

**Current status of the research, development,
innovation and technology transfer related to
climate change in the Republic of North Macedonia**

- Rapid Assessment Report -

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*Empowered lives.
Resilient nations.*

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List of Abbreviations

BUR	Biennial Update Report
CTCN	Climate Technology Centre and Network
DTU	Danish Technical University
EGTT	Expert Group on Technology Transfer
FTA	Fast Technical Assistance
GCF	Green Climate Fund
GEF	Global Environment Facility
LPAA	Lima-Paris Action Agenda
NAMA	Nationally Appropriate Mitigation Plan
NAP	National Adaptation Plan
NAZCA	Non-state Actor Zone for Climate Action
NC	National Communication
NDE	National Designated Entity
NGO	Non-Governmental Organisation
TA	Technical Assistance
TAP	Technology Action Plan
TEC	Technology Executive Committee
TT	Technology Transfer
UK	United Kingdom
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
R&DITT to CC	Research & Development, Innovation and Technology Transfer for Climate Change

CHAPTER 1:

Introduction

1.1 Climate change – globally and nationally

Climate change is one of the most pressing issues of the global community for the 21st century. The primary cause of climate change is increased concentrations of greenhouse gas (GHG) emissions due to human activities, such as combustion of fossil fuels, deforestation and increased methane emissions.

The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty adopted on 9 May 1992 and opened for signature at the Earth Summit in Rio de Janeiro from 3 to 14 June 1992, as a response to the emerging impacts of the climate change. It then entered into force on 21 March 1994, after a sufficient number of countries had ratified it. The UNFCCC objective is to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system" [1]. In this context, the term "climate technologies" is frequently used and refers to the technologies that we use to address climate change. Climate technologies that help us reduce greenhouse gas emissions include renewable energies such as wind energy, solar power and hydropower. To adapt to the adverse effects of climate change, we use climate technologies such as drought-resistant crops, early warning systems and sea walls. There are also 'soft' climate technologies, such as energy-efficient practices or training for using equipment.

Acknowledging the significance of the climate change problem and the necessity to take effective actions for its mitigation, Republic of North Macedonia ratified the UN Framework Convention on Climate Change (UNFCCC) on December 4, 1997 (Official Gazette of RM – 61/97), and became a party to the Convention on April 28, 1998. The Ministry of Environment and Physical Planning (MoEPP) has been designated as the National Focal Point to the UNFCCC, the key governmental body responsible for policy making with regard to the provisions of the UNFCCC ("Official Gazette of RM" No 61/97). Moreover, Republic of North Macedonia with an assistance of UNDP has developed and adopted dedicated National Strategy for Clean Development Mechanism for the first commitment period of the Kyoto Protocol, 2008-2012.

1.2 Objectives and structure of the report

This report is part of the project 00110592 "Macedonia's Fourth National Communication and Third Biennial Update Report on Climate Change under the UNFCCC", implemented by the Ministry of Environment and Physical Planning, with technical and financial support from the United Nations

Development Programme (UNDP) and the Global Environmental Facility (GEF). The immediate objective of the project is to assist the country in the preparation and submission of its Fourth National Communication and Third Biennial Update Report on Climate Change to the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) for the fulfilment of its obligations to the Convention.

In 2010 the Technology Mechanism TT: Clear, as an instrument for transfer of technology and technological and institutional development between the member states of the UNFCCC was established to facilitate the implementation of enhanced action on technology development and transfer to support action on mitigation and adaptation in order to achieve the full implementation of the Convention. **Macedonian government has not nominated a National Designated Entity under this UNFCCC mechanism for climate technology yet.**

This report presents the rapid assessment that was conducted for determining the current status of the research, development, innovation and technology transfer related to climate change in Republic of North Macedonia, summarizes the main principles of the UNFCCC TT: Clear Mechanism and possibilities for its utilization in the country, and **proposes the most appropriate institutions for the National Designated Entity for this mechanism**, providing initial recommendations and guides for the process of its utilization.

The report is structured in six chapters. The first chapter is introductory and provides brief overview of the climate change and objectives and structure of the report. The second chapter analyses the possibilities, benefits and requirements for using the TT Clear Mechanism. In the third chapter, the other mechanisms related to climate change are explored and analysed. The greatest share of this chapter is dedicated to the on-going and forthcoming programs of the European Union. In addition to this, all relevant national, regional and international funding programmes, such as national governmental initiatives, organisations for support of innovations and technology development, bilateral donor programmes and nature trusts for protecting the environment. The fourth chapter analyses the implemented and on-going projects, actions or initiatives and selects those which refer to research, development, innovation and technology transfer related to climate change. The analysis brings to light evidence-based conclusions on the national strengths, weaknesses and main gaps in respect to this field. In the fifth chapter, the legal setting in Republic of North Macedonia in respect to the environment and climate change is discussed. In addition, the relevant institutions from all three societal sectors (public, private and NGO/CSO) are considered and assessed, and **the top most appropriate institutions for NDE for the TT Clear Mechanism are proposed**. And finally, the last chapter of this report concludes the current state of development of R&D, innovation and technology transfer for climate change, summarizes the legal and institutional setup and capacities appropriate for NDE, and provides recommendations for the process of utilization of the TT Clear Mechanism in the country. The selected projects funded from all researched funding sources and donors are provided in the list of annexes.

This report will assist UNDP and the Ministry of Environment and Physical Planning (MoEPP) in the preparation of Macedonia's Fourth National Communication (NC) and Third Biennial Update Report (BUR) on Climate Change under the UNFCCC. Moreover, the analyses of the implemented, on-going and planned initiatives related to climate change that were conducted in greater depth could be significant source for inputs that will assist the policymakers and the donors in the process of planning and projecting the future programmes, measures and strategic steps.

CHAPTER 2:
Summary about the UNFCCC
Technology Transfer Mechanism

2.1 UNFCCC Technology Mechanism and its web platform

The UN's climate and technology website, TT:CLEAR, which was established in 2001, has a long history in facilitating the development and transfer of climate technologies. Today it serves as a web platform for climate technologies and provides information on the Technology Mechanism, the Technology Executive Committee and Technology Needs Assessments, as well as technology projects from around the world, connections to the community and virtual participation to various climate-related events via the CTCN (Climate Technology Center and Network). CTCN is established for fulfilling the connectivity needs and linking the technology climate solutions. The CTCN, together with the Technology Executive Committee is part of the Technology Mechanism, which was promoted in 2010 as a practice for enhancing technology development and transfer to developing countries and is under the guidance of and accountable to the Conference of the Parties (Fig. 2.1).

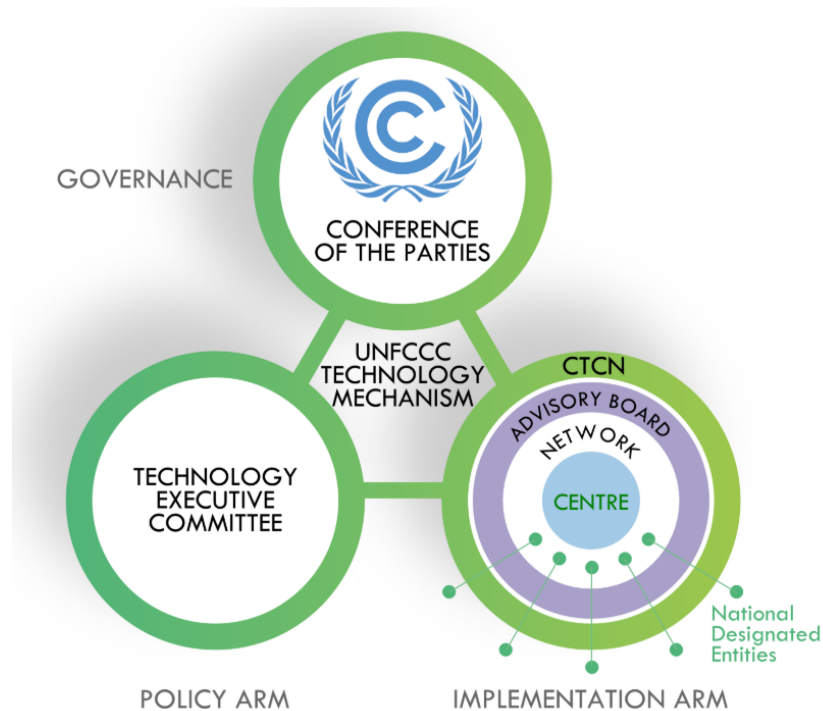


Fig. 2.1 Structure of the UNFCCC Technology Mechanism [2]

The Technology Executive Committee and the Climate Technology Centre and Network work together to enhance climate technology activities. Their functions are complementary and support developing country efforts to address both policy and implementation aspects of climate technology development and transfer. The Conference of the Parties (COP) invited Parties to nominate their national designated entities (NDEs) for the development and transfer of technologies, pursuant to in order to facilitate the operationalization of the CTCN. The NDEs serve as national bodies in charged

for the development and transfer of technologies and as focal points for interacting with the Climate Technology Centre regarding requests from developing country Parties about their technology needs.

The **Technology Executive Committee** is the Technology Mechanism's policy body. It analyses issues and provides policy recommendations that support country efforts to enhance climate technology development and transfer. The committee consists of 20 technology experts representing both developed and developing countries. It meets several times a year and holds climate technology events that support efforts to address key technology policy issues. Since its inception in 2010, the TEC has undertaken work on key areas of climate technology development and transfer. These include: climate technology financing; enabling environments and barriers; national systems of innovation; research, development and demonstration of technology; technologies for adaptation; technologies for mitigation; technology needs assessments; technology road maps; and strategic and emerging issues. The functions of the TEC are:

- Provide an overview of countries' climate technology needs;
- Analyse policy and technical issues related to climate technology development and transfer;
- Recommend actions to promote climate technology development and transfer;
- Recommend guidance on climate technology policies and programmes;
- Promote and facilitate collaboration between climate technology stakeholders;
- Recommend actions to address barriers to climate technology development and transfer;
- Seek cooperation with stakeholders and promote coherence across technology activities;
- Catalyse the development and use of climate technology road maps and action plans.

The **Climate Technology Centre and Network** is the implementation body of the Technology Mechanism. The centre is hosted by the UN Environment in collaboration with the United Nations Industrial Development Organization, and is supported by 11 partner institutions. It also has a network of national, regional, sectorial and international organizations which support it to undertake its services. The CTCN is accountable to and guided by the Conference of the Parties through an advisory board. Developing countries may send a request to the centre through their national focal point, called a national designated entity. It accelerates the development and transfer of technologies through three services:

- Providing technical assistance at the request of developing countries on technology issues
- Creating access to information and knowledge on climate technologies
- Fostering collaboration among climate technology stakeholders via its network of regional and sectorial experts.

The CTCN delivers five main types of technical support on climate technologies:

- Technical assessments, including technical expertise and recommendations related to specific technology needs, identification of technologies, technology barriers, technology efficiency, as well as piloting and deployment of technologies;
- Technical support for policy and planning documents, include strategies and policies, roadmaps and action plans, regulations and legal measures;
- Trainings;
- Tools and methodologies; and
- Implementation plans.

The CTCN's online knowledge portal, at <www.ctc-n.org>, serves as a gateway to the CTCN's technical assistance and capacity-building services. It also serves as a library of climate technology information and tools, organized by geographical region and technology sector, which is made available through an open-source database. In addition, the CTCN provides training and support to strengthen developing country capacity to identify technology options, make technology choices and operate, maintain and adapt technologies.

Although the CTCN provides technical assistance rather than direct funding to countries, in some cases the CTCN can help to play a matchmaking role with funding sources.

It should be underlined that climate or clean technologies has now grown into third largest venture capital investment sector behind information technologies and biotechnologies. Clean technologies (clean energy, efficiency, energy storage, transportation, clean industry, air and environment, water and agriculture) represent different products, services and processes, all intended to reducing or eliminating negative environmental impact and to improving responsible use of natural resources.

2.1.1 Technology Transfer Framework

In 2001 countries created the technology transfer framework, known officially as the framework for actions to enhance the implementation of Article 4, paragraph 5, of the Convention. The technology transfer framework covers five key technology themes:

- **Technology needs and needs assessments.** This theme refers to a set of country-driven activities that identify and determine the mitigation and adaptation technology priorities of certain developing country;
- **Technology information.** This theme serves to establish an efficient information system in support of technology transfer and to improve the generation and flow of, access to, and quality of technical, economic, environmental and regulatory information;
- **Enabling environments for technology transfer.** This theme focuses on government actions, such as fair trade policies, removal of technical, legal and administrative barriers to technology transfer, sound economic policy, regulatory frameworks and transparency, in order to create effective environment for private and public sector technology transfer;
- **Capacity-building for technology transfer.** This theme aims to strengthen the capability of institutions and actors, as well as to improve existing scientific and technical skills for transfer of technologies in the developing countries; and
- **Mechanisms for technology transfer,** for facilitation the support of financial, institutional and methodological activities, with the following 4 sub-themes:
 - innovative financing;
 - international cooperation;
 - endogenous development of technologies; and
 - collaborative research and development.

2.2 Financial support through the financial mechanism

The financial mechanism under the UNFCCC Convention provides financial resources (grants and lending instruments) to assist developing 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);
- Green Climate Fund (GCF).

2.2.1 GEF (Global Environment Facility)

The **Global Environment Facility** (GEF) was established in 1991 as the financial mechanism of the main multilateral environmental agreements. GEF is the largest funder worldwide of projects aiming to generate global environmental benefits, while supporting national sustainable development initiatives. Since the first session of the UNFCCC Conference of Parties (COP), in Germany, 1995, the GEF has served as an operating entity of the financial mechanism of the Convention.

The GEF has 183 member countries. GEF funds are contributed by donor countries, available to developing countries. The financial contributions are replenished every four years by donor countries and up to 2022, from GEF1 to GEF7, there are allocated US\$24.5 billion, up-to-date allocated US\$18.3 billion, supplemented by more than US\$115 billion in co-financing for over 4,890 projects.

