal 2020



North Macedonia should consider the development of carbon projects in all of the ENDC sectors, although the issue of double counting/double claiming of offsets remains contentious. To do this, it should evaluate the carbon markets against the natural advantage it may have in producing and delivering certain offsets vis a vis other countries.

As an example of a win-win carbon project which can raise financing, North Macedonia has an biochar-related carbon removal measure in its ENDC. Advanced biochar removes emissions permanently from the carbon cycle, fixing carbon for hundreds of years and commanding high prices for carbon removal certificates. As a soil-enhancing product, it meets key SDG objectives. Partnership with an advanced manufacturer of biochar by supporting the co-location of manufacturing facilities could create a unique emission removal advantage for North Macedonia.

Eighth Principle: North Macedonia should consider as a financing strategy the development of carbon projects across virtually all of the ENDC Sectors.

4.2 Results of a Criteria-based Financing Strategy

The above principles form a methodology for which measures to deploy first in the private sector. Appendix B maps the above principles against the main ENDC measures, from a scale of dark green (most compatible) to light green (least compatible). It also calculates a general index of carbon efficiency, comprised of the cost of the measure (according to its allocated budget) divided by the amount of emission reductions achieved.

Initial results from Appendix B show that Energy sector measures meet most of these criteria. Technology cost reductions are spread throughout the sectors. Lowest cost of carbon reduction is

concentrated in Energy and Agriculture. Carbon markets favour Agricultural and Forestry measures, while a carbon tax may favour infrastructure which replaces carbon-intensive generation most (Energy). Large hydro, FiT and FiP, rooftop solar and RES without incentives all score high in relative cost effectiveness, job creation, government control through regulation, and the capacity for acceleration through a carbon tax.

4.3 Financing strategies by Sector

ENERGY SECTOR
<p>Renewable energy generation paid for mainly by the private sector is expected to dominate North Macedonia's ENDC financing going forward - more than 2,000 MW (solar, wind, small hydro, biomass and biogas projects) are projected by 2040. Most of those assets after 2027 – 2030 will be without subsidies. While these in turn will necessitate funds to balance and improve the grid will need to come from a fiscal budget to allow uptake of renewable energy as the number of RES projects increases, a small but impressive track record for RES IPP projects is building.</p> <p>So far, much of the finance for renewable energy has come with the support of multilateral banks. North Macedonia features the largest number of greenfield plants financed by the EBRD in the Western Balkans (20 plants, 15 financed directly and five through intermediaries). Yet private capital is now making investments in unsecured greenfield and project companies with government-backed PPAs.</p> <p>The implementation of a carbon price will increase commercial project funding due to an import tax on fossil-fuel derived electricity. Due to the need for baseload power and grid stabilisation, investment in storage plus renewables is also commercially viable.</p> <p>North Macedonia also has big plans for large hydropower, a favourite of investors. The Energy Development Strategy foresees a total of 998 MW of new hydro capacity added through 2040. The hydropower boom is accelerating, with a new tender for 21 locations in 2019 and early IPPs and PPPs confirm the availability of funding.</p> <p>For these reasons, the private sector can be counted on to produce much of the EUR 5.6 billion required given certain preconditions, long term debt provided by multilateral banks. Feed-in-tariffs and -premium policies for renewables will need to be set at appropriate levels by national tenders. The most cost-effective technologies, supply chains and sources of financing for low-emission energy generation must be used if consumers are not to suffer energy price hikes.</p>
ENERGY GENERATION: EUR 5,587 million
<p>Reduction of Network Losses. Main objective: Reduction of losses in electricity and heat networks Description: Technical measures for reducing distribution electricity losses comprise of overhead lines replacement with underground (where possible), transition to 20 kV voltage level, installation of new transformation stations to shorten the low voltage lines, as well as automation and remote network management.</p>
<p>Strategy: Urgency, High; Timing, immediate</p> <p>MEPSO owns and operates the grid as a corporatized public entity and grid improvements are undertaken from its budget. Grid modernisation to be undertaken through an accelerated investment strategy with long-term loans from the EIB or EBRD, collateralised by grid infrastructure.</p> <p>In the past, the EBRD has improved energy grid efficiency by providing a €25m loan to the national electricity transmission company (MEPSO) to rehabilitate existing substations. This was the first non-sovereign guarantee loan to a public energy company in the Western Balkans.</p> <p>The Bank also provided a €37m loan to MEPSO to finance the first electricity interconnector between Albania and North Macedonia. The Bank mobilised a €12m investment grant under the WBIF for smart grid investments. All projects were complemented by €100m worth of grants and TA for project preparation and implementation, mobilized by the Bank via the Western Balkan Investment Fund (WBIF). However, disbursements of loan and implementation of large infrastructure projects have been slow as a result of low implementation capacity of key counterparts, a lack of coordination among various ministries and two years of political crisis.</p> <p>Seek FDI funding for balancing the grid due to increased balancing requirements from intermittent power (renewables),</p>

plan for energy storage projects, which are not considered in the ENDC.

Reduction of Network Losses (continued). For the heating sector, replacement of old heat pipelines with pre-insulated ones and optimization of substations. Rehabilitation of the hot water distribution network, replacement of pumps in the heating substations with new energy efficient pumps and other measures (modernization of the SCADA system, integration of the distribution networks).

Installation of modern equipment for regulation and monitoring in the heating substations for control and reduction of the consumed heat. BEG plans to invest in rehabilitation and expansion of the network but the expansion is still not defined.

Strategy: Urgency, medium. Timing, medium term (seek alternatives).

All 620MW are based on natural gas-fired Combined Heat and Power Plants (CHPs). Expansion would require long term infrastructure financing with loans from EIB/EBRD.

Alternative, non-polluting heating technologies and insulation should be encouraged for residents.

ESM provides district energy to Bitola, Mogila and Novaci through waste heat recovery from the coal plant REK Bitola, and coal usage is phased out, these cities would be left without a heating source. KfW would provide funding for modern heating provision.

RENEWABLE ENERGY – HYDRO

Large Hydropower Plants - Main objective: Increase of the domestic generation capacity from renewable energy sources. (Budget: EUR 1.7bn).

Description: Construction of large hydropower plant. Planned: Vardar Valley's 12 plants have a total of 320 MW planned; Chebren 333 MW and Globochica 42 MW.

Strategy: Urgency, High. Short time-scale to replace coal. Timing, immediate

Private sector funding secured through a national auction to be carried out asap, cost overrun risk to be carried by winner. 10 international expressions of interest were received in December 2020.²⁷

Government to produce feasibility studies to reduce uncertainties related to environmental issues and potential cost overruns. Climate change risk assessment for identified sites as well as the required Environmental Impact Assessments.

World Bank, EBRD and EIB now have detailed guidelines on required evidence; mitigating negative environmental impacts of hydropower plants is vital to complete licensing procedures and to secure funding from these financiers.