According to the Instrument for the Establishing the **Restructured GEF**, from March 2015 [3], the GEF Trust Fund is established with replacement and terminating of the previous existing Global Environment Trust Fund (GET).

Restructured GEF has 18 partner Agencies where implementing Agencies are UNDP, UNEP, UNIDO, EBRD and World Bank. The World Bank serves as the **GEF Trustee**, administering the GEF Trust Fund, contributions by donors. The Trustee helps mobilize GEF resources, disburses funds to GEF Agencies and prepares reporting and monitoring helping in lending investment focusing on institution building, infrastructure development and policy reform across all the focal areas of the GEF. The GEF Council approved a new GEF Policy on Gender Equality (GEF, 2017) in November 2017. The Policy marks GEF's increased ambition to ensure gender equality and promote women's empowerment across its operations.

GEF supports **technology transfer** to help developing countries address global environmental challenges. It is leading funding source for the transfer of **environmentally sound technologies** (ESTs) to address climate change, having supported technology transfer activities in 168 developing countries.

Based on **Poznan Strategic Programme on Technology Transfer**, under UNFCCC COP14 (2008), the GEF supports technology transfer through three funding windows designed to: (i) Conduct technology needs assessments; (ii) Support pilot priority technology projects linked to technology needs assessments; and (iii) Disseminate GEF experience and successfully demonstrated ESTs.

The objective of the Poznan Strategic Programme is to scale up investment in technology transfer to help developing countries address their needs for ESTs. According to these objectives, under UNFCCC COP16 (2010), UNFCCC establishes a **Technology Mechanism**, consisting of:

- Technology Executive Committee and
- **Climate Technology Centres and Network (CTCN).**

During the UNFCCC COP18 (2012), **UNEP** is selected as a host of CTCN, an important part of the Technology Mechanism. Until now, GEF is supporting four regional projects and Climate Technology Centers and Network through one global project, with investment over \$40 million and leveraged over \$300 million for promoting accelerated transfer and scaled-up deployment of climate change technologies. Two CTCN are established Pilot Asia-Pacific and Pilot African CTCN.

Under GEF operated other trust funds, where the one of them supports technology transfer activities:

- **Special Climate Change Fund (SCCF)**

Through the GEF with guidance from UNFCCC, the Special Climate Change Fund (SCCF) targets two key sectors for adaptation and **technology transfer** in all development country parties to the UNFCCC. SCCF supports both long-term and short-term adaptation activities in water resources management, land management, agriculture, health, infrastructure development, ecosystems and coastal zone management.

The technology transfer window (SCCF-W) of the SCCF

Through this SCCF-B window, the GEF supports the **transfer** of climate-resilient technology for both mitigation and adaptation. This goes together with support to help countries put the technology to use and apply research, as well as to implement demonstration and deployment projects.

The GEF has the following roles in the **long-term** implementation of the **Strategic Programme on Technology Transfer**:

- Support for Climate Technology Centers and Climate Technology Network;
- Piloting priority technology projects to foster innovation and investments;
- Private-Public partnership for technology transfer;
- Technology Needs Assessment;
- GEF as a catalytic supporting institution for technology transfer.

2.2.1.1 GEF in the Republic of North Macedonia

North Macedonia is a member of a constituency of GEF till 1994. Since then, North Macedonia has received grants of US\$ 154.227.107,00 with leveraging in co-financing of US\$ 799.305.350, 00 for 23 national projects, 14 regional and 4 global projects.

For the reported period 2014-2020, GEF dataset [4] of the projects consists: 5 national, 3 regional and 1 global projects approved under the GEF-6 (2014-2018), managed under implementing agencies UNDP, UNEP and EBRD and 1 regional project under the GEF-7 (2018-2022) as concept approved, under implementing agency EBRD.

The list of approved and under realization GEF projects includes 4 projects in climate change, 2 in biodiversity, 2 in land degradation, 1 in chemical and waste and 1 in multi-focal areas. Distribution of the projects by focal areas is presented on the Fig. 2.2. The full list for GEF projects is provided in *Annex 1*.

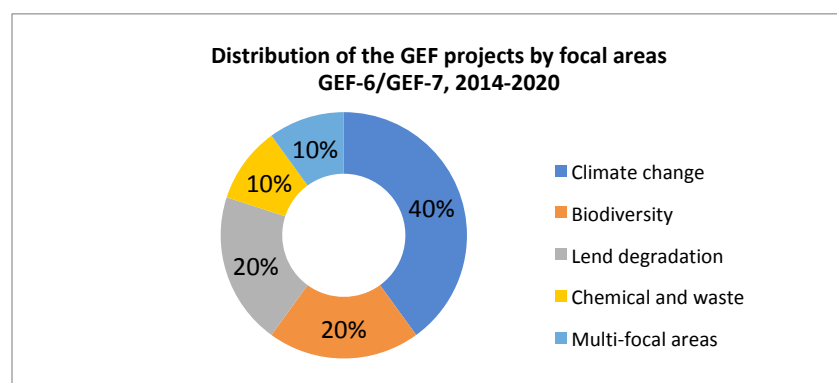


Fig. 2.2 Distribution of the GEF projects by focal areas, period 2014-2020

During the current replenishment period, GEF-6 and GEF-7, the country has received an indicative allocation of US\$ 6.110.487,00 to execute projects, distributed on focal areas: US\$ 1.500.000, 00 in biodiversity, US\$ 2.000.000, 00 in climate change and US\$ 2.610.487, 00 US\$ in land degradation. Total programed funding of GEF projects, according to dataset [2] and date in *Annex 1*, consists grants amount of US\$ 39.511.943,00 and leveraging in co-financing US\$ 322.459.795,00.

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.

2.2.2 GCF (Green Climate Fund)

The Green Climate Fund is operating entity of the financial mechanism of the UNFCCC and of the Paris Agreement [5]. It was established in 2010 by the 194 countries party to the United Nation Framework Convention on Climate Change as an operating entity of the Financial Mechanism of the Convention. Paragraph 2 of the GCF's Governing Instrument states its mandate as follows: In the context of sustainable development, the Fund will promote the paradigm shift towards low-emission

and climate resilient development pathways by providing support to developing countries to limit or reduce their greenhouse gas emissions and to adapt to the impacts of climate change, taking into account the needs of those developing countries particularly vulnerable to the adverse effects of climate change. GCF's investments are aimed at achieving maximum impact in the developing world, supporting paradigm shifts in both mitigation and adaptation. The Fund aims for a 50:50 balance between mitigation and adaptation investments over time. It also aims for a floor of 50 percent of the adaptation allocation for particularly vulnerable countries, including Least Developed Countries (LDCs), Small Island Developing States (SIDS), and African States [6].

GCF is the world's largest multilateral climate fund, having disbursed \$911m to 105 developing countries. The total number of approved projects is 124, for which the total \$5.62b funding is allocated by GCF. The total value of the approved projects including the co-financing is \$20.62b. Thematically, 25% of the approved projects fall in the category "adaptation", 41% for the category "mitigation", while the rest 34% cover the "cross-cutting" actions [7].

In respect to the geographic distribution of the GCF projects, the greatest share of the value of approved projects belongs to the priority area: Africa (39.2%), then Least Developed Countries (25%) and Small Island Developing States (18.8%).

GCF makes investments within 8 strategic result areas, in line with the country priorities:

- Energy generation and access;
- Transport;
- Building, cities, industries and appliances;
- Forests and land use;
- Health, food and water security;
- Livelihoods of people and communities;
- Ecosystems and ecosystem services; and
- Infrastructure and the built environment.

GCF funds both, private and public sector. There are 25 projects funded in the private sector (38% with total amount of \$2.1b), while the remaining 99 projects that are funded, belong to the public sector (62% with total amount of \$3.5b). The 5 financial instruments that are available are used in the disbursed funding: Guarantees with 1%; Equity with 9%; Results-based payment with 4%; Loans with 41%; and Grants with 45%.

GCF effectively manages environmental and social risks and impacts in financed activities, ensuring as well equal participation of women, youth, indigenous populations and other minority and highly vulnerable groups. Equality and ensuring accessibility to the resources without discrimination and prejudice are part of the basic guiding principles of the Environmental and Social Policy. From other hand, Environmental and Social Management System aims to reduce conflict, ensure equal benefit and avoid harm to people and ecosystems. The GCF gender policy ensures contribution of the GCF projects to gender equality, to take into account gender aspects where mainstreaming of gender and social factors make climate events more effective, sustainable and efficient. Gender policy is applied to all GCF activities, regardless of whether they are implemented by international, regional, national or subnational, state or private organizations.

GCF invests in adaptation and mitigation activities in developing countries managing the projects implemented by the partner organizations, known as accredited entities. GCF ensures developing

country ownership of climate change funding, based on country-driven approach. It works with appointed National Designated Authority (NDA) in developing countries, as interface between their governments and GCF in order to approve all GCF project activities within the country according to national priorities.

The Cabinet of the Deputy Prime Minister in Charge of Economic Affairs and Coordination of Economic Sectors is **appointed NDA in North Macedonia** for the GCF.

2.2.2.1 GCF in the Republic of North Macedonia

GCF participates into North Macedonia through one **(1) multiple countries cross-cutting project**, 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. Project realization framework is October 2018-September 2034. Total value of this worldwide project is \$585M under EBRD, as accredited entity for technical assistance, with total GCF financing of \$95.9M, out of \$24.3M grant and \$71.6 loan.

For effective investments in climate change adaptation and mitigation, the Green Climate Fund (GCF) has offered **two national GCF readiness and preparatory support projects** for investments in North Macedonia, implemented by FAO under the leadership of the Cabinet of the Deputy President of the Government in charge of economic affairs, in its role as NDA to the GCF. The engagement with the Green Climate Fund through the readiness support facilitates the country to consolidate its efforts to have national and global impact and streamline a sustainable and green aspect to its economic development and also, to be able to create a Country Work Programme (CWP) for the GCF.

Within the country's **first project** under this GCF readiness and preparatory support programme [8], FAO supported the Government to set up the national mechanism, institutional framework, and procedures needed to effectively access and deploy resources from the Fund. Aligned with national priorities, it should call for bold climate action to stimulate concrete solutions that lower emissions and to help build resilience in priority sectors.

As first **result** of first readiness project at the end of 2019, it should be underlined the beginning of the CWP for the GCF with an open call for project ideas through website (greendevdevelopment.mk) as a key communication tool for knowledge and information sharing on the GCF activities in North Macedonia. All interested stakeholders, including academic institutions, national/local authorities, public and private companies, civil society organization, and other legal entities are invited to submit project ideas that propose climate change adaptation or mitigation actions in at least one of the priority sectors, including energy, transport, water resources, agriculture, waste, biodiversity, health, forestry, and cultural heritage.

CHAPTER 3:
**Other mechanisms related to climate
change and possibilities for funding**

3.1 EU mechanisms

In March 2010, the European Commission (EC) adopted its **Europe 2020 Strategy** [9] for smart, sustainable and inclusive growth, designed to deliver EU agenda for growing in the current decade. It emphasizes three reinforcing priorities of smart, sustainable and inclusive growth, designed to improve Europe's competitiveness, productivity and sustainable social market economy. The EU has adopted five strategic targets to be reached by 2020, related to: Employment, Research & Development, Climate change& energy (CC), Education and Social exclusion. According to strategy, the targets are measurable by indicators and to be reached by 2020. The **CC target, which is** in the focus of this report, is measurable with follow indicators: reducing greenhouse gas emissions by at least 20% compared to the 1990 level, increasing the share of renewable energy in final energy consumption to 20%, moving towards a 20% increase in energy efficiency.

Nowadays, it is clear that Europe 2020 Strategy has provided an important contribution to the EU's socio-economic development since its launch in 2010 [10]: record high employment, the greenhouse gas emissions objective has been met, the renewable energy and energy efficiency targets are on track. However, EU enforces progress according to targets of 2020 Strategy with stimulating research, innovation and investment in projects through different **EU financial mechanisms**.

In order to achieve these targets of Europe 2020 Strategy, a wide range of funding opportunities are available through **Competitive Programmes** of the EU for the period 2014-2020. EU Competitive Programmes (EU funding mechanisms) are programmes financed directly from the EU's budget in the form of grants and cover priorities, as defined by the EU and aimed at contributing to the implementation of EU policies. They 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).

The large list of EU Competitive Programmes (2014-2020) enforces progress through financing the projects in different thematic categories. In this report are presented Programmes as EU mechanisms for funding the projects, selected by thematic categories in line with 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 the countries in the pre-accession phase as North Macedonia.

3.1.1 Horizon 2020 the Framework Programme

From 2014, according to EU Regulation [11], all the European Union mechanism, programmes and funding opportunities for the science, innovation, technology and society, are under **Horizon 2020 the Framework Programme** for research and innovation, for period 2014-2020, with total projected investment of 75€ billion. Horizon 2020 is implemented via **multiannual work programmes** that integrate EU policy objectives in the priority setting, prepared by the EC and advisory consultative

groups from industry, research and society. **The first** Multiannual work programmes (2014-15) providing an investment of around €13 billion; **the second** (2016-2017) with around €27 billion and on-going **third** work programme (2018-2020) that will provide further investments of around €35 billion in research and innovation.

Horizon 2020 is complemented by the separate work programmes that cover projects funding in following topics, where each topic consist packages of actions. List of **topics in Horizon 2020** consists: Excellent science, Industrial leadership, Society challenges, Science with and for society, Spreading excellence and widening participation, European Innovation Council (EIC), European Institute of Innovation and Technology (EIT), Euratom and Focus areas. Across the topics in Horizon 2020, gender dimension is a cross-cutting issue and is mainstreamed in each of the different parts of the Programme, in order to ensure fostering gender balance in research teams and in decision-making.

From 2014, Horizon 2020 has offered several key funding opportunities, through **packages of actions** in above mentioned topics, to support research, innovation and technology transfer projects related to CC for countries in the pre-accession phase, as North Macedonia:

- **Excellent science** through packages of actions: Future and emerging technologies and Research infrastructure;
- **Industrial leadership** through packages of actions: Leadership in enabling and industrial technologies and Innovation in SMEs;
- **Societal challenges** through packages of actions: Secure, clean and efficient energy, Smart, green and integrated transport, Climate action, environment, resource efficiency and raw materials and Food security, sustainable agriculture and forestry;
- **Science with and for society** through package of actions: Responsible research and innovation;
- **EIC** through packages of actions: EIC Accelerator, Fast track to innovation, Future and emerging technologies;
- **EIT**, an independent EU body and integral part of Horizon 2020 with focus to strength Europe's ability to innovate and to support creating sustainable economic growth, through his 'knowledge triangle' based cross-border partnerships called Innovation Communities (IC):
 - EIT Climate IC - addressing climate change adaptation and mitigation challenges,
 - EIT Inno Energy IC - achieving sustainable energy;
 - EIT Raw materials IC - ensuring the accessibility, availability and sustainable use of raw materials for the economy and citizens;
 - EIT Food IC - creating leaders of a global revolution in food innovation and production.

New **Work Programme 2018-2020** is the last for Horizon 2020 [12] based on EU policy priorities with goal to provide funding opportunities and projects support that will enlarge EU competitiveness, technology development, innovation for society and businesses, building market share and employment generating. This Work Programme has been fully updated with new objectives in the light of emerging priorities and connecting with the forthcoming **Horizon Europe** programme, the next research and innovation framework programme.

This Work Programme identifies **few key novelties**, that directly correlating with research, innovation and technology transfer to CC and SD:

- Actions towards **three O's policies** of Open innovation, Open science and Open to the world;
- Actions with strong commitment to sustainable development and quality of life in EU, as well as the EU's position in the world, towards implementation of **Sustainable Development Goals** (SDG);
- Actions defined through **four** mutually reinforcing **Focus Areas** that are aligned to EU's major policy priorities and three of them directly tackled CC:
 1. Building a low-carbon, climate resilient future (LC),
 2. Connecting economic and environmental gains – the Circular Economy (CE),
 3. Digitising and transforming European industry and services (DT), and
 4. Boosting the effectiveness of the Security Union (SU).

Within **first Focus Area LC** (total budget €3706 million): The EU confirmed in 2016 its commitment to the Paris Agreement by adopting the “Clean Energy for all Europeans” legislative package [13], which includes a EC Communication on Accelerating Clean Energy Innovation. Its proposed twenty actions in four key areas that have potential to fast track the research, innovation, technology transfer and market-introduction to technologies based of LC: decarbonising Europe's building stock, strengthening the EU's leadership in renewable energy, developing integrated and affordable energy storage solutions and electro-mobility.

Within **second Focus Area CE LC** (total budget €1019 million): It is planned to support transition to a circular economy and to consolidate relevant research& development and innovative initiatives to make strong contribution to sustainable development goals (budget of €1 billion), to climate action and to industrial competitiveness, by enabling industrial symbiosis and developing new business models and sustainable businesses, in order to minimise waste and pollution, to use resources efficiently by digitalization and high-technology readiness level.

Within **third Focus Area DT LC** (total budget €1796 million): Advances related to digitisation, underpinned by key enabling technologies (KETs), will transform industry and services (budget of €1,8 billion) and provide technology transfer solutions to several major societal challenges, such as tackling climate change through reducing energy and resources consumption as well as waste, increasing the efficiency of transport systems, improving the production in agriculture and food systems.

This work programme 2018-2020, last in Horizon 2020 Framework Programme, has consisted increased investment in sustainable development and climate related R&I. In the light of the Paris Agreement, marking a new era in the fight against climate change, the Horizon 2020 will invest at least 35% of its total budget for climate actions where more than 60% programme's objectives contributing to sustainable development, including in areas like health, food, energy, transport and resource efficiency.

Levels of EU co-financing rate for this Programme are different by actions:

- Coordination and Support actions 100%
- Research and Innovation actions 100%
- Innovation actions 70% (except for non-profit legal entities - 100%)
- Pre-commercial procurement (PCP) Co-fund 70%

Beneficiary partners are: private sector, public sector, non-profit organization, academic institutions and research centers.

3.1.1.1 Horizon 2020 in the Republic of North Macedonia

All opportunities in frame of Horizon 2020 the Framework Programme are open for beneficiary partners from North Macedonia. The Ministry of Education and Science (MES) is the national designated entity responsible for **H2020 Framework Programme** and Work Programme 2018-2020 in North Macedonia.

According to EU statistics [14] for the period 2014-2020, full list of the approved H2020 projects with participation of the partners from North Macedonia contains **63** projects with total received funding of €8.87 million. Number of organizations from NM, involved as partners in H2020 projects, is 85 where 79 organizations are from Skopje's planning region, 2 from Pelagonia's region, 2 from South-West region, by 1 from Polog's region and East region.

Figure 3.1 provides information about the diversification of the H2020 funding received, by type of organization with net part from total EU budget contribution. Evident is that the largest beneficiary is private sector with 20 participation and net EU contribution of €2.64M (share 30%), then higher education with 25 participation and €2.36M (26%), research organizations with 19 participation and €1.83M (21%), public bodies with 8 participation and €1.14M (13%) and other with 13 participation and €0.89M (10%).

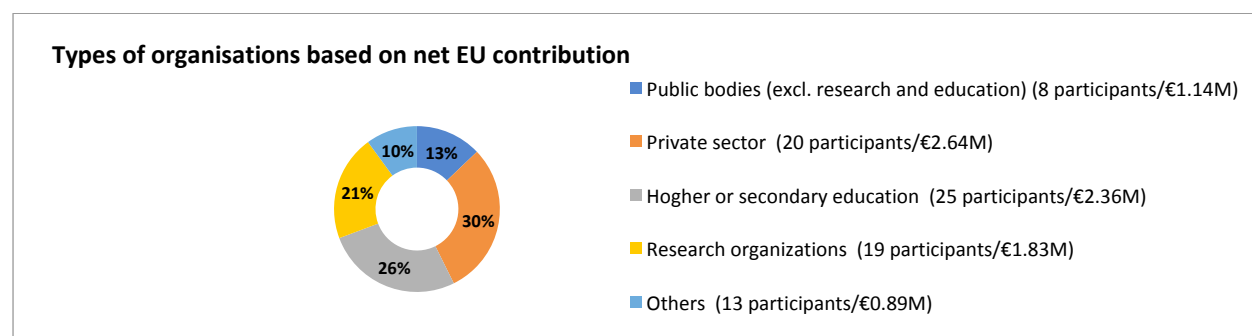


Fig. 3.1 Types of organisations from the country based on net EU budget contribution

The complete list of R&D, innovation and technology development projects consists **52** projects with total allocated amount of **€5.681.192,00** (EU financing and co-financing for all members of consortia) presented in **Annex 2** of this Report, as funded by the H2020 for period 2014-2020.

Selecting that list of projects by criteria to be directly/or indirectly related to the climate change (R&DITT to CC), there are listed 38 projects. That means that total share of the climate related from all funded projects with Macedonian participation is about 60%.

Analysis of the funded projects by instruments of H2020 (Fig. 3.2) presents highest numbers of projects under Research Innovation Action and Coordination and Support Action, within 15 projects per action. The highest financed amount with €2.442.290,00 is under Innovation Action.

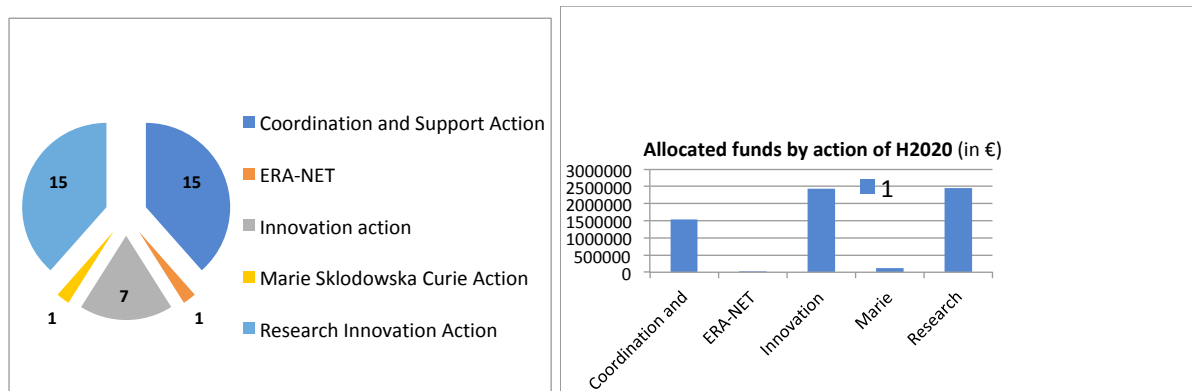


Fig. 3.2 Number of R&D/ITT projects related to climate change with allocated funds by action of H2020

It should be underlined that through this allocated H2020 budgets, the country has strengthened research potentials and innovation capacity for development of the technologies and their transfer with direct or indirect impact on the climate change mitigation. The objectives and main expected results of the listed projects in Annex 2 are classified into policies connected to climate, as: secure, clean and efficient energy, low-cost low-carbon energy supply, climate action, environment, resource efficiency and raw materials, smart, green and integrated transport, increasing production efficiency coping with climate change and ensuring sustainability.

3.1.2 Forthcoming Horizon Europe

The part of the Horizon 2020 work Programme 2018-20 with calls and topics for 2020 has been fully updated, with all the content in order to revitalise and reset the programme in the light of emerging priorities and connecting with the forthcoming Horizon Europe programme, the next research and innovation framework programme.

New content extended to address new policy priorities of Horizon Europe are included in Programme 2018-20 within the calls for 2020 in focus areas, through the follow topics, more of them connected to CC: a) Next generation of batteries, b) Secure, clean & efficient energy, c) Plastics, d) Competitive, low-carbon and circular Industries, e) Climate action, environment, resource efficiency & raw materials, f) Health, demographic change, g) Secure societies and h) Artificial Intelligence.

In April 2019, agreement for European Union Framework Programme for research and innovation (2021-2027) Horizon Europe has been reached by the European Parliament and the Council of the Union [15] with budget of €100 billion. According to this agreement, Horizon Europe will be structured in three Pillars with ensuring cross-cutting promotion of gender equality, supported by activities aimed at widening participation and strengthening the European Research Area (Fig. 3.3).

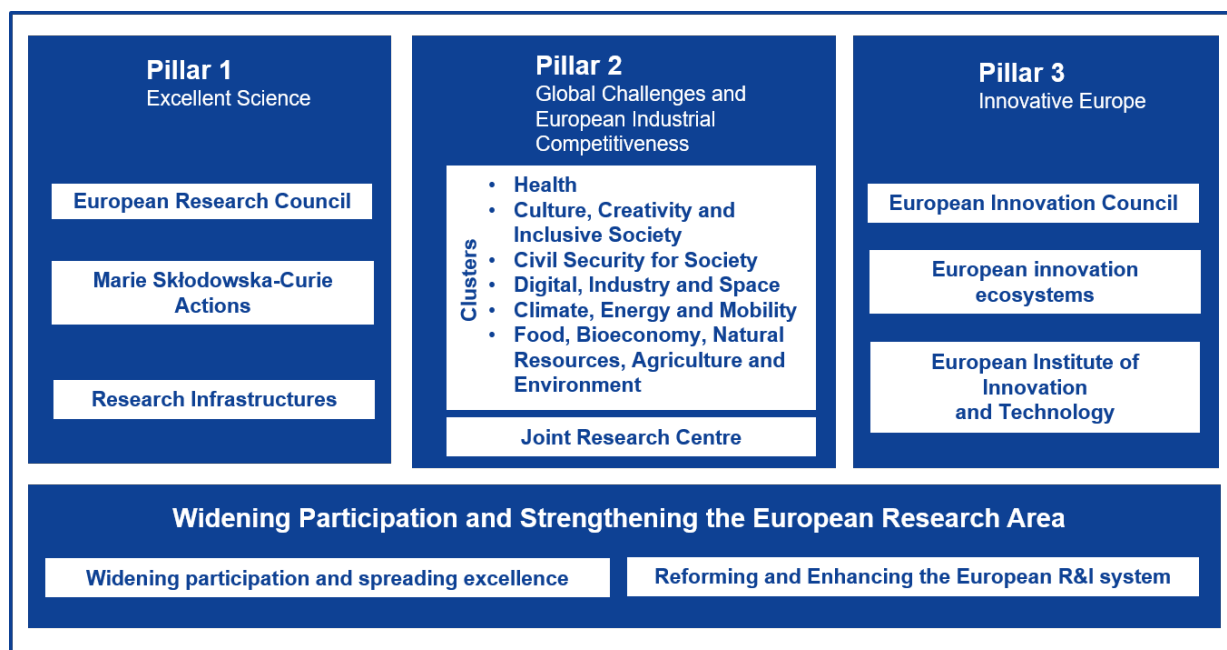


Fig. 3.3 Preliminary Structure of Horizon Europe [15]

The Strategic Planning process will focus in particular on Pillar II, “Global Challenges and European Industrial Competitiveness” and will prepare the Strategic Plan for Horizon Europe for 2021-2024, by setting out key strategic orientations for the support to research and innovation.

The Strategic Plan will describe major policy drivers, strategic policy priorities, and the targeted impacts to be supported through Horizon Europe from 2021 to 2024.

3.1.3 Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME)

The work programme of the European Commission for **Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME)**, managed by the Executive Agency for Small and Medium-Sized Enterprise’s (EASME), provides better access to markets and to finance, improves conditions for businesses, supports innovation activities and encourages entrepreneurship. The COSME runs from 2014 to 2020, established by the Regulation No.1287/2013 of European Parliament from December 2013 [16], with a planned budget of € 2.3 billion. Financial instruments under access to finance are managed by the European Investment Fund (EIF).