See long term green bond issuance or loans for debt and private sector investment.

OTHER RENEWABLE ENERGY

Incentives Feed-In Tariff, Main objective: Increase generation capacity from renewable energy sources

Incentives Feed-In Premium, Main objective: Increase generation capacity from renewable energy sources

Biomass Power Plants, Main objective: Increase generation capacity from renewable energy sources

Urgency: Very urgent to replace coal. Timing, immediate due to development barriers

The government should fast-track licenses and permits, prepare feasibility studies and business plans, conduct tenders and assemble portfolios of shovel-ready projects.

Continue to use grant funds from the EBRD and others to support implementation of competitive tender for solar and wind projects.

Develop Feasibility Study for new Small Hydro Power Plants (small HPPs) tenders and new PPP tenders.

Support private sector renewable programme by (i) providing technical support to the Market Operator of North Macedonia (MEPSO) to review the Power Purchase Agreement (PPA), and (ii) assisting local authorities in the finalisation of a market standard PPA for renewable energy projects.

Consider issuing climate or green bonds as long-term sources of capital which can be on-lent to leverage projects.

Payments for FiT and FiP budgets could be captured from carbon tax revenues. Introduction of CO₂ tax in order to

²⁷ <https://balkangreenenergynews.com/energy-giants-bid-for-north-macedonias-cebren-hydropower-project/>

stimulate the investments in RES and to increase the penetration of energy efficiency measures

DISTRIBUTED RENEWABLE ENERGY

Solar Rooftop Power Plants, Main objective: Increase of the domestic generation capacity from renewable energy sources
Solar Thermal Collectors, Main objective: Reduction of the energy costs and improvement of the efficiency

Urgency: High. Replace coal fired plants given low cost of rooftop solar and the reduced need to finance the grid.
Timing, immediate expansion of existing program

Financing rooftop solar is a well proven third-party investment through leasing, or energy savings contracts.

This measure requires net metering, ie the consumer becomes a “prosumer” and sells electricity back to the grid. North Macedonia has already adopted a program to promote renewable energy sources and energy efficiency in households for 2021 including subsidies for prosumers.

The State will reimburse up to 30% of the costs of the purchase and installation of photovoltaic (PV) systems, with a capacity of up to 4 kW, for the production of electricity for self-consumption. Individual subsidies are capped at about EUR 1,000 per household.

The installation of rooftop-based solar systems for business consumers in North Macedonia is offered by Electricity distributor EVN in cooperation with ProCredit Bank. As a result of this cooperation, companies will be able to obtain loans from ProCredit Bank @ 3 % in order to finance the installation of solar systems.

EVN claims that electricity bills could be reduced by up to 30 %, while EVN will purchase all the surplus electricity. The return of investment is expected in 6 to 8 years.

Solar heating/cooling technology allows for low-cost heating as well as PV generation (hybrid solar) which can reduce the needed rooftop area. Investments can be pooled and sold as an asset class to pension funds.

ENERGY EFFICIENCY - € 3,148 million

Sector guidance: North Macedonia should implement regulations on energy efficient buildings, light bulbs, and industrial operations right away. Required funds will come from residents and companies, with local schemes sponsored to subsidise domestic sources of capital.

While per-capita energy consumption is low in North Macedonia, the percent share of energy as an input of GDP is four times higher than the average of the EU. Energy efficiency is therefore a solution to many problems: economic competitiveness, balance of payments for energy use, security of energy supply, energy poverty, sustainable transport, etc. Modernisation and efficiency investments in the energy and heavy industry sectors offer economic benefits which will be captured by the private sector. Cash savings can be achieved by boosting energy efficiency in public sector buildings and retrofitting the existing housing stock with more efficient technologies, in line with EU standards.

Other countries in the region have operated such EE Funds for many years. In Bulgaria, an EE Fund was established in 2006, serving mostly SME industry, public and residential sectors, with about 60% of projects in municipalities. The Fund provides loans to end users, portfolio loans to ESCOs, and loan guarantees. In Armenia, to support the build-up of an ESCO industry, an EE Fund similar to the one considered in North Macedonia uses simplified ESCO contracts to share performance risk with private construction firms and contractors.

ENERGY - RESIDENTIAL AND NON-SPECIFIED (COMMERCIAL AND SERVICE SECTOR)

Retrofitting of Existing Central Government Buildings Main objective: retrofit of existing public buildings to meet the objectives of the EE Directive and the Energy Efficiency Law

Retrofitting of Existing Local Self-government Buildings, Main objective: Retrofitting of existing public buildings with aim to meet the objectives of the EE Directive and the Energy Efficiency Law

Urgency: High; Timing, immediate

Description: Renovation of public buildings to boost energy efficiency, to be funded by building owners and yielding certificates for energy performance as a prerequisite.

Green bonds for long term infrastructure investment to be issued at national level and onlent. World Bank EE fund to be accelerated.

Larger scale renovation projects are a natural target for 3rd party investment in energy efficiency and as in the case above the main de-risking tool for such projects would be flexible contract duration to reflect the risks of entering a new market.

OTHER RENEWABLE ENERGY

Increased Use of Residential and Commercial Heat Pumps Main objective: Efficient use of electricity
Description: Phasing out heating devices with resistive heaters, as well as inefficient biomass stoves and their replacement with heat pumps in compliance with EU Climate and Energy Policy

Urgency, medium; timing, Medium Term

Heat pumps can have a payback times of less than five years and therefore consumer leasing programs for solar PV rooftop schemes can be extended to heating.

Focusing on heat pumps for public sector buildings as part of a general schedule of improvements first can drive down the cost of installation and prove the concept. Heat pumps run on electricity, so power needs to be renewable to be fully emissions-reducing.

RESIDENTIAL AND COMMERCIAL RETROFITS

Retrofitting of Existing Residential Buildings, Main objective: To meet the requirements under the Energy Efficiency Law – reconstruction of residential buildings including windows replacement

Retrofitting of Existing Commercial Buildings, Main objective: Retrofitting of existing commercial buildings with aim to meet the objectives of the EE Directive and the Energy Efficiency Law. The commercial building area is estimated to nearly 8 million m². Existing commercial buildings need to be renovated including windows replacement initiated by the owners.

Urgency, Medium, Timing, gradual build up to medium term implementation

These measures include compulsory certification of buildings for residential and commercial occupancy with the cost born by the owner. Energy efficiency certifications are required in most EU countries.

Credit lines are offered through commercial banks from EBRD (through the (GEFF)) to support adoption of green technology.

Loans are provided for citizens and housing associations for investment in energy efficiency of residential buildings including in new heat or geothermal pumps, efficient stoves, windows, and installation of solar panels, insulation on walls, roof or floors, investments in hot water collectors.

Citizens also obtain the right to apply for a grant of up to 20% of the total amount of the investment.

A project for energy efficiency in the residential sector in amount of € 25 million is under implementation with debt funding from the European Investment Bank. It is expected that around 25.000 households will be covered using ESCO companies and additional grant funds of up to 20% of the total investment would be provided by municipalities.

Due to the new Energy Efficiency Law²⁸ local ESCOs can provide financing and legal solutions because they recover investments from savings in energy costs, without requiring upfront payment by the beneficiary.

Initiated by the owners and/or supported by commercial banks and funds. Commercial banks and energy efficiency funds can provide financing to municipalities, with compensation added to higher rent where tenants benefit.

Ramp up work with international donors and lenders to widen energy efficiency schemes.

Municipalities are the natural beneficiary and implementation agent of these programs. They should seek the direct international funds to do so, including transfer of expertise. Energy efficiency projects for households work particularly well in partnership with municipalities, with funding coming from international banks. The City of Skopje, in order to encourage citizens to use renewable energy sources to heat their homes, implemented the measure to subsidize or provide a refund of part of the cost of pellet stoves in amount of 70%. For 2018 and 2019, a total of 7,255 grants were awarded.

Improved energy efficiency & green technologies across sectors through credit lines: (i) a dedicated and highly successful SME programme under the Regional Energy Efficiency Programme for the Western Balkans (REEPWB) with €9m signed with 3 commercial banks, (ii) 3 GEFF credit lines (€5m) targeting the residential sector.

²⁸ ESCOs use specific contracts that enable the implementation of energy efficiency projects for street lighting, buildings renovations and efficient heating and lighting equipment in new and old buildings.

Promote ESCOs: developed a standardized template of an ESCO agreement across Western Balkan CoOs that can be utilised by private sector and municipalities; consider capital investment in new ESCOs

Financing could include low interest “green loans” for the building owners, or mortgage extensions backed by energy savings in the case of single-owner housing blocks.

NGOs such as Habitat and USAID have provided grants or free renovation services to the energy poor.

Voucher programs targeting efficiency repairs are also a model. Supported with government funds for specific investments.²⁹

Investments in heat pumps and improvements in building envelopes, including windows, could be bundled up into a ‘residential decarbonisation financing mechanism’ which would reduce the expenditure of municipal and national budgets for energy.

RESIDENTIAL AND COMMERCIAL NEW BUILD

Construction of new buildings, Buildings that will meet the minimum criteria set in the Rulebook of Energy Performance in buildings

Construction of passive buildings, Main objective: By 2021, all new building should be nearly zero-energy buildings
Description: The measure considers construction of new passive residential buildings in compliance with the EU Directive 2010/31/EU. This measure will provide issuing of certificates for energy performance of buildings, as a prerequisite for putting the building into operation

Urgency: High, meet EU timetable; Timing, immediate

Regulatory initiative which will increase the cost of building but can be priced into rental or sales. Paid for by the building owner.

Requires intensive dialogue with (mostly) the national construction industry.

ENERGY EFFICIENT LIGHTING

Phasing out of incandescent lights, Main objective: Improve the efficiency of lighting following the EU policies.

Urgency: High, meet EU timetable; Timing, immediate

Replacing incandescent light bulbs is by now a global standard and can be introduced immediately to improve energy efficiency.

Bulb suppliers can be requested to engage the public in initial LED giveaways

Improvement of Street lighting in Municipalities, Main objective: reduce the costs and increase the quality of street lighting.

Description: Inefficient light bulbs should be replaced, purchasing new ones that comply with the criteria of belonging to the highest EE class possible (CFL and LED lamps).

Urgency, medium; Timing, medium term

Two municipalities are currently implementing Energy Savings Performance Contracts, which demonstrate the viability of the ESCO model, with Makedonski Telekom acting as an Energy Service Company.³⁰ The next stage is for significant expansion.

The World Bank’s EE Fund seeks to create an ESCO sector for municipalities, and may extend its financing to other activities, including rooftop PV, solar water collectors, and street lighting.

²⁹ A total of MKD52.000,000 is available to householders, including: MKD8.000,000 for solar thermal collector systems in households, 22.000,000 for reimbursement of part of the costs for PVC or aluminium windows, 14.000,000 for reimbursement of part of the costs for procurement of pellet stoves in households, and 8.000,000 for reimbursement of part of the costs for PV panels up to 4 kW for own consumption.

³⁰ Makedonski Telekom will pay for the investment needed to replace old lighting with LEDs, while the municipalities will repay the whole investment exclusively through energy savings guaranteed by the ESCO. The contract period is around six years, during which the ESCO undertakes the responsibility of installation and maintenance of the equipment.

The EE Fund is an instrument that should become central for the development of the 3rd BURs energy efficiency measures.

Due to the short pay-back time for investment in energy efficiency measures, financing vehicles can provide funding without taking significant credit risk.

Seek blanket REEP financing for larger projects and to fund ESCO portfolios, funded by the EU and supported by the Energy Community. A €5 million project funded by the REEP supports implementation of energy efficiency for municipal street lighting and heating.

Energy Performance Agreements and tender documentation must receive more technical assistance. The Ministry of Economy is preparing a feasibility study for EE and ESCO financing in state buildings through a Public Private Partnership.

Government to provide ESCO service suppliers risk guarantees from the risk of non-payment of municipalities. The cost of street lighting, including electricity and maintenance, can have a huge impact on the budget of the municipalities.

ENERGY -- MANUFACTURING INDUSTRIES AND CONSTRUCTION

Strategy for energy efficiency and decarbonization in industrial processes. North Macedonia's industrial sectors make up 22% of final energy consumption, 44% of which is accounted for by the Iron and Steel Industry. When heavy industry falls into EU emissions regulations and the EU ETS, North Macedonian output is likely to exceed standard emission budgets upon EU Accession. There is scope to reduce these emissions by increasing the share of co-firing in furnaces with biomass and high-energy content refuse derived fuels (RDF). Waste heat recovery technology represents profitable energy efficiency measure based on mature technology.

Energy management in manufacturing industries, Main objective: Efficient management of manufacturing processes in the industry aiming to increase production using the same energy consumption.

Description: Obligatory energy audits of large companies and implementation of ISO 50001 standard, as well as advanced measurement and introduction of new IT technologies.

Introduction of efficient electric motors, Main objective: Increase the competitiveness of the industrial products through improvement of the efficiency in the production process and reducing the resources.

Description: Electric motors are responsible for a high share of the total electricity consumption in industries replacement of the obsolete machines currently in use, with new more efficient motors.

Introduction of more advanced technologies, Main objective: Introduction of more advanced technologies in the industrial processes that will also enable use of more environmentally-friendly fuels.

Description: Advanced industrial technologies present major opportunities for further reduction of the energy consumption and potentially lower costs as well as environmental benefits. In addition, they can help various industries to progress at a much faster rate.