Small and Medium-sized Enterprises (SMEs) are the backbone of Europe’s economy, providing 85% of all new jobs. The EC aims to recognise the central role of SMEs in the EU economy and to promote entrepreneurship and improve the business environment, to allow them to realise their full potential in global economy.

COSME supports Small and Medium-sized Enterprises (SMEs) in the following **four main areas**:

- Facilitating access to finance;
- Supporting internationalisation and access to markets;
- Creating an environment favourable to competitiveness;
- Encouraging an entrepreneurial culture.

COSME addresses to above mentioned four main programme's objectives through:

- **Access to finance:** Increasing the sustainable competitiveness of EU companies and facilitating access to finance for SMEs in different phases of their lifecycle: creation, expansion or business transfer. In order to achieve this objective, the EU has mobilised loans (**Loan Guarantee Facility**) for SMEs by providing guarantees to financial institutions and equity investments (**Equity Facility Growth**) for SMEs by providing risk capital to equity funds investing in SMEs, mainly in the expansion and growth-stage phases.
- **Access to markets:** Helping SMEs access and benefit from new markets, within and outside the EU, and boosting Intellectual Property protection for innovative SMEs. COSME funds the **Enterprise Europe Network (EEN)** consisting of over 600 offices in 50 countries helping SMEs find business and technology transfer partners, understand EU legislation and access EU financing. Providing **digital tools** designed for SMEs development: Europe Business Portal and SME Internationalisation Portal.
- **Creating better framework conditions for competitiveness:** Supporting by business-friendly environment favourable for business creation, innovation and growth, by reducing unnecessary administrative and regulatory burdens, developing smart regulation and reinforcing the use of “Think Small First” principle for policy-making at national and regional level. Supporting competitive industries with market potential, by helping SMEs to take-up new business models and integrate into new value chains. Promoting world class clusters with internationalisation and cross-sectorial cooperation, B2B matchmaking, fostering creative partnership and accelerating the digitalisation, online resources and digital skills for businesses.
- **Encouraging an entrepreneurial culture in Europe:** Promoting **Entrepreneurship 2020 Action Plan** through a wide range of activities: mobility exchanges, best practices diffusion, entrepreneurship education, mentoring new and potential entrepreneurs, including young and women, fostering cross-border transfer of experience between entrepreneurs. Focus on **digital entrepreneurship** to help European businesses in digital transformation and benefit from digital era, crucial for competitiveness and growth.

During period from 2014, COSME has become tool for easier access to finance for entrepreneurs with cross-border activities, resulting in additional lending or investment for EU companies, with more than €3.5billion.

Level of EU co-financing rate for this Programme is 40% to 60% of the eligible costs.

Beneficiaries are: private sector, public sector.

Main office of the Enterprise Europe Network, responsible for **COSME Programme in North Macedonia**, is located at the Ss. Cyril and Methodius University in Skopje.

3.1.3.1 COSME in the Republic of North Macedonia

From 2014, beneficiary partners from North Macedonia have realized in total 5 projects (Fig. 3.4) with total budget of €586.514,00 (Fig. 3.5), where office of EEN in North Macedonia, for promoting COSME objectives and support SMEs in the country, has realized projects with total budget of €443.272,00, as is shown at Figure 3.6.

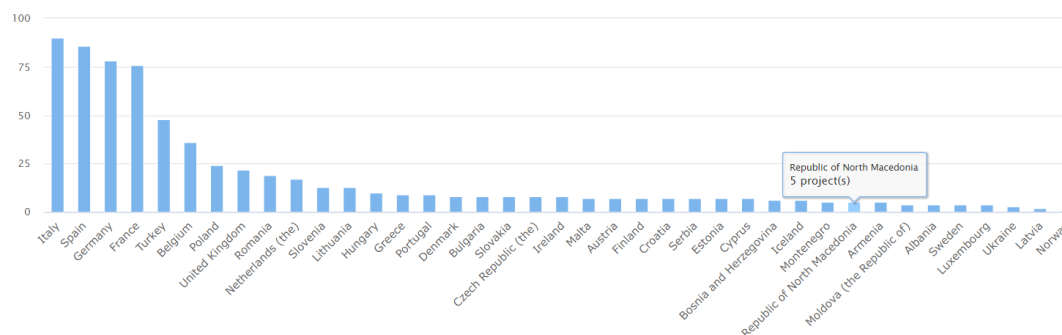


Fig. 3.4 Number of projects funded by COSME (based on the coordinator's country)
(Source: COSME Data Hub, <https://cosme.easme-web.eu/#>)

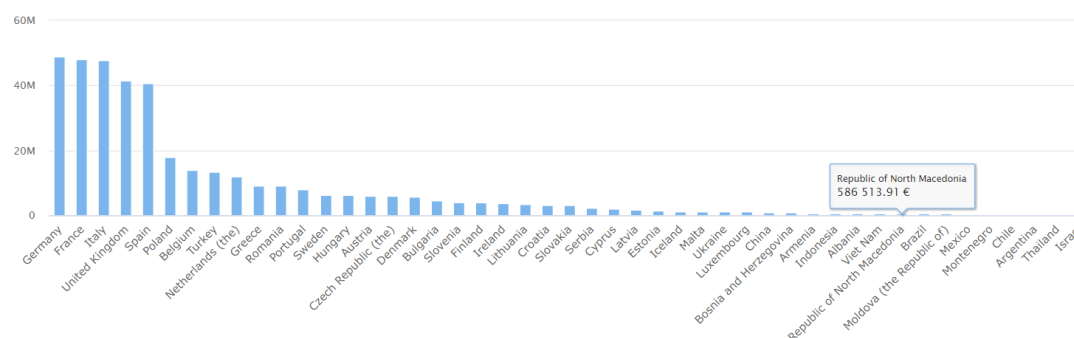


Fig. 3.5 Budget allocated per country
(Source: COSME Data Hub, <https://cosme.easme-web.eu/#>)

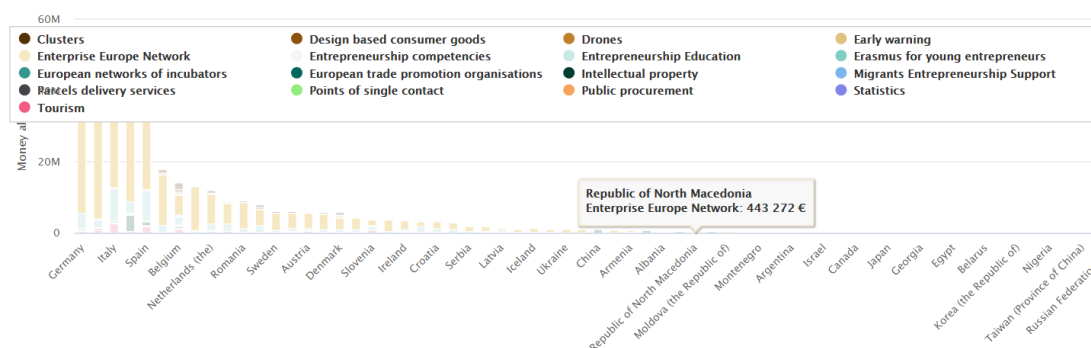


Fig. 3.6 Budget per topic per country
(Source: COSME Data Hub, <https://cosme.easme-web.eu/#>)

3.1.4 ERASMUS+ Programme

Erasmus+ is the EU Programme, implemented by the European Commission, established according to the EU Regulation No.1288/2013 of the European Parliament and the Council from December 2013 [17], in the fields of education, training, youth and sport for the period 2014-2020. Those fields make a major contribution to help tackle socio-economic changes and to support the implementation of the European policy agenda for growth, jobs, equity and social inclusion. Erasmus+ is the result of the **integration** of the six European programmes in the fields of education, training and youth, implemented by the Commission during the period 2007-2013: Lifelong Learning, Youth in Action, Erasmus Mundus, Tempus, Alfa and Edulink.

The Programme supports actions, cooperation and tools consistent with the objectives of the Europe 2020 Strategy [18] and its initiatives for growth, jobs, social equity and inclusion. The aim of Erasmus+ is to contribute to the achievement of the objectives of the strategic framework for **European cooperation in education and training** (ET2020) [19] through investment in knowledge, skills and competences that will benefit individuals, institutions and society by contributing to growth and prosperity in Europe and beyond. Also, Erasmus+ aims to promote and to achieve the sustainable development by providing opportunities for education, knowledge and skills and contributing to the EU's commitment to the 2030 Agenda and its **Sustainable Development Goals** (SDGs) [20].

In order to achieve its objectives, the Erasmus+ Programme implements the following Actions: Key Action 1-Learning mobility of individuals, Key Action 2-Cooperation for innovation and exchange of good practices, Key Action 3-Support for policy reform, Jean Monnet Action and Sport Action.

Erasmus funds projects with partners from European ‘Programme Countries’ and ‘Partner Countries’, where programme countries comprise the 28 Member States plus five other European countries, including North Macedonia.

Level of EU co-financing rate for this Programme is defined with different percentage of the eligible costs per key actions.

Beneficiaries are: private sector, public sector, non-profit organization, academic institutions and research centers.

The **National Agency for European educational programmes** and mobility is public institution responsible for implementation of Erasmus+ in North Macedonia.

3.1.4.1 Erasmus+ Programme in the Republic of North Macedonia

According to the Erasmus Projects Results Platform [21], the list of the projects funded by the EC under Erasmus+ and its programmes in the fields of education, training, youth and sports, institutions in the RNM are granted in total through 5330 projects, for period from 2014 to 2019 year. Under KA2, Cooperation for innovation, closer to the analysed area for this report, North Macedonia's institutions are granted in total with 758 projects. In general, by implementation of those projects in the country, there is provided strong contribution to development of knowledge based society within

sustainable development, better jobs and social cohesion with providing environmental protection and increasing academia-industry-society cooperation related to environmental sustainability aspects.

Filtering of provided data set of 758 projects (with NM's partners) was made by the topics given at EU project platform related to CC, as selecting criteria. Data set of 42 projects is listed by selecting the following topics: Green skills, Environment and climate change, Transport and mobility, Climate action, environment and nature protection, Rural development and urbanisation, Energy and resources. Those 42 projects are granted in total with €7.106.660,00, for Macedonian participants in projects' consortia and listed in *Annex 3*.

3.1.5 Connecting Europe Facility (CEF) Programme

Connecting Europe Facility (CEF) is new funding mechanism for infrastructure projects of common interest for trans-European transport, energy and telecommunications networks. CEF supports the development of high performing, sustainable and efficiently interconnected trans-European networks (TEN) in the fields of transport, energy and digital services. CEF enables implementation of projects of common interest within TEN policy for construction of new or upgrading of existing infrastructure for ensure sustainable and efficient transport, enhance energy supply security, foster the energy from renewable sources and develop carbon dioxide networks and accelerate ultrafast broadband networks.

CEF offers financial support to projects through grants and innovative financial instruments such as guarantees and project bonds. From 2016, key priorities of CEF is enabling and strengthening the synergies between the three sectors and synergy with Horizon 2020.

Level of EU co-financing rate for this Programme is 50% to 75% of the eligible costs.

Beneficiaries are public sector, non-profit organization, academic institutions and research centers.

Since January 2014, in CEF programme has been realized budget **in total €28.7 billion** out of €30.4 billion (€23.6 billion for Transport, €4.6 billion for Energy, and €0.5 billion for Telecom).

3.1.5.1 CEF Programme in the Republic of North Macedonia

From 2014, beneficiary partners from North Macedonia have realized 1 project with total budget of €100.000,00 only through the CEF sector transport in CEF Programme [22], presented at the Fig.3.7.

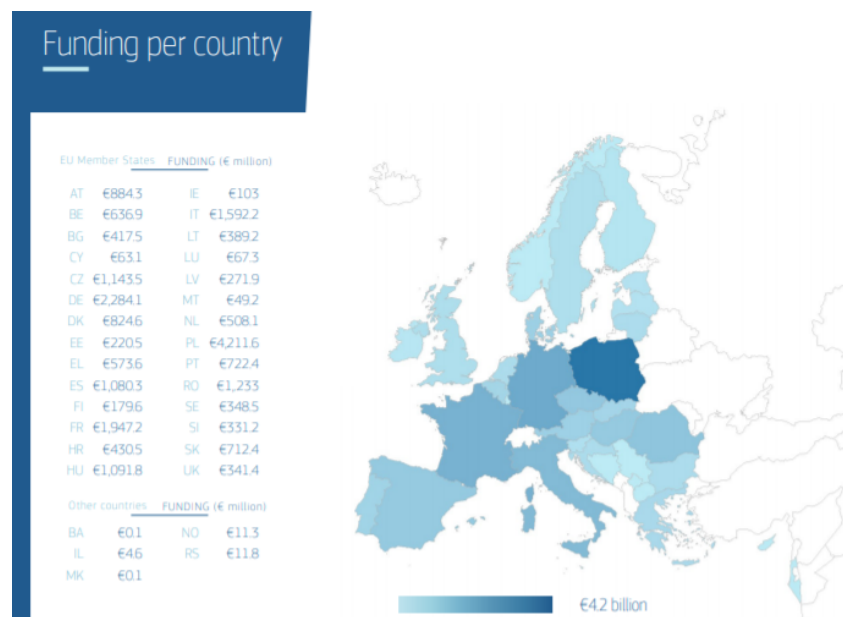


Fig. 3.7 Funding per country in CEF Transport for five years period (2014-2019) [22]

3.1.6 LIFE Programme

The **LIFE programme** is the EU's funding instrument for the environment and climate action created in 1992. The current funding period 2014-2020 is aiming to:

- contribute to the shift towards a resource efficient, low-carbon and climate resilient economy, to the protection and improvement of the quality of the environment and to halting and reversing biodiversity loss;
- improve the development, implementation and enforcement of Union environmental and climate policy and legislation, and to catalyse and promote integration and mainstreaming of environmental and climate objectives into other Union policies and public and private sector practice, including by increasing their capacity;
- support better environmental and climate governance at all levels.

LIFE Programme is organized in two sub-programmes divided by supported actions.

Sub-programme Environment with supported actions:

Environment and Resource Efficiency – with goal to support of resource efficiency-related policy and legislation, including the Roadmap to a Resource Efficient Europe; development, testing and demonstration of integrated approaches in the areas of water, waste and air; and for the assessment and monitoring of the factors, pressures and responses that impact on the environment.

Nature and Biodiversity - with goal to contribute to the implementation of Union policy and legislation in the area of biodiversity including the Union Biodiversity Strategy to 2020 and to support Natura 2000 network.

Environmental Governance and Information – with goal to promote awareness raising on environmental matters, education for sustainable development and dissemination of information in the field of environment.

Sub-programme Climate Action with supported actions:

Climate Change Mitigation – with goal to contribute to the implementation and development of Union policy and legislation on mitigation; to improve the knowledge base for the development, assessment, monitoring of mitigation actions and integrated approaches; to contribute to the development and demonstration of innovative mitigation technologies, systems and methods.

Climate Change Adaptation – with goal to contribute to the development and implementation of Union policy and legislation on adaptation, including mainstreaming across policy areas; to improve the knowledge base for the development, assessment, monitoring and implementation of effective adaptation action; to contribute to the development and demonstration of innovative adaptation technologies.

Climate Governance and Information – with goal stakeholders support to Union policymaking in the field of climate, and to promote education for sustainable development; to support dissemination of information in the field of climate for more effective compliance with and enforcement of Union climate legislation

Level of EU co-financing rate for this Programme is 50% to 75% of the eligible costs.

Beneficiaries are public sector, non-profit organization, academic institutions and research centers.

Since January 2014, for LIFE programme is located total budget **of €3,45 billion, where:**

- the budget allocation for environment is €2,59 billion and
- the budget allocation for climate action is €864 million.

3.1.6.1 LIFE Programme in the Republic of North Macedonia

According to the data from LIFE projects database [23], starting from 2014, there are realized 891 projects. **None** projects realized with participation of partner institution from North Macedonia.

3.1.7 IPA – Instrument for Pre-accession Assistance (IPA)

From January 2007 onwards, the Instrument for Pre-Accession Assistance (IPA), established by Council Regulation (EC) 1085/2006 of 17 July 2006 [24], replaces a series of EU programmes and financial instruments for candidate and potential candidate countries (pre-accessing countries), namely PHARE, CBC, CARD, SAPARD.

IPA 2007-2013 (IPA I) had a budget of € 11.5 billion. Its successor, IPA 2014-2020 (IPA II) builds on the results already achieved by dedicating € 11.7 billion.

Implementation of IPA I is still underway with realization of projects with signed agreements up to the end of 2013. For IPA II [25], signing of the agreements for financial assistance is ongoing process up to the end of 2020. IPA I and IPA 2 are designed to provide financial assistance through **five components**:

- Component 1: Transition assistance and institution building;
- Component 2: Cross-border cooperation (CBC) with EU and pre-accessing countries;
- Component 3: Regional development (transport, environment, regional and economic development);
- Component 4: Human resource development and
- Component 5: Rural development.

IPA funds support reforms in the pre-accessing countries throughout the accession process with technical and financial investment in pre-defined sectors: public administration reform, rule of law, sustainable economy, people and agriculture. Novelty of IPA II is its strategic focus according to pre-accessing country's strategic documents for own reforms and development in line to European strategic priorities.

EU pre-accession funds are a sound investment into the future and help the beneficiaries make political and economic reforms, preparing them for the rights and obligations that come with EU membership. Also, IPA helps the EU reach its own objectives regarding a sustainable economic recovery, energy supply, transport, environment and climate change etc. IPA components (3, 4, 5) allows beneficiary countries to prepare themselves for successful participation in EU cohesion policy after accession and to help them to absorb EU cohesion funding more effectively once it becomes available.

Several public institutions are **national designated entities** responsible for implementation of IPA Instruments in North Macedonia divided by the components: Ministry of labour and social policy, Ministry of agriculture, forestry and water economy, Ministry of education and science.

Central Financing and Contracting Department in the Ministry of Finance is **controlling body** for financial monitoring of IPA instruments realization under supervision of EU Delegation in the NM.

3.1.7.1 IPA Programmes in the Republic of North Macedonia

Instrument IPA I

According Council Regulation [26], planned indicative allocations of IPA I 2007-2013 funds in North Macedonia, separately by year, are presented in Table 3.1.

Tab. 3.1 IPA I allocated funds for North Macedonia [26]

	2007	2008	2009	2010	2011	2012	2013	Total
IPA I (2007-2013) Allocated funds for NM (in €Million)	58.5	70.2	81.8	91.6	98.0	101.8	113.2	607.1

Realization of the funded projects, with signed agreements under five components in frame of IPA I, has to be finalized up to seven years after ending of IPA I programme, or after 2013. From that reason, this Report covers analysis of donors' projects in NM related to CC for the period 2014-2019 and for IPA programmes, include dataset of IPA I ongoing and closed funded projects.

Assistance under **IPA I - Component 1** have focused on implementing the main priorities of the European partnership and involved investment aiming at institution building and transition measures. It is delivered through annual national programmes and project fiches [27].

Assistance under **IPA I - Component 2** have supported cross-border cooperation activities between North Macedonia with neighboring EU countries and potential candidate country (Albania and Serbia), as well as participation in the European Cooperation Transnational programme 'South-East Europe-SEE' [28].

Support under **IPA I - Component 3** has focused on the improvement of transport and environment infrastructure with a total allocation for the period 2007-2013, as presented below in Table 3.2:

- In the **transport sector**, the IPA I assistance focuses on the continuation of the development of the South East Europe Core Regional Transport Network (corridors VIII and X).
- In the **environmental sector**, investments focus on waste water treatment and solid waste management where the impact to the population and sustainable development is the highest.

Tab. 3.2 IPA I-Component 3 budget composition for North Macedonia [28]

IPA I – Component 3 (2007-2013) Budget composition for NM (in €Million)	IPA contribution (Co-financing rate max 85%)	National co-financing (to be defined per project min 15%):	Total IPA funding with min 15% national co-financing:
	€192.157.615,00	€33.910.184,00	€226.067.799,00

Assistance under **IPA I – Component 4** has been focused to foster the development of human resources, in particular by improving the quantity and quality of human capital, leading to more and better jobs, higher growth and increased national competitiveness at international level [29].

Support under **IPA I – Component 5** in North Macedonia [30] is concerning the common agricultural policy and related policies for competitive and sustainable agriculture; strong, sustainable rural communities and diverse and sustainable rural environment.

Allocation of IPA I sources for realization of research, development, innovation and technology transfer projects related to climate change

This section consist data set completed according to the statistics provided from Secretariat of European Affairs of the Government to the Republic of North Macedonia, based to the data base of CFCD (Central Financing and Contracting Department) of Ministry of Finance of the Republic of

North Macedonia and to direct communication of responsible authorities in order to represent updated results.

During the period 2014-2020, the country has received contribution from Instrument IPA I through all five components. Here are discussed all components with exception of the Component 2, presented under INTERREG Programme.

- **IPA I Component 1 – Transitional Assistance and Institutional Building (TAIB)**

In section bellow, there are listed information about contracted projects according to the annual national programmes of the Republic of North Macedonia (2009 to 2013) with signed agreements and presented contracting Authority's contribution (IPA + national co-financing). Following numbers of approved projects per year are given according to indicated sources from CFCD:

IPA I Component 1-TAIB, National Programme 2009, contacted projects in total 76 with frame of realization 2011-2015

[<https://cfcd.finance.gov.mk/wp-content/uploads/2013/11/IPA-Programme-TAIB-2009.pdf>];

IPA I Component 1-TAIB, National Programme 2010, contacted projects in total 21 with frame of realization 2012-2016

[<https://cfcd.finance.gov.mk/wp-content/uploads/2013/11/IPA-Programme-TAIB-2010.pdf>];

IPA I Component 1-TAIB, National Programme 2011, contacted projects in total 41 with frame of realization 2014-2017

[<https://cfcd.finance.gov.mk/wp-content/uploads/2013/11/IPA-TAIB-2011.pdf>];

IPA I Component 1-TAIB, National Programme 2012, contacted projects in total 46 with frame of realization 2016-2018

[<https://cfcd.finance.gov.mk/wp-content/uploads/2013/11/IPA-Programme-TAIB-2012.pdf>];

IPA I Component 1-TAIB, National Programme 2013, contacted projects in total 52 with frame of realization 2017-2018

[<https://cfcd.finance.gov.mk/wp-content/uploads/2013/11/IPA-Programme-TAIB-2013.pdf>].

Extracted **IPA I Component 1** (TAIB) projects related to focus of this assessment, research, development, innovation or technology transfer in line to climate change, are listed in **Annex 4** with total number of **21** projects with total amount of **€283.730.393,00** where indicative amount of EU contribution and national co-financing is different per project.

- **IPA1 Component 3 – Regional Development, Transport and Environment (RDTE)**

According to sources approved from CFCD, the list of contracted projects with signed agreements and presented contracting Authority's contribution (IPA I contribution + national co-financing) consist in total **73** projects with the overall time frame for realization 2010-2019.

Related to the priority areas of the Component 3, large number of projects is connected to the **focus** of assessment R&DITT directly or indirectly connected to the climate change. Analysis of the data set provides **52 projects** from **IPA I Component 3** (RDTE) (**Annex 5**).

[<https://cfd.finance.gov.mk/wp-content/uploads/2013/11/IPA-Programme-RD.pdf>].

Those selected projects, relevant for this assessment, are listed in *Annex 5* and consist a **total budget** of **€309.502.995,00** where indicative amount of EU contribution and national co-financing is different per project.

On the follow Figure 3.8, there are presented total number of contracted projects related to R&DITT to CC with total allocated budgets for three components into IPA I Programme, according to data provided above for Components 1 and 3, as well as data for Component 2 provided in next section.

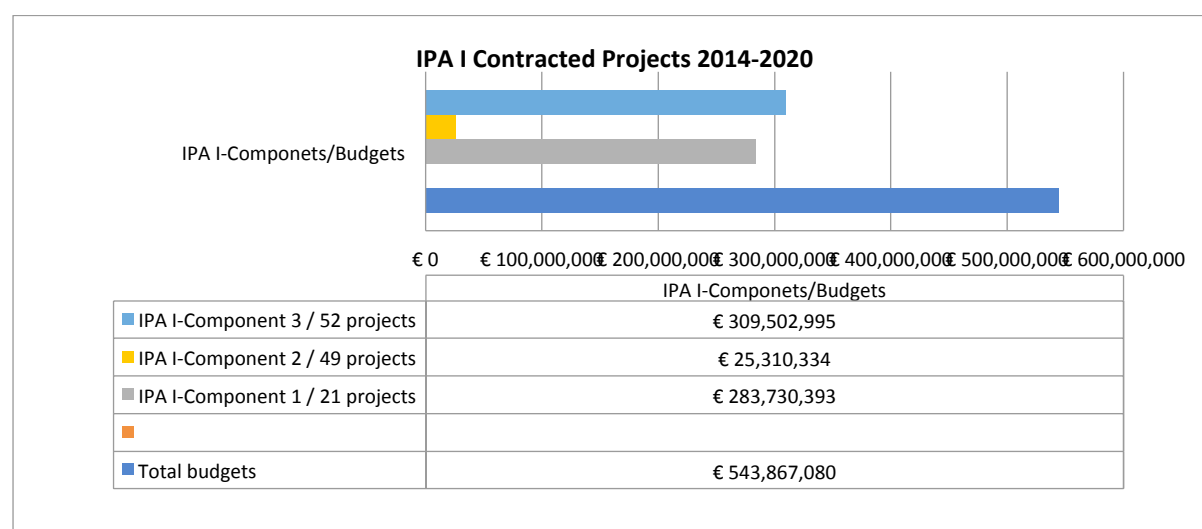


Fig.3.8 IPA I Programme contracted R&DITT to CC projects with total allocated budgets for three Components (for period of realization 2014-2020)

Instrument IPA II

In **IPA II**, for North Macedonia indicative funding allocation is with **budget** of €608.7 million. Indicative allocations by year are given in Tab. 3.3.

Tab. 3.3 IPA II allocated funds for North Macedonia [28][31]

	2014	2015	2016	2017	2018-2020	Total
IPA II (2014-2020) Allocated funds for NM (in €Million)	81.7	67.2	64.6	82.2	313.1	608.7

According to strategic focus [28], **priority sectors** for funding financial assistance under IPA II in the **period 2014-2020** are:

- Democracy and governance;
- Rule of law and fundamental rights;
- Environment, climate action and energy [8];
- Transport;
- Competitiveness and innovation;

- Agriculture and rural development;
- Social development;
- Regional and territorial cooperation.

IPA II 2014-2020 National Programmes documents defines conditions for funding assistance with end period for signing agreements (up to 2020), as well as end implementation period (after seven years), for all above mentioned priority sectors, except last one.

Priority sector for regional cooperation is defined by IPA II 2014-2020 Cross-border Cooperation Programmes, separate for neighboring countries, new in the pre-accessing group (Serbia and Kosovo) [28].

Allocated **funds per priority sectors** for IPA II assistance period of 2014-2020, given in the Table 3.4, are adopted according to EC Decision for Annual Action Programme of Republic of North Macedonia [32].

Tab. 3.4 Allocated funds per sectors for IPA II in NM [28][32][33]

North Macedonia	Total 2014-2020 (in €Million)	Total 2018-2020 (in €Million)	CC relevant (%)
Democracy and rule of law	187.8	83.3	
Democracy and governance	130.9	130.9	
Rule of law and fundamental rights	56.9	56.9	
Competitiveness and grown	421.0	229.8	
Environment, climate action and energy	123.3	62.2	100%
Transport	115.2	67.1	60%
Competitiveness, innovation, agriculture and rural development	135.6	77.3	10%
Education, employment and social development	47.0	23.3	
Total	608.7	313.1	

According to deep analysis of eligible data from responsible institutions in MK, at the moment on-going process of negotiations, signing agreements or evaluations are ongoing. From that reason there aren't **ongoing funded projects under IPA II** and this report doesn't consisted listed signed funded projects by IPA II 2014-2020 programme components.