Strategy: Urgency, medium. Timing, medium term

Corporate balance sheet financing with possible subsidised industrial energy efficiency audits. Loans can be repaid through energy savings with technology warranties to improve economic competitiveness.

EE Fund investments possible and energy audits to be subsidised and prepared in advance.

Government should set minimum EE standards for industrial appliances and machinery that includes motors.

Outdated technology should be replaced with efficient alternatives when it breaks down.

ENERGY – TRANSPORT € 11,096 million

Sector guidance. This budget is nearly half of total ENDC expenditure but accounts for a small amount of carbon emissions. Typically transport infrastructure is financed out of long term loans, often onlent by international development banks.

There is not a clear path to engaging third party private capital in fleet renewal without subsidies to buy back very old and polluting cars or prevent them from going on the roads. For EVs, even with tax breaks, fleet electrification will be difficult without EV charging infrastructure. Biofuels are an intermediary solution. Partnerships with international suppliers and power companies seeking to expand their charging infrastructure are an option.

North Macedonia could seek to attract foreign direct investors to build battery manufacturing and other supply chain

facilities in anticipation of ascension to the EU market.

PUBLIC TRANSPORTATION USE

Increased use of the railway Main objective: Improve the energy efficiency in the transport sector using cheap and efficient railway transport.

Extend Railroad link to Bulgaria by 2027

Description: Using this mode of transport as one of the most efficient can also improve the competitiveness of the companies. Return the utilization level of this transport as of three years ago, and further increase it. Improve stations and “access to the stations”, increase the network security and expand the network coverage.

Strategy: Urgency, medium. Timing, medium term

Financing from EIB, EBRD and/or infrastructure bonds. EBRD extended a €145m sovereign loan (one-fourth of total project cost) to the Public Enterprise for Railways Infrastructure of North Macedonia (PERI) to modernise and upgrade 2nd phase of the Eastern part of the Trans-European Rail Corridor VIII. Mobilized EUR 69m investment grant for the phase 1 via WBIF.

When Skopje and Sofia are connected, this railway line will be part of the trans-European corridor number 8, linking Bulgaria, Macedonia and Albania.

Prospective FDI financing from prospective Chinese rail project, Budapest-Belgrade-Skopje to Chinese-owned Thessaloniki port.

EU funding also a possibility as part of a package of transport investment agreed at a summit in Trieste in July 2017, establishing a transport community between the EU and the Western Balkans³¹ financed by the EBRD with a grant of EUR 68.6 million of co-financing from the European Union through the Western Balkans Investment Framework.

RENEW AND REPLACE POLLUTING VEHICLES

Renewing of the national car fleet. Main objective: Use of more advanced technologies in order to slow down the growing energy consumption in the transport sector and decrease the average age of the fleet (18 years).

Renewing of other national road fleet (light duty and heavy goods vehicles and buses) Main objective: Reduction of local air pollution (SO₂, Nox, PM2.5 etc.) Description: This measure anticipates introduction of a regulation that will enable renewal of the vehicle fleet of light duty and heavy goods vehicles and buses.

Advanced mobility, Main objective: Reduction of the local air pollution (SO₂, Nox, PM2.5 etc.)

Description: The measure includes conducting campaigns/providing subsidies and systems for use of new or rented bicycles, electric scooters, promoting walking, and introduction of parking policies that would reduce the use of cars in the city area. People, especially in smaller towns where a lot of them use cars for short distances, would increase the use of bicycles/electric scooters or walking.

Strategy: Urgency, long term but ultimately meeting EU standards. Timing, long term

Long term finance from private owners assisted by a “carrot and stick” approach: “buy”/prohibit oldest cars to get them off the road; subsidize hybrids. Reduce VAT from 18% to 5% for hybrid and electric vehicles; direct subsidizing of hybrid vehicles; excise duties on diesel fuel and petrol. Vehicle permits and “MOT” of used cars.

Equalise taxes on unleaded petrol and diesel.

Enforce public institution’s purchase of vehicles with low CO₂ emissions (up to 90 gCO₂/km by 2020 and 50 gCO₂/km by 2025) (covers only new vehicles). Set limit for vehicle age.

Institute congestion charging zones in major cities; Develop biofuel industry to reduce diesel pollution.

³¹ The EU document states that seven new transport projects in the Balkans were agreed at the summit, with an overall value of around €500 million, to be co-funded by the EU. It put the value of the Skopje-Sofia railway at €152 million, by far the biggest of the seven, with the EU grant providing almost half, or €70 million.³¹

INTRODUCTION OF ELECTRIC VEHICLES

Electrification of Transport, Main objective: Transition from society based on fossil fuels to low carbon society, where the renewable energy and electrification of the transport will play the most important role.

EV proliferation requires a systems as well as a policy approach. Inexpensive EVs imported from China could be subsidized through direct subsidies to the customer (and the environment).

Experience in China and India shows that the proliferation of low cost EVs is viable.

Another aspect of the sector is the unique infrastructure that is required, which is built and financed by separate providers, both private and public.

Charging networks are often set up in connection with multinationals such as utilities and engineering companies. Electrification of public transport involves large public sector and multilateral funding. Together, this is a complex puzzle which must be implemented with a coordinated strategy; the electrification of transport and its funding is effectively separate from energy in terms of financing.

Strategy: Urgency, long term but ultimately meeting EU standards. Timing, long term

Direct subsidizing of electric vehicles, 5000 EUR in the period 2020-2023

Reserve green parking in all public parking lots

Obligation to place fast chargers at all gas stations on motorways (at every 100 km by 2020)

AGRICULTURE AND FORESTRY EUR 106 million

Agricultural land in North Macedonia covers 50% of the surface area while forests cover about 39% of the country. Livestock production emits greenhouse gases mainly as a result of enteric fermentation and manure. GHG emissions from crop production stem from inadequate and excessive fertilization with mineral fertilizers; poor application of manure; and mismanagement of arable land. Financing projects in agriculture and forestry requires a positive cash flow, or at least sufficient carbon offsets; these are possible through land regeneration and livestock management programs, increased fertility of land, reduction of fertilizer use, and de-methanization of animal feed.

In forestry, emissions are grouped into the following categories: forest land grassland and wetland, including land use changes between the categories. Five carbon pools include above-ground biomass, below-ground biomass, litter, dead wood and soil organic matters. Regarding increased sequestration, there are opportunities for biomass, biochar and managed forest growth. Nature-based sequestration and emission reductions attract carbon financing due to the very inexpensive cost of carbon reductions.

New technologies should be sought and North Macedonia should tap into the international drive for biodiversity, SDG goals and other sources and drivers of natural capital-related donors and lenders.

Reduction of CH₄ emissions from enteric fermentation in dairy cows by 3%

Description: By modification of the feed composition and nutrition practice in dairy cows, the emission of CH₄ due to enteric fermentation can be reduced by 20%. Modification of feed content into TMR, the CH₄ emission will be decreased by 20%. The mitigation measure can be easily applied on dairy farms, by nutrition management. It is also cost effective and does not require additional subsidies or incentives. Practical training and demonstration for farmers will be sufficient

Reduction of N₂O emissions from manure management in dairy cows by 20%. Description: By modification of manure management in dairy cows, the emission of N₂O can be reduced up to 20%. Farms will need to apply improved manure management in order to reduce N loss and NO_x emissions. It will require subsidies for farm design and construction.

Reduction of N₂O emissions from manure management in swine farms by 13%

Description: By modification of the manure management in swine farms, N₂O can be reduced up to 50%. The mitigation measure will require subsidies for adapting and incentives in farm design and construction.

Reduction of N₂O emissions from manure in dairy cows by 20% for farms below 50 Livestock Units

By modification of the manure management in dairy cows, the emission of N₂O can be reduced up to 30%. Regulation may be required, however, to make available the desired feed types and feed suppliers and farmers alike will have to adapt. A levy on chemical fertilizers might finance a commercial risk guarantee for suppliers of manure tank systems.

Strategy: Long term but ultimately meet EU standards. Timing, long term

The government can incentivise desired feed types and feed suppliers to reduce emissions through animal feed. Biogas-based energy production already exists in North Macedonia. Industrial-scale manure treatment systems could be organized as an SPV with dairy farms investing alongside 3rd party investors.

Government regulations should require manure treatment and methane emission control (closed storage) with enforcement. Reusing manure as fertilizer to the farms represents an economic benefit and a potential reduction in emissions for those that otherwise use chemical fertilizer.

CONVERSION OF LAND USE

Conversion of land use of field crops above 15% inclination Main objective: To reduce the intensity of soil erosion and loss of soil organic matter

Description: Cultivation of land on inclined terrain causes intensive processes of soil erosion and mineralization of organic matter, leading to intensive decomposition of soil organic matter and emission of soil carbon into atmosphere. Conversion of such areas into perennial grassland (pastures, meadows) will significantly decrease intensity of soil organic matter depletion and emission of soil carbon and will lead to carbon sink.

Contour cultivation on areas under field crops on inclined terrains (5-15%)

Main objective: To reduce erosion of top soil and conservation of soil organic matter

Description: Regular cultivation in crop production means a massive disturbance of top soil layer, which cause intensive mineralization of soil organic matter (SOM) and CO₂ emissions. Downslope cultivation of cropland can cause soil erosion, whereby a significant quantity of soil carbon is released into atmosphere.

Strategy: Urgency, low, but can be implemented with no cost, so prioritise.

Contour cultivation means that all agro-technical operations should be across slope and exclude areas above 15% inclination. With a systematic campaign for increasing the awareness of the farmers this measure can be widely adopted. Using government land, it may be possible to offer smaller plots of better land in exchange for the inclined terrains.

BIOCHAR

Use of biochar for carbon sink on agricultural land Main objective: Carbon sink through negative emission technology.

Biochar, made from agricultural waste, can improve soil water holding capacity, nutrients storage into the soil, and increase yield. Advanced biochar captures up to 3 times more CO₂ than its weight, due to its high carbon concentration.

Strategy: Urgency, High due to potential demonstration effect of emission reduction plus soil fertility improvement.

This technology, recently commercialised, can be financed with carbon due to the high prices for carbon removal offsets.

WASTE AND WASTE TREATMENT

EUR 59 million

Main objective: Set targets for reducing generation, reuse, recycling and treatment of waste at industrial installations The destructive nature of methane from anaerobic digestion enables substantial carbon offsetting in waste treatment, which can also be a source of renewable energy. Hence although waste treatment is traditionally funded through national and local budgets, there are opportunities – and dedicated financing – for waste to energy and other circular economy projects. Many new technologies turn pre-incineration waste into gas and bioplastics. EU financing sources can be used for measures such as waste-to-energy generation (non-incineration), waste prevention, recycling, and composting.

Landfill gas flaring Main objective: Environmental protection and meeting the highest European standards

Description: Rehabilitation of the existing non-compliant landfills and “wild” dumpsites including capping, gas extraction and flaring.

Mechanical and biological treatment (MBT) of waste in new landfills with composting,

Main objective: Environmental protection and meeting the highest European standards

Description: Opening of new regional landfills in all waste management regions with installed system for mechanical and biological treatment and composting.

Improved waste and materials management at industrial facilities, Mitigation action: Improved waste and materials management at industrial facilities

Strategy: urgent. The financing of landfill to energy projects which are tapped so that methane can produce electricity have two main revenue streams – power and potentially carbon offsets.

Concessions with municipalities and PPAs with energy offtakers needed. Landfill gas flaring and capture projects exist around the world and the technology is low cost and low risk. MEPSO could be a co-concessionaire from the perspective that should the local authority unrightfully decide to terminate the concession, it effectively makes the PPA null and void.

5 Recommendations

Implementing the North Macedonian ENDC will require integrating climate-related activities into existing and proposed infrastructure programmes. This is likely to involve initiatives led not only by the Ministry of Environment, but also Ministries of Planning, Transport, Energy and others. To normalise climate-related activities, it is helpful to build capacity across all government departments involved in implementation.

This will include increasing private sector engagement in national climate policies, strategies, coordinating committees and national financing bodies, and promoting public–private dialogue on climate finance through regular forums and institutions. Increasing public–private dialogue can increase understanding of climate change opportunities within the private sector, as well as increase appreciation of investment barriers. It will be critical to involve the private sector in the design and implementation of national climate change policies and projects. Specific recommendations follow:

5.1 Institutionalise the oversight and coordination of climate finance activities.

- This can increase domestic, as well as international, fiscal support for climate initiatives.
- Mainstream climate change into national budgeting processes
- Ensure NDC implementation priorities are reflected in budgets, helping existing policies, programmes and project pipelines to be ‘green’.

5.2 Assess public and private financing options

- Assess the potential for further domestic fiscal support for each measure. Review development policies, programmes and infrastructure project pipelines to assess the potential for ‘greening’ these activities to include ENDC priorities and screening the climate risks or mitigation potential associated with these projects.
- Identify opportunities to mainstream climate change priorities into the national budgetary and infrastructure planning process. This can indirectly increase domestic and international fiscal support for climate change initiatives.
- Additional engagement with key departments may be required, including planning, finance and sectors involved with ENDC implementation, at both the national and subnational levels.
- Consider what information on the co-benefits of climate action might be useful to these departments, to obtain buy-in and support.
- Assess the amount and type of support required to close each funding gap (e.g. capacity-building, technical assistance, finance) and the likely type of funding source (e.g. government, bilateral and multilateral funders and private sector).
- If investors are hesitant to make significant investments in climate-related projects, consider whether smaller, more manageable projects can be financed initially (e.g. demonstration or pilot projects) thereby improving the financial track record for the sector or technology.