Allocation of IPA II sources for realization of research, development, innovation and technology transfer projects related to climate change

According to deep analysis of eligible data from responsible institutions in MK, at the moment of negotiations, signing agreements or evaluations are on-going. From that reason there aren't **ongoing funded projects under IPA II** and this report doesn't consisted listed signed funded projects by IPA II 2014-2020 programme components.

Analysis of the Monitoring Plan for programing the multi-annual country Action Programme for the Republic of North Macedonia for environment and climate action (2014-2020) - Direct and indirect

management actions, CRIS Decision No. IPA II/2014/037702, provided by the authority of SEP, presents the programed investment line for environmental issues and climate action.

The legal provisions for this Action Programme are stipulated in the following document:

- Commission Implementing Decision of 17.12.2014 adopting a multi-annual Action Programme for the Former Yugoslav Republic of Macedonia on Environment and Climate Action and Transport for the years 2014-2016, Brussels, C(2014) 9850 [34].

The Action Programme consist **46 programed projects** for environment and climate action with indicted contribution (IPA II + national co-financing) and in contracts' signing process. Realization is planned in next seven years. The programmed projects are grouped in three actions:

- Action 1 – Approximation of environmental and climate action legislation in priority areas and gradual move to sector based approach
- Action 2 – Investment in water and waste management
- Action 3 – Support of Sustainable Development.

Important for the national legislation, related to issues of the Report, is one programmed project under Action 1 in IPA II, titled: Preparation of Long-term Strategy and Law on Climate Action. For this project, there is signed service contract with projected IPA contribution of €977.500,00. This project is listed in multi-annual Country Action Programme, between 46 above mentioned projects [33][34].

3.1.8 INTERREG

European Territorial Cooperation (ETC), better known as Interreg, is one of the two goals of the EU Cohesion Policy and provides a framework for the implementation of joint actions and policy exchanges between national, regional and local actors from different Member States. The overarching objective of ETC is to promote a harmonious economic, social and territorial development of the Union as a whole.

Interreg is built around three strands of cooperation:

- Cross-border (Interreg A)
- Transnational (Interreg B)
- Interregional (Interreg C)

Five programming periods of Interreg have succeeded each other from 1990 onwards: INTERREG I (1990-1993); INTERREG II (1994-1999); INTERREG III (2000-2006); INTERREG IV (2007-2013); and INTERREG V (2014-2020).

The Interreg programmes are financed in the framework of the EU Regional Policy, also referred as Cohesion Policy due to its aim to dissolve regional disparities between Europe's regions. This investment policy consumes around one third of the EU's budget. It targets all regions and cities in the European Union in order to support job creation, business competitiveness, economic growth, sustainable development, and improve citizens' quality of life.

The fifth period of Interreg, which is of special interest in this analysis, is based on 11 investment priorities laid down in the ERDF Regulation contributing to the delivery of the Europe 2020 strategy for smart, sustainable and inclusive growth. At least, 80% of the budget for each cooperation programme has to concentrate on a maximum of 4 thematic objectives among the eleven EU priorities presented on the Figure 3.9.

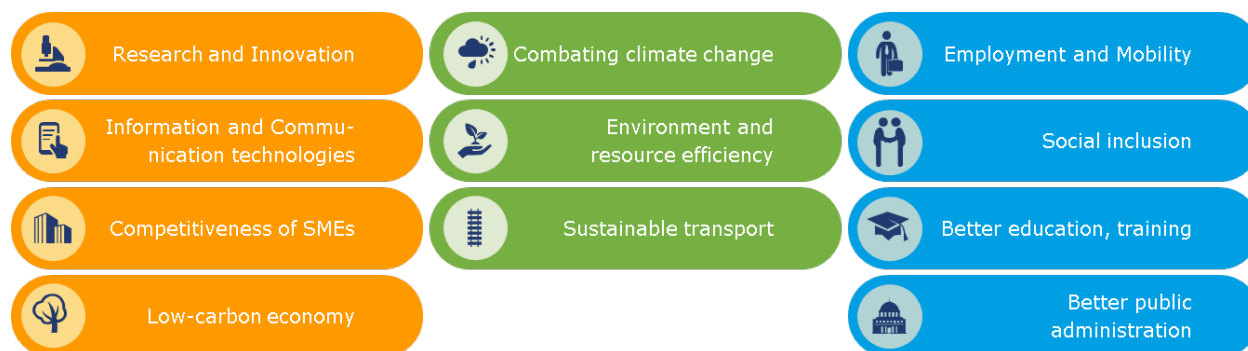


Fig 3.9 European Union priorities of INTERREG V Programme

The fifth programming period of Interreg has a budget of €10.1 billion invested in over 100 cooperation programmes between regions and territorial, social and economic partners. This budget also includes the ERDF allocation for Member States to participate in EU external border cooperation programmes supported by other instruments (Instrument for Pre-Accession and European Neighbourhood Instrument). It includes the following programmes and instruments:

- 60 Cross-border – Interreg V-A, along 38 internal EU borders. ERDF contribution: €6.6 billion.
 - 12 IPA Cross-border: Instrument for Pre-Accession and European Neighbourhood Instrument
 - 16 ENI Cross-border :International Cooperation and Development
- 15 Transnational – Interreg V-B, covering larger areas of co-operation such as the Baltic Sea, Alpine and Mediterranean regions, as well as some non-EU countries. ERDF contribution: €2.1 billion.
- The interregional co-operation programme, INTERREG Europe, and 3 networking programmes (Urbact III, Interact III and ESPON) covering all Member States of the EU, as well as Norway and Switzerland and in case of URBACT also Iceland and Lichtenstein. They provide a framework for exchanging experience between regional and local bodies in different countries. ERDF contribution: €500 million [35].

- Interreg A: Cross-border cooperation

European Cross-Border cooperation, known as Interreg A, supports cooperation between NUTS III regions from at least two different Member States lying directly on the borders or adjacent to them. It aims to tackle common challenges identified jointly in the border regions and to exploit the untapped growth potential in border areas, while enhancing the cooperation process for the purposes of the overall harmonious development of the Union.

- Interreg B: Transnational cooperation

Transnational cooperation, known as Interreg B, involves regions from several countries of the EU forming bigger areas. It aims to promote better cooperation and regional development within the Union by a joint approach to tackle common issues. Interreg B supports a wide range of project investment related to innovation, environment, accessibility, telecommunications, urban development

etc. The transnational programmes add an important extra European dimension to regional development, developed from analysis at a European level, leading to agreed priorities and a coordinated strategic response.

This strand of cooperation foresees meaningful work between regions from several EU Member States on matters such as communication corridors, flood management, international business and research linkages, and the development of more viable and sustainable markets. Themes covered include:

- Innovation, especially networks of universities, research institutions, SMEs;
- Environment, especially water resources, rivers, lakes, sea;
- Accessibility, including telecommunications, and in particular the completion of networks;
- Sustainable urban development, especially polycentric development.

- Interreg C: Interregional cooperation

Interregional cooperation known as Interreg C, works at pan-European level, covering all EU Member States, and more. It builds networks to develop good practice and facilitate the exchange and transfer of experience by successful regions. It showcases what regions do well, to the benefit of those still investing.

3.1.8.1 Participation of the Republic of North Macedonia in the Interreg programmes

The Republic of North Macedonia participates in the Interreg A: Cross-border cooperation and Interreg B: Transnational cooperation programmes. The cross-border cooperation programmes between the Republic of North Macedonia and each of the five neighbouring countries are adopted and in the stage of implementation. Also, the country participates in one transnational cooperation programme: Interreg Balkan-Mediterranean Programme. In the following sections, each of these operational programmes is briefly described.

In North Macedonia, the responsible institution is the Ministry of Local Self-Government (MLS), responsible for the overall coordination of the programme and control function.

Interreg IPA CBC Bulgaria – The Republic of North Macedonia

The Interreg-IPA "Bulgaria – the Republic of North Macedonia" cross-border Programme is adopted on 5th August 2015 by the Commission with Decision № C (2015) 5653, as a second cycle of cooperation and focuses on measures aiming at mitigating the effects of climate change and at addressing issues related to the conservation of nature and biodiversity, the sustainable use of natural resources, environmental protection and risk management at cross-border level [36].

The Interreg IPA CBC programme covers 5 border regions, 2 in Bulgaria with 23 municipalities and 3 regions in North Macedonia with 29 municipalities. The total budget of the cooperation programme is €19,461,690, while the total EU contribution from the Instrument for Pre-accession Assistance (IPA) is €16,542,434 [37].

The programme focuses on the following three priorities:

- Environment;
- Sustainable tourism;
- Competitiveness.

So far, there have been announced two calls for project proposals under this programme.

Under the **1st call** for proposals, in total 52 projects was financed out of that **22** projects in PA1 related to DITT to CC (protection with green infrastructure; climate change mitigation and adaptation; sustainable development of society) with distributed amount of €4.570.574,00 where 85% of that amount is EU IPA contribution of **€3.884.988,00**.

Under the **2nd call**, 17 projects were approved, where **5** projects are DITT to CC climate oriented under all three Priority Axes with amount of €1.905.213,00 allocated for that focused projects with 85% EU contribution of **€1.619.431,00**.

That assessment shows results of **27 projects** approved for period 2014-2020 related to development, innovation and technology transfer to climate change actions, with total amount of **€5.504.419,00 EU contribution** into IPA CBC North Macedonia and Bulgaria cooperation programme. Those projects are full listed in *Annex 6*.

Interreg IPA CBC Greece – Republic of North Macedonia

The Interreg IPA CBC Programme "Greece - Republic of North Macedonia 2014-2020" was approved by the European Commission on August 6, 2015 by decision C (2015) 5655. The Programme supports regional cooperation between Greece and the Republic of North Macedonia. The Programme's overall objective is to enhance territorial cohesion by improving living standards and employment opportunities holding respect to the environment and by using the natural resources for upgrading of the tourism product [38].

The total budget allocated to the Programme is €45,470,066.00, out of which €38,649,552.00 (85%) is Union Support and the €6,820,514.00 (15%) the National Counterpart. The programme eligible area includes 5 border regions in Greece and 4 regions in the Republic of North Macedonia.

The Programme is built upon the following three Priority Axes;

- Priority Axis 1: **Development and Support of Local Economy**, which promotes employment and mobility of human resources as well as aims to improve health and social investments and services. It supports the protection of natural and cultural heritage in order to improve the attractiveness and encourage tourism in the cross-border area. The specific objectives under this priority axes are:
 - Create employment opportunities for educated graduates by exploiting comparative advantages with the use of innovative tools and practices
 - Improvement of preventive health care and social services in the rural cross-border areas
 - Improve the attractiveness and promote tourism by promoting natural and cultural assets
- Priority Axis 2: **Protection of Environment – Transportation** that focuses on the improvement of public infrastructure and reduction of isolation by improved access to transport, information and communication networks and services. It promotes sustainable management, treatment and recycling of waste as well as supports sustainable management of protected areas, ecosystems and biodiversity and addresses prevention, mitigation and

management of natural disasters, risks and hazards. The specific objectives under this priority axes are:

- Upgrade public infrastructure to improve road travel time, safe border crossing and promote energy efficiency towards green transport
 - Sustainable management and recycling of bio-wastes
 - Sustainable management of protected areas, ecosystems and biodiversity
 - Prevention, mitigation and management of natural disasters, risks and hazards
- Priority Axis 3: **Technical support.**

Under this programme, the calls for project proposals can be divided in two periods: the old period, starting from 2010 until 2013, and the current period, which has started in 2015. Under the old period, there were 4 calls for proposals in total. The first three calls referred to all priority axes (amounted to €6,188,651.00, €14,010,347.00 and €7,514,217.00 respectively), while the last call was only for the Priority Axis 3 (amounted to €705,000.00 in total, or to €528,750.00 provided by ERDF).

During the current period 2014-2020, there have been 2 calls for project proposals so far.

The **1st call** applied to the first and the second priority axes. The total (Union and national) indicative budget available for the Call was €20,461,530.00, which fund was used for approving **40** project proposals for implementation.

The **2nd call**, which is currently still open, is targeted and restricted, which means it is dedicated only to the following specific objectives: Create employment opportunities for educated graduates by exploiting comparative advantages with the use of innovative tools and practices; and Improve the attractiveness and promote tourism, under the Priority Axis 1, and: Prevention, mitigation and management of natural disasters, risks and hazards, under the Priority Axis 2. The total (Union and national) indicative budget available for the Call is €6,000,000.00.

For this IPA CBC Programme regarding R&DITT with CC focus during the period 2014-2020, there are **15 projects** (fully provided in Annex 6) with total budget of €16.078.111,00 and amount of 85% or **€13.666.394,00 EU contribution**.

Interreg IPA CBC Republic of North Macedonia – Albania

The programme for Cross-border cooperation (CBC) between Republic of North Macedonia and Republic of Albania has been implemented under the framework of the Instrument IPA II with a view to promoting good neighbourly relations, fostering union integration and promoting socio-economic development [39].

The legal provisions for its implementation are stipulated in the following pieces of legislation:

- Regulation (EU) No 231/2014 of the European Parliament and of the Council of 11 March 2014 establishing an Instrument for Pre-accession Assistance (IPA II);
- Regulation (EU) No 236/2014 of the European Parliament and of the Council of 11 March 2014 laying down common rules and procedures for the implementation of the Union's instruments for financing external action and
- Commission Implementing Regulation EU no 447/2014 of 2 May 2014 on the specific rules for implementing the IPA II regulation.

This CBC Programme covers the period 2014-2020 and relates to the New Financial Perspective of the European Community. The eligible regions on the territory of Republic of Macedonia include 27

municipalities and there are 12 districts (with 17 municipalities) on the territory of Republic of Albania that fit in the Programme Area. The programme eligible area includes 27 municipalities in Republic of North Macedonia and 12 districts (with 17 municipalities) in Republic of Albania [40].