5.3 Secure access to international funds for national/subnational institutions

Direct access involves national or subnational institutions directly receiving finance from funding sources and disbursing them to relevant projects without an international agency managing and overseeing the funds as an intermediary. Each fund has different accreditation requirements for

institutions seeking direct access, including demonstrating capacities such as financial and administrative management, monitoring and evaluation (M&E), project management, gender mainstreaming and equity, and environmental and social management.

- Screen a selection of national and subnational institutions against the accreditation requirements for the relevant fund or funds, to identify potential eligible institutions and the resources required to fully meet the accreditation requirements.
- For institutions that are already accredited (depending on the funding source, these may be referred to as ‘accredited entities’ or ‘implementing entities’), the next step may be to develop a project pipeline and put forward funding proposals so that finance can be accessed.

5.4 Develop a project pipeline that can be put forward to financing sources

Build technical and relational capacities within North Macedonian Ministries to develop a project pipeline. Capacities that can support the development of a project pipeline include:

- The ability to undertake financial and technology needs assessments across priority sectors, to assess where efforts need to be focused and ensure projects are robust;
- Technical understanding of available technologies to ensure the most suitable and effective technology is being used;
- Coordination with relevant ministries to develop joint project proposals and navigate ministerial priorities;
- Financial modelling and cost–benefit analysis expertise to determine the feasibility of the proposed projects and ensure projects stay within the ENDC budget;
- Writing skills to develop business cases and project concept notes, to ensure the most effective outcomes for implemented projects;
- The capability to design and select climate change projects and programmes.

Any climate change-related capacity-building could potentially include the integration of SDG principles into project concepts. Implementing the ENDC will require a strong pipeline of climate change projects, as well as integrating climate-related activities into existing and proposed infrastructure programmes.

To support the integration of climate-related activities into infrastructure projects and programmes, it may be helpful to build capacity across all government departments involved in ENDC implementation. In addition, there may be non-government stakeholders who have key roles to play in the design and selection of climate change projects. It may be useful to include them in any capacity-building programmes.

- Develop funding proposals that can be shared with bilateral and multilateral funders
- Many bilateral and multilateral financing sources allow for the submission of project concept notes, so that initial feedback can be received on the eligibility and viability of the project, before preparing a full funding proposal.
- Requirements for full funding proposals will vary between funders, with typical requirements including information about financing requirements (e.g. co-financing to be provided by the country), as well as a detailed description of project activities and the anticipated results.

5.5 Develop funding proposals for the private sector

It may be useful to meet private sector investors to receive early feedback on project ideas, for example through roundtable discussions and consultations. Private capital will seek funding proposals that address the following concerns:

- Is the technical solution well thought through - does the technology have a track record?
- What remedies are available if operating costs are higher than expected (e.g. enforceable performance bonds from construction companies)?
- What reassurance can be given that the revenues will be achieved (e.g. additional government support, government-backed guarantees and credit ratings, minimum price agreements and realistic demand forecasts)?

Identify the barriers to private sector investment across relevant priority actions for ENDC implementation. These can include perceived or actual risks (e.g. credit risks, policy or political risks, technology risks), the scale of investment opportunity available (e.g. transaction costs are too high in relation to the size of the opportunity), or returns are too low (e.g. due to interest rates and taxes). Identify financial and non-financial interventions needed to address barriers for private sector investment across relevant priority actions for ENDC implementation. Financial interventions include:

- risk-mitigation instruments (e.g. policy risk insurance: government or donor-backed partial guarantees);
- concessionary loans (e.g. to improve the financial viability of projects);
- grants (e.g. to improve financial viability of projects or climate-risk assessments and energy-efficiency audits);
- aggregation instruments (e.g. to increase the scale of investment opportunity);
- tax breaks (e.g. for low-carbon or climate-resilient technologies);
- feed-in tariffs (e.g. to incentivise renewable energy);
- and public–private partnerships.

Non-financial interventions include:

- strengthening the rule of law (e.g. so that investors can seek compensation if energy companies do not honour offtake agreements); developing ‘matchmaking’ services (e.g. between project developers and investors);
- capacity-building for the financial sector (e.g. to address perceived risks associated with low-carbon or climate-resilient technologies);
- and knowledge transfer (e.g. writing guides for developing projects, preparing legal templates for power purchase agreements, rental and loan agreements).

Develop public–private financing structures and pilot projects to showcase viable business models and attract climate investment. Strengthen capacity of relevant departments to identify and develop financially viable opportunities for the private sector, including:

- knowledge of financial and investment terminology (e.g. payback periods, internal rates of return, equity returns, pre-tax and pre-finance project returns)
- understanding of the constraints and requirements of investors (e.g. banks typically need to see sufficient net cash flows to comfortably pay loans)
- knowledge of the range of financial and non-financial mechanisms available to increase the financial viability of projects for the private sector, and to reduce risks (e.g. the risk of cost overruns, revenue streams being lower than anticipated), as well as different ways to call for private sector involvement in projects (e.g. funding competitions, bidding for projects)
- skills and experience in conducting commercial negotiations with the private sector.
- Increase private sector engagement in national climate policies, strategies, coordinating committees and national financing bodies.

Greater public–private dialogue on climate finance through regular forums and institutions will include sectoral associations, investor platforms and public consultations. Increasing dialogue can lead to increased understanding of climate change opportunities within the private sector, as well as appreciation of investment barriers and how these can be addressed.

5.6 Design and implement a climate finance MRV System

Identify climate-related spending across all relevant finance flows. Building on any finance MRV systems that are in place, develop standard methodologies and key performance indicators for a climate finance MRV system, including agreeing a definition – with all relevant stakeholders – of what constitutes climate change-related activities.

- Identify all the relevant institutions that are likely to receive climate finance, and put in place data-sharing agreements (e.g. memoranda of understanding) between relevant departments and institutions, and the climate finance tracking team.

Track and report climate-related spending across all relevant finance flows.

- Introduce regular reporting on climate activities for government ministries and implementing entities with key performance indicators to ensure comparability.
- Develop a central tracking system that allows users to standardise input data.
- Process and analyse data on a regular basis, delivering findings to be used to guide the strategic thinking of the team leading national climate finance coordination.

North Macedonia has most of the components in place to allow it to follow the lead of other European countries and profit from large scale investment into its energy, industrial and built infrastructure. There is every reason to believe that with the strong commitment of the EU to a zero-carbon transition as well as opportunities from North Macedonia’s legacy high emissions, international investment funds, just transition expenditure, green bonds, monetised energy savings and carbon offsets will provide significant capital to finance the North Macedonian ENDC.

Appendix A. Policy Initiatives Supporting NDC Financing Strategy

Instrument Type	Policy Initiative	Description	Impact on Financial Sector	Action in Northern Macedonia?
Market-based Policies				
	Carbon Emissions Trading (eg EU ETS)	A market-based incentive to reduce pollution through a cap-and-trade mechanism. Firms are required to hold certificates equal to their emissions.	Increases attractiveness of emissions-reducing investments	YES – Voluntary markets
	Renewable Energy Certificates	A certificate awarded to certify the production of renewable energy	Renewable energy plants sell certificates to improve returns to investors	NO
	Energy Savings Certificates	Certification of one unit of saved electricity, enabling trading of certificates	Energy savings investors can sell certificates to finance projects.	NO
	Net Metering	A power supply agreement allowing for two-way exchange between the grid and consumer with renewable energy generation. Customers pay only for net electricity.	Creates significant financial incentives to invest in distributed energy systems.	Proposed
Regulations				
	Feed-In-Tariff	Policy which offers fixed rate price for a fixed term at which renewable energy will be bought by the grid & guarantees grid access	Creates a financial structure for large renewable energy projects. Bankers can lend and investors calculate returns	YES
	Renewable Portfolio quota	Regulation that a fraction of electricity, heat or installed energy comes from RES	Increases attractiveness of renewable energy investments	YES
	Energy savings targets	Requirement that individuals or companies meet energy savings.	Increases revenues for ESCOs	YES
	Power purchase agreements	Contract between government and energy producer to purchase power over a specific period for a specific price.	Increases investments in large-scale renewable energy.	YES
	Standards for energy audits	Savings targets which quantify energy savings opportunities for industrial energy savings investment	Higher transparency and cash flow security for the financing of energy savings investments	PROPOSED
	Priority sector lending	A part of domestic bank lending is allocated to green projects.	Obligates financial institutions to dedicate funds to priority sectors	NO
	Public sector bidding	Govt organizes tenders to purchase renewable energy from new build installations under competitive bidding, typically for electricity rates above the market norm.	Increases returns on renewable energy investments; anticipated returns are not known before completion of bidding process	YES
Fiscal				

Incentives				
	Government guarantees	Government credit backs rating of a climate infrastructure project, making it bankable	Easier to get financing, cost of capital for projects is reduced.	LIMITED
	Tax exemption/tax reduction	Exemption from or reduction of a specific tax (income tax, VAT, import tax, property tax) granted to an organisation	Decreases costs of renewable energy or energy efficiency projects	PROPOSED
	Capital cost subsidy	One-time payment by a utility, govt agency or publicly owned bank to cover a share of the capital cost of an investment.	Decreases capital expenditure required for up-front investments	PROPOSED
	Interest rate subsidy	Payment by a govt agency or public bank to cover a share of the capital cost of an investment	Increases financial institutions returns on credit; reduces risk	YES
	Subsidy for services	Maintenance or energy audits	Increases returns from operating RES	NO
	Accelerated tax depreciation	Allows a company to depreciate assets so that the purchase of a fixed asset is more attractive	Decreases taxable returns in the early years of an asset's life	NO
	Carbon tax	A tax levied on firms' carbon dioxide emissions	Decreases returns on co2 emitting plants	YES
Public financing				
	Refinancing	A public funding scheme that refinances financial institutions assets at below market rates.	Decreases cost of capital for financial institutions.	NO
	Public venture capital fund	Scheme provided to early stage companies in RES; energy efficiency projects with grants/ investmt	Greater investment opportunities through increased number of high-growth start-ups	NO/EU
	Loan and credit guarantees	Govt or institution assumes the debt of a borrower in case of default.	Decreases financial institutions risks in extending credit	YES
	Direct public financing	Financing provided by govts or institutions in the form of equity, debt or quasi debt, sometimes as a PPP	When combined with PPP, improves investment condition for financial institutions	YES
	Grant funding	A scheme whereby govt agencies or institutions offer funding for projects, programs and feasibility studies. Grant funding provided within a PPP.	Increases awareness of successful projects financed with grants. Improves investment conditions for financial institutions	YES
Information	Green banking guidelines and/or establishment of a Green Bank	Govt agencies, central banks provide guidelines for activities which reduce environmental risk in credit decisions, assessing clean technologies, etc.	Increases financial institutions' awareness of opportunities in green banking	NO

Appendix B. Mapping NDC measures Against Investment Criteria

ENDC measures and policies	Data from NDC			North Macedonia NDC Goals		Commercial Appeal to Private Sector		Intl Finance	Govt Policy Leverage		
	Cost/ budget € M	No of Jobs	GHG emission Reductions (tons)	1. Contributes most to NDC GHG targets	2. Maximises jobs	3. Rapidly declining cost curve	4. High return or low risk technology	5. Appeals to intl finance sources	6. High Leverage through regulation	7. High Leverage thru Carbon Tax	8. High Leverage thru Carbon
<i>Reduction in network losses</i>	€170.0	N/A	323.4								
<i>Large Hydro</i>	€1716	N/A	740.7								
<i>FIT and FiP</i>	€312.1	372	383								
<i>Biomass CHP</i>	€24.3	28	21								
<i>Rooftop solar</i>	€318	443	142								
<i>RES w/o incentives</i>	€1046	1377	189.2								
<i>Solar thermal</i>	€34.8	401	7.2								
<i>Heat pumps</i>	€330.6	38	392.3								
<i>New Construction</i>	€282.7	553	19.8								
<i>New Passive Buildings</i>	€1068	1324	17								
<i>Street lighting municipalities</i>	€19.5	9	32.5								
<i>Replace Incadesent lights</i>	€558	274	401.8								
<i>Retrofitting resid buildings</i>	€941.8	1576	49								
<i>Retrofitting com. buildngs</i>	€530	482	98.2								
<i>Central Heating</i>	€3.2		9.3								
<i>Energy mgmt, manufactng industries</i>	N/A	N/A	67.8								
<i>Efficient electric motors</i>	€99.7	N/A	14.9								
<i>Intro of advancd technologies</i>	€344.8	N/A	128.3								
<i>Renew car fleet</i>	€1659.5		24								
<i>Railways</i>	€180.6		37.2								
<i>Renewal</i>	€1660		24								

<i>national fleet</i>											
<i>Advanced mobility</i>			3.6								
<i>Renewal, other fleet</i>	€2300		64.6								
<i>Electrification of transport</i>	€4132		41.9								
<i>Reduction of CH4 emissions from dairy cows</i>	€2		41.9								
<i>Reduction of N2 from swine</i>	€1		2.1								
<i>Integrated management of forest fires</i>	€1.5		345								
<i>Afforestation</i>	€7.8		312								
<i>Biochar for carbon sink, agricultural land</i>	€47		110								
<i>Solar Irrigation</i>	€47		93.3								
<i>Landfill gas flaring</i>	€20.5		489.7								
<i>Treatment w/ composting</i>	€36.1		108								
<i>Selection of waste - paper</i>	€2.0 €2.1		62.5								