The Programme concentrates on three IPA II Regulation **Thematic Priorities** deriving from needs-opportunity analysis. These are, namely:

- TP 1: Encouraging tourism and cultural and natural heritage (opportunity-driven);
- TP 2: Enhancing competitiveness, business, trade and investment (needs and opportunity-driven) and
- TP 3: Protecting the environment, promoting climate change adaptation and mitigation, risk prevention and management (needs driven).

The CBC Programme includes also a **Technical Assistance** Priority as horizontal issue. The specific objective of the technical assistance is to ensure the efficient, effective, transparent and timely implementation of the CBC programme as well as to raise awareness of the programme amongst national, regional and local communities. The principle of smart, sustainable, inclusive growth and environmental sustainability is recognised as a **cross-cutting issue** and is applied to all Programme Thematic Priorities and their objectives.

The total allocated budget of the cooperation programme is €13.790.000,00 while the indication on the maximum amount of Union IPA II contribution in co-financing will be €11.900.000,00.

Under this programme, there have been two calls for project proposals so far. Under 1st call, September 2016, a total of **9** projects were financed with total amount of €3,370,096.00, where EU IPA II Contribution is €2.864.582,00 [41].

The 2nd call, February 2019, was opened for TP1 and TP3 with the allocated amount of €2,890,000.00, EU funding [42].

For this IPA CBC Programme regarding R&DITT with CC focus, there are **4 projects** fully provided in *Annex 6* with budget of €1.455.379,00 and 85% or amount of **€1.237.072,00 EU IPA contribution**.

Interreg IPA II CBC Serbia – Republic of North Macedonia

The Cross-border Cooperation (CBC) Programme Republic of Serbia – Republic of North Macedonia is implemented under the framework of the Instrument of Pre-accession Assistance (IPA II) to support CBC with a view to promoting good neighbourly relations, fostering EU integration and promoting socio-economic development. The legal provisions for its implementation are stipulated in the same pieces of legislation as indicated above for INTERREG IPA II North Macedonia – Albania, from 2014[43].

The Programme eligible areas are 2 Serbian districts and 3 Macedonian regions with following thematic priorities and specific objectives:

Thematic priority 1: Promoting employment, labor mobility and social and cultural inclusion

Specific objectives:

- 1.1: Skills improvement and creation of employment opportunities in perspective sectors
- 1.2: Development of an inclusive society

Thematic priority 2: Encouraging tourism and cultural and natural heritage

Specific objectives:

- 2.1: Mobilizing cultural and natural resources for joint development of sustainable tourism products and destinations
- 2.2: Fostering joint risk management systems of natural and cultural sites, as well as human settlements, including disaster or emergency preparedness

Thematic priority 3: Technical assistance

Specific objective:

- 3.1: Ensuring effective, efficient, transparent and timely implementation of the Programme and awareness raising

Within the Cross-border Cooperation Program Serbia-North Macedonia for the period 2016-2020, €4,055,883.00 has been allocated, out of which €3,500,000.00 is provided through IPA funds of the European Union, and the remaining amount is provided through national co-financing. On Macedonian side the co-financing is provided by the Ministry for local self-government, while on the Serbian side, currently the co-financing is applicant's own contribution.

The 1st call for proposals was opened in July 2019 and covered all specific objectives under the first two thematic priorities [44]. Although the selection and evaluation process has not been completed yet, it is expected significant actions for research, development, innovation and technology transfer related to climate projects to be financed.

Interreg IPA CBC Republic of North Macedonia – Kosovo

The 2014-2020 cross-border cooperation programme Kosovo-The Republic of North Macedonia is implemented under the framework of the instrument of IPA II and supports cross-border cooperation with a view to promoting good neighbourly relations, fostering European Union integration and promoting socio-economic development. The programme was adopted on 10.12.2014. The legal provisions for its implementation are stipulated in the same pieces of legislation as indicated above for INTERREG IPA II North Macedonia – Albania, from 2014 [45].

The European Union Office in Kosovo is in charge of all contract and payment (both countries) issues, acting as the Contracting Authority. The Programme eligible areas are 2 Kosovo's region and 3 Macedonian regions with four thematic priorities:

- TP1: Enhancing competitiveness, business and SME development, trade and investment;
- TP2: Encouraging tourism and cultural and natural heritage;
- TP3: Protecting the environment, promoting climate change adaptation and mitigation, risk prevention and management
- TP4: Technical Assistance

One of the four main programme objectives addresses the environmental pollution issues in the cross-border region. The total financial allocation of EU contribution for the period 2014-2020 is €8,400,000.00. The total amount, with co-financing from national beneficiaries, for this IPA II CBC Programme is allocated €9,734,118.00 distributed for four thematic priorities [45].

So far, under this programme, there have been three calls for project proposals launched.

The 1st call was announced on June 2017 covering TP1 and TP2, where 9 projects were awarded with available amount of €2,040,000.00 [46].

During the **2st call** from August 2018, **2** projects were awarded with amount of €350,000.00 in TP2 [47].

The **3rd call** from March 2019 covers the TP2 and TP3 thematic priorities with overall indicative amount available of €2,040,000.00 awarded **3** project grants. Two of these projects will implement activities within the third priority referring to environment protection and climate change adaptation and mitigation [8].

Respectively three calls, there are **3 projects** fully provided in **Annex 6** connected to R&DITT with CC focus awarded with amount of **1.105.899,00 EU contribution** as 85% from total planned budgets.

3.1.8.2 The summary results for INTERREG Cross Border Cooperation

According to data provide above for successful projects signed under all four CBC programmes, the Figure 3.10 presents the total numbers of approved DITT to CC projects for reported period, with total budget of €25.310.334,00, where EU contribution of 85% from the total budgets. The detailed list of projects is enclosed in *Annex 6*.

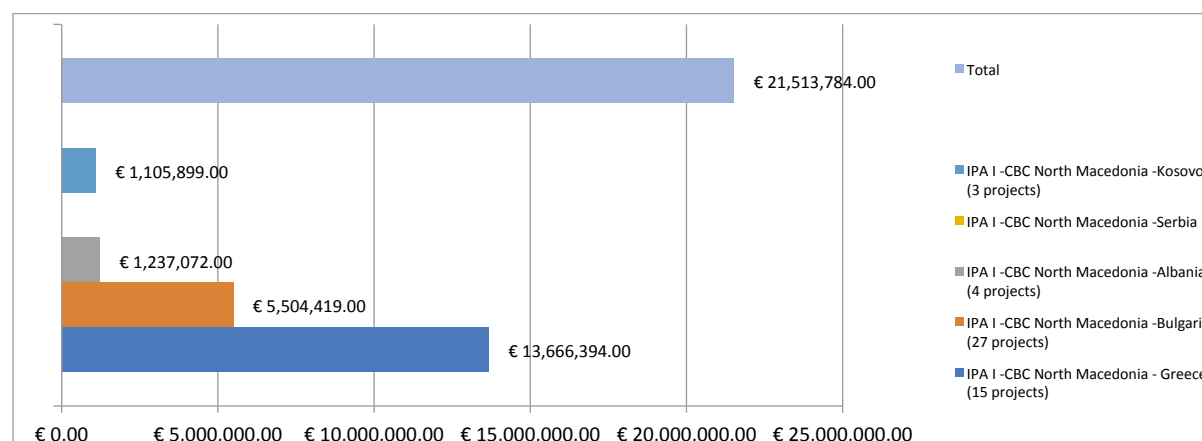


Fig.3.10 Numbers of approved projects related to DITT to CC with total EU contribution for all CBC Programmes (period 2014-2020)

3.1.8.3 Interreg Balkan – Mediterranean Programme

The INTERREG Balkan-Mediterranean 2014 – 2020 Programme is the first initiative of the European Commission that brings together the five countries from the Balkan and Eastern Mediterranean Sea: Bulgaria, Cyprus, Greece, Albania and North Macedonia [49].

The BalkanMed Programme is co-financed by the European Regional Development Fund (ERDF) with €28,330,108.00. The total support from the Instrument IPA II fund accounts for €5.126.138,00. Therefore, the total budget of the Programme, including national contribution, is €39,727,654.00.

BalkanMed is focused on addressing two key challenges: territorial competitiveness and environment. Accordingly, the Programme is built upon the following two Priority Axes:

- Priority Axis 1: “Entrepreneurship & Innovation”
- Priority Axis 2: “Environment”

This joint programme aims to contribute to the EU 2020 Strategy, for smart, sustainable and inclusive growth across maritime and terrestrial borders.

Under 1st call of this programme, announced on 16.12.2015, there are 20 projects granted under the Priority Axis 1, and North Macedonia has participated in **13** project consortia. Some of these projects also tackle environmental issues. On the other hand, under the Priority Axis 2, which is dedicated to the environmental actions, there are 23 projects granted in total, and North Macedonia has participated in **11** project consortia. Regarding R&DITT with CC focus, there are **8** projects fully provided in *Annex 7* with total allocated budget of €9.512.215,00 for all partner institutions in projects consortia where missed data per partner institution.

3.2 JRC

The Joint Research Centre (JRC) is the European Commission's (EC) science and knowledge service established to carry out research in order to provide independent scientific advice and support to EU policy. JRC, as reference center for science and technology provides scientific and technical support to the conception, development, implementation and monitoring of EU policies. Today, it becomes working as Science Hub of the EU.

JRC is funded by the EU's budget for Research and Innovation and creates knowledge, delivering the best scientific evidence and innovative tools for the EU policies that matter to citizens, businesses and governments, including digital technologies, supporting competitive economy, providing protected Union and working towards sustainable Europe.

The JRC creates most of the intellectual properties (IP) rights of the Commission and works of technology transfer of inventions to third parties in order to maximise their impact on society. The JRC runs the Commission's Central IP Service with an aim to further enhance the effective management of IPR and takes an active role in the Commission policy-making process for policies related to IP and Technology Transfer.

JRC contributes to the functioning of the European Research Area (ERA), makes partnership with industry in order technology development, and participates to EC research and innovation programme Horizon 2020 on collaboration with associated countries to help in research and technical field. JRC promotes close cooperation through a wide range of expert exchange possibilities, such as job opportunities, workshops, training courses and research projects.

The Ministry of Education and Science is the national designated entity responsible for collaboration with the JRC.

3.3 Other EU funding schemes related to CC

3.3.1 European Green Deal's Investment Plan

The European Union is committed to becoming the first climate-neutral bloc in the world by 2050. This requires significant investment from both, the EU and the national public sector, as well as the private sector. The **European Green Deal Investment Plan (EGDIP)**, as the Sustainable Europe Investment Plan, presented by the Communication document No. COM2020/21 at **14 January 2020** from the Commission to the European Parliament, the Council, the European Economic and Social Committee [50], will mobilise public investment and help to unlock private funds through EU financial instruments, notably **Invest EU**, which would lead to at least €1 trillion of investments.

EGDIP will mobilize EU funding and create an enabling framework to facilitate and stimulate the public and private investments needed for the transition to a climate-neutral, green, competitive and inclusive economy. Complementing other initiatives announced under the Green Deal, the Plan is based on **three dimensions**:

- **Financing**: mobilizing at least €1 trillion of sustainable investments over the next decade, with a key role by the European Investment Bank.
- **Enabling**: providing incentives to unlock and redirect public and private investment by facilitate sustainable investment.
- **Practical support**: in planning, designing and executing sustainable projects.

While all Member States, regions and sectors will need to contribute to the transition, the scale of the challenge is not the same. Some regions will be particularly affected and will undergo a profound economic and social transformation. The **Just Transition Mechanism (JTM)** is a key tool to ensure that the transition towards a climate-neutral economy happens in a fair way and will provide tailored financial and practical support to help workers and generate the necessary investments in those areas.

The **InvestEU Programme** was proposed in June 2018 as part of the future long-term EU plan and it is complementary to the European Green Deal Investment Plan. InvestEU dedicates at least 30% of mobilised investments to climate and environment related projects. Even Invest EU is oriented to the EU member states, it contributes to the JTM with a new InvestEU scheme to mobilise €45 billion of eco-sustainable investments in the regions most affected by the transition challenges. InvestEU Programme provides technical assistance and advisory support through the InvestEU Advisory Hub for identification, development and implementation of green investment projects.

Good practice from European Green Deal Investment Plan and InvestEU

From European Green Deal through InvestEU, the European Investment Bank (EIB) and National Promotional Institution from Lithuania (Lithuanian Public Investment Development Agency) have signed a €12.5 million, supporting the creation of the first national energy efficiency investment platform in Lithuania, focused on climate actions and generating cohesion benefits.

The financing is used to support the first dedicated national investment platform to promote and finance energy efficiency climate action oriented projects across Lithuania. The underlying investments are focus on the installation of solar panels on private homes, the renovation of multi-apartment buildings and energy efficiency investment in industrial companies. As such, the platform will serve many different beneficiaries throughout Lithuania, helping them to cut CO₂ emissions and lower their energy bills.

For the next period, **European Green Deal Investment Plan** with its mechanisms is identified as strong instruments extremely useful for the **NDE** and therefore will be **recommended as an important source** for providing technical assistance and financial support of the national designated entity under the UNFCCC clear mechanism for climate technologies.

3.3.2 EU Developed countries multilateral and bilateral funding schemes

Bilateral funding schemes or **donation support** provided by developed countries as **donor**, economic leaders in Europe and wider in the world, take activities to promote, facilitate and finance as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to developing countries, to enable them to implement the economical grown and green development in developing countries.

According to the Organisation for Economic Cooperation and Development (OECD), Official Development Assistance (ODA) constitutes the total donation support as a technical cooperation and funds, provided by a government or public governmental agency intended for promotion of social-economic progress of the developing countries.

The majority of the activities relating to technology transfer targeted mitigation and involved technology transfer in the energy sector, in particular related to the deployment and diffusion of renewable energy and energy efficiency technologies. In the section bellow, briefly are described lines of bilateral funding or donor's programmes.