Appendix C. Summary of measures by Financing Strategy

ENDC measures and policies (Ordered by Priority)	Cost/budget € M	No of Jobs	GHG emission Reductions (tons)	Who should finance this measure?	Type of financing Mechanism	Timing	Assumptions/Pre-conditions
Energy Generation							
<i>Reduction in network losses</i>	€170		323.4	EIB EBRD	Long term loans	Right away; timeframe within 2 years.	Integration of W Balkan grid; necessary to integrate RES
<i>FIT and FiP</i>	€312	372	383	Private Investors/ Banks	Project financing	Right away	Need to harmonise with EU rules; prepare shovel-ready projects
<i>RES w/o incentives</i>	€1,046	1377	189.2	IPA II EIB/EBRD Supplier Credit	Blended finance, risk reduction	To follow FIT and FiP projects in line with EU standards; implement after carbon tax	Need to harmonise with EU rules; prepare shovel-ready projects
<i>Rooftop solar</i>	€318	443	142	Private Investors Seller finance	Third party finance with free energy audits,	Right away	Funds on-lent through banks
<i>Large Hydro</i>	€1,716		740.7	IPA II EIB/EBRD If IHA environmental rules are met	Commerc'l Banks	Large Hydro after wind and solar tenders; due to envirm issues to addressed	Subsidies reduced so they are the same as other RES
Lighting and Building							
<i>Replace Incadesnt lights</i>	€558	274	401.8	Third party finance to commercial entities; EBRD regional funding	Energy savings contracts	Right away	Publicity and free light bulb schemes. Free energy audits
<i>Street lighting municipalities</i>	€19.5	9	32.5	Budgets/3rd party finance; GCF Green Cities Program	Energy savings contracts	Right away- immediate savings.	Tie municipal budgets to implementation
<i>New Passive Buildings</i>	€1,068	1324	17	Private finance - developer	Long term "green" loans or mortgage	After regulation are in place	Regulations to be put in place
<i>New Construction</i>	€283	553	19.8	Developer pays	Long term "green" loans or mortgage	After regulation are in place	Regulations to be put in place
<i>Retrofitting residential buildings</i>	€942	1576	49	Habitat for Humanity, REEP Plus, EBRD; Commercial banks,	Low interest loans to families; onlending from govt to municipi.	Right away- immediate savings and reduction in energy poverty	UNOPS grants for preparing regulations EBRD aid for energy audits

ENDC measures and policies (Ordered by Priority)	Cost/budget € M	No of Jobs	GHG emission Reductions (tons)	Who should finance this measure?	Type of financing Mechanism	Timing	Assumptions/Pre-conditions
<i>Retrofitting commercial buildngs</i>	€530	482	98.2	Companies' balance sheets; REEP Plus, EBRD; Commercial banks	"Green" loans or bonds; Green mortgages	Right away-immediate savings.	UNOPS grants for preparation of regulations EBRD aid for energy audits
<i>Heat pumps</i>	€331	38	392.3	Tax incentives, municipal budgets, Housing associations REEP Plus, EBRD; Commercial banks	Home budgets, subsidies from government for fuel poverty	Heating and electricity transition must be addressed together, so in tandem with phasing out of fossil fuels for heating.	Part of overall regulation to defossilize heating
<i>Biomass CHP</i>	€24	28	21	KfW grants EU Private investors	Blended finance	Small sector - so not so urgent. Medium term	PPAs with distributor needs to be possible, or sell to private heating customer
<i>Solar thermal/solar thermal PV (Hybrid)</i>	€35	401	7.2	Supplier credit Third party finance REEP	Energy Savings contracts	Medium term. Target technology; start prototypes	Net metering would be helpful
<i>Central Heating</i>	€3.2	N/A	9.3	Municipal Budgets to pay for District Heating, EBRD	National budgets	Broad trend toward distributed heating; is this infrastructure justified?	
IPPU							
<i>Energy mgmt, manufacturng industries</i>	N/A	N/A	67.8	Companies' balance sheets; Private Energy efficiency funds, REEP Plus, EBRD; Local banks	"Green" loans or bonds for "inside the fence" investments; energy contracts. Carbon Finance	Immediate launch of incentives	Energy efficiency regulation on motors, lights Carbon Tax
<i>Intro of advanced technologies</i>	€345	N/A	128.3	Companies' balance sheets; Energy effc funds	Reduce operating cost/ private investment	Long term	Energy efficiency regulation on motors, lights Carbon Tax
<i>Efficient electric motors</i>	€100	N/A	14.9	Companies' balance sheets; Energy effc funds	Reduction operating cost/ private investment	Medium term	Reduce subsidies for diesel
Transport							
<i>Renew car fleet</i>	€1,660	N/A	24	Car financing, tax incentives	Green Leases, car loans	Long term	Mileage regulations Old car purchase program Tax incentives for less polluting cars
<i>Railways</i>	€181	N/A	37.2	Long term borrowing, EIB EBRD	Government bonds	Medium term	Compliance with EU regulations
<i>Renewal, fleet</i>	€2,300	N/A	64.6				

ENDC measures and policies (Ordered by Priority)	Cost/budget € M	No of Jobs	GHG emission Reductions (tons)	Who should finance this measure?	Type of financing Mechanism	Timing	Assumptions/Pre-conditions
<i>Electrification of transport</i>	€4,132	N/A	41.9	EBRD, EU and multi-donor; Asset finance by manufacturer	Long term govt borrowing, E5P-financed electric "green" buses	Continue from program in 2020	Regulations on emissions, inner city low pollution zones
Agriculture and Forestry							
<i>Reduction of CH4 emissions from dairy cows</i>	€0.2	N/A	41.9	Carbon offset project Third party funding from project developer	Direct investment plus offsets	Short to Medium term, make use of offset markets	Incentivise farmers
<i>Reduction of N2 from swine</i>	€1	N/A	2.1	Carbon offset project Seek third party funding from project developer	Direct investment plus offsets	Short to Medium term, make use of offset markets	Incentivise farmers
<i>Integrated management of forest fires</i>	€1.5	N/A	345	Could be integrated with biomass project	Government budget	Short to medium term, make use of offset markets	Compliance with EU
<i>Afforestation</i>	€8	N/A	312	Carbon offset project EU and ICCC	Carbon developers	Short to medium term, make use of offset markets	Compliance with EU regulations
<i>Biochar for carbon sink, agricultural land</i>	€47	N/A	110	Carbon offset project EU and ICCC priority Seek third party funding developer	Manufacturing unit finance from the EU Carbon developers	Short to medium term, make use of offset markets	Feasibility report
<i>Solar Irrigation</i>	€47	N/A	93.3	Project developers, farm owners	Private or third party finance.		No barriers to implementation
<i>Landfill gas flaring</i>	€21	N/A	489.7	Carbon offset project EU and ICCC priority Seek third party funding developer	Private or third party finance.	Short to medium term, make use of offset markets	Landfill gas project pipeline with basic information on methane resources