3.3.2.1 Bilateral mechanisms from German Financial and Technical Cooperation (GIZ)

The Federal Republic of Germany is one of the major bilateral development partners of the North Macedonia. The bilateral and multilateral development cooperation is within the competence of the Federal Ministry for Economic Cooperation and Development – BMZ where different organizations are commissioned for implementation (KfW, DEG, GIZ) with instruments for cooperation in place.

GIZ – German International Cooperation (Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) [51] has been actively engaged in the Republic of North Macedonia since 1992. Germany, through this bilateral development cooperation is second largest bilateral **donor**. Technology transfer cooperation with industry-academia granted projects and four TT centers development were in the focus for the period 1998-2006.

Since 2007, GIZ as main commissioning party of the BMZ supports projects focused on fostering EU integration within **transposition of legislation** and regional cooperation in three **focus areas**:

- environmental sustainable infrastructure and climate change (I Focus Area - GIZ-ESICC),
- economic development and employment (II Focus Area - GIZ-EDE),
- governance and democracy (III Focus Area - GIZ-GD).

GIZ's range of services covers a wide range of topics and management methods, developed in continuing exchange between industry and science. There are activities on:

- promoting regional and local economic development;
- supporting the implementation of EU compliant policies;
- working on the development of evidence-based policy recommendations for economic diversification, sustainable development with regard to water resources, environmentally sound economics and technologies, adaptation to climate change and rural development;
- the country is facing pollution issues, droughts and floods with impacts on agriculture, as consequences of climate change that require improvement by trans-boundary cooperation between North Macedonia and its neighbouring countries.

GIZ Programme financial support in the Republic of North Macedonia

GIZ programme for **environment sustainable infrastructure and climate change** (GIZ ESICC) offers three regional projects frames with participation of North Macedonia [51]:

- Climate Change adaptation in Western Balkans, overall period 2012-2021, for all Western Balkans (WBs). The objective of trans-boundary flood risk management and risk mapping is strengthening with regard to climate change; where results showed that the measures supported by the project are effective in mitigating flood damage.
- Open regional fund for South East Europe – Energy Efficiency, overall period 2006-2020, for countries of Western Balkans. The goal is to support energy and climate relevant society

actors and to implement EE and climate protection measures, through regional networks in South-Eastern Europe, in implementing required EU regulations where beneficiaries are private and public sectors and society.

- Open regional fund for South East Europe for the implementation of biodiversity agreements, overall period 2018-2021, for regional cooperation between countries of Western Balkans with regard to fulfilling international and EU-relevant obligations concerning the preservation of biodiversity.

GIZ programme for **economic development** (GIZ-ED) offers three regional projects frames for North Macedonia [52]:

- Regional and local economic development, overall term 2010-2015, for planning and implementing regional and local structure with measures for EU financing where are established eight economic planning regions (EPR) in NM; and second cycle 2015-2020 for GIZ funding development programmes for companies' competitiveness in eight EPR in NM GIZ carrying out by the National Council for Regional Development and the Ministry for Local Self Government (MoLSG).
- Open Regional Fund for South-East Europe – Foreign Trade Promotion, overall term 2006-2020 for all WBs, in order to improve framework conditions for trade in South-East Europe as part of the EU convergence process.
- Support to Economic Diversification of Rural Areas in Southeast Europe (SEDRA), overall term 2018-2021, for all WBs where is great disparities between the urban and rural areas, in order to strength institutional capacities of selected stakeholders in WBs, also in NM for supporting EU-compliant economic diversification in rural areas.

For the period 2014-2020, the **total budget** of the GIZ Programme in NM for two focus areas, GIZ-ESICC and GIZ-EDE (only economic development), is estimated on **14.302.000,00€**. This financial support covers seven (**7**) **projects** (two national and five regional), selected according to the donor's criteria of R&DITT related to CC projects, listed in the ***Annex 8***.

The total amount (Fig. 3.11), with **61%** or 8.700.000,00 € is allocated to economic development (**ED**) projects and with **39%** or 5.602.000,00€ is allocated to **ESICC** projects. Diversification of this funding by sector is given on the Figure 3.12, where the largest support is indicated for economy and sustainable businesses and next for energy efficiency.

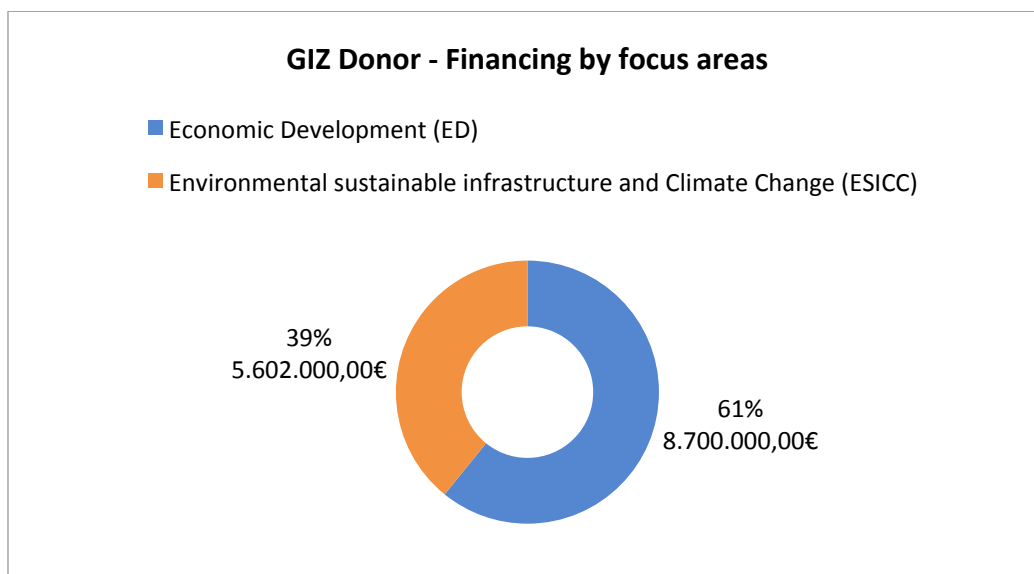


Fig. 3.11 Financing by focus areas of GIZ Programme

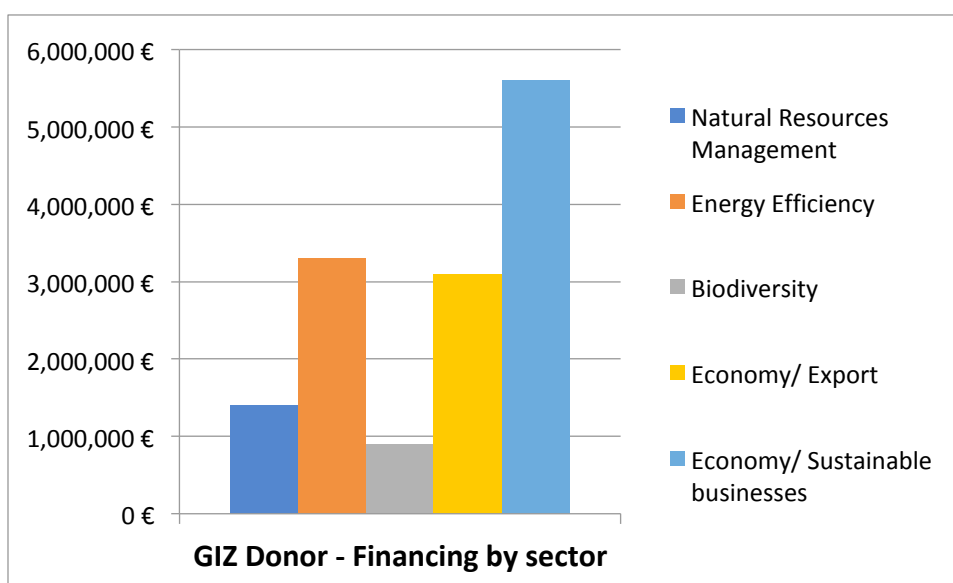


Fig. 3.12 Financing by sector in GIZ focus areas ESICC and ED

3.3.2.2 Norwegian Programmes for development cooperation

Norwegian assistance to North Macedonia is allocated by grant scheme that support projects under the bilateral cooperation programme and regional purposes for Western Balkan, with **priority sectors**, related to common European challenges: (i) Governance, (ii) Energy, environment and climate change mitigation, (iii) Society and (iv) Economic development for job creation.

Norway Grants scheme in frame of **Fond for Regional Cooperation** (FRC) supports projects tackling EU economic, environmental and social challenges through cross-border and transnational cooperation where North Macedonia is in group of beneficiary countries. FRC with budget of **€34.5 million** supports cooperation focuses on knowledge sharing, exchange of good practice and capacity building in R&D, innovation and technology transfer projects across the priority sectors of the EEA (for EU member states) and Norway Grants (for **pre-assessing countries**) 2014-2021 [53]. Big part of the FRC fund is related to priority sector of environment, energy, climate change and low carbon economy.

Norwegian Programmes financial support in Republic of North Macedonia

Norway Grants scheme (for pre-assessing countries), for the period 2014-2021, which is in the frame of Fond for Regional Cooperation (FRC) is in process of project proposals evaluation and selection for granting. From that reason, there still aren't data for granted projects in analysed period.

Key framework project for 2018-2020 funded by two donors, Norway Embassy and Sweden International Cooperation Agency (SIDA) is "Nordic support for progress of North Macedonia" [54] with budget of **€4 million**, supporting Secretariat for European Affairs with national and local institutions in prioritizing the technical assistance that is needed for EU accession:

- providing infrastructural grants in the less developed region in the country,
- providing employment with training opportunities and
- supporting administration in addressing long-lasting environmental issues by preparing clean-up of the waste water plants and the dislocation of the linden waste from the Ohis factory.

This project, selected according to the donor's criteria for supporting projects in R&DITT related to CC, is listed in **Annex 9**.

Additionally, in Annex 9 there are listed three **(3) projects** financed by Ministry of Foreign Affairs of Norway as a technical assistance, in previous period before FRC (2012-2016). Two projects with allocation of **€10.7M** are related to energy policy by increasing institutional capacity (Regulatory Commission of North Macedonia) compatible to EU. Third project is related to environmental policy for capacity strengthening of the Ministry of Environment and Spatial Planning in the sector of integrated pollution prevention and control, with allocated budget of **€0.62M**.

3.3.2.3 Swedish Programmes for development and cooperation

According to **Sweden's Strategy** for reform cooperation with Eastern Europe and Western Balkan (WBs) for the period 2014-2020 [55], it governs use of funds allocated and managed by the Swedish International Development Cooperation Agency (**SIDA**) for WBs in totals about €360 millions. This strategy covers the same period with Instrument for Pre-accession Assistance (IPA II) for WBs and aims to assist the WBs countries to forge closer links with the EU. After 2014 for North Macedonia [1], direct development cooperation under SIDA programmes is closed. But SIDA is still present as a donor in the projects implemented through the implementing agencies.

The activities in the WBs are expected to result in the economic development with competitive SMEs, strengthened democracy and especially, in sustainable development with goal to build better environment with **reduced climate change** and expected following results:

- WBs countries increase compliance with EU regulations and international agreements on the environment, climate and energy.
- Enhanced environmental responsibility among the business sector and civil society.
- More sustainable public services in areas such as water and sewage, waste management, energy efficiency and renewable energy.

3.3.2.4 Swiss Programmes for development and cooperation

Swiss transition cooperation in North Macedonia is focused on three **priority domains** of interventions, all in line to SDGs:

- Domain I: Democratic Governance.
- Domain II: Employment and Economic Development.
Switzerland's involvement in this domain of the **economic area** aims to promote: (1) employment prospects through support of market-oriented vocational training and (2) sustainable economic growth based on supporting development and innovation of the competitive private sector and startups.
- Domain III: Infrastructure and Environment.
Cooperation in **environmental area** is committed to ensuring that the institutions of the country are able to better protect the environment and reduce the effects of climate change. By investing in infrastructure and strengthening the capacities of public

authorities in NM, Switzerland's bilateral funding programmes aims to improve the quality of services in the areas of water supply, wastewater treatment and waste disposal.

Swiss cooperation in NM is based on **Swiss Cooperation Strategy for North Macedonia 2017-2020** [56], implemented jointly by the Swiss Agency for Development and Cooperation (**SDC**) and the State Secretariat for Economic Affairs (**SECO**). The financial commitments for the period 2017 to 2020, is amount of **€76 million** with allocation of 28% for Domain II and 39% for Domain III. Funding scheme is programed with requirement of co-funding from NM authorities.

Swiss programmes financial support to the Republic of North Macedonia

List of funded projects by Swiss SDC and SECO, active or completed for period 2014-2020, in bilateral programme between Swiss and North Macedonia and multilateral programme for Western Balkans with including Macedonian beneficiary institutions; consist in total 104 projects [57]. Selected by the sector given at the portal of Swiss Federal Council for financed projects, there are finding following total numbers of funded projects for NM (2014-2020), closely connected to R&D, innovation and technology transfer related to climate change (R&DITT to CC):

- 6 projects under sector: Climate change and environment where 3 in multi-focal sectors with agriculture and education,
- 3 projects under sector: Agriculture, food and security, multi-focal with CC,
- 17 projects under sector: Employment and economic development, 2 of them related to environmental policy, environmental education and CC,
- 7 projects under sector: Water.

The full list of **15 national R&DITT to CC projects** supported by **Swiss SDC** and **SECO** for beneficiaries in North Macedonia is given in **Annex 10** of this Report.

During the current period (2014-2020), the total budget of the Swiss SDC and SECO Programme, allocated for R&DITT to CC projects according to donor's criteria, is estimated on **27.318.670,00€**.

Allocation of total amount by the sectors is shown on the Figure 3.13: €3.8M are allocated to economic development (ED) projects, €2.3M to water and 21.23 million to climate change (where €6.9M multi-focal domain with agriculture and €0.7M with education).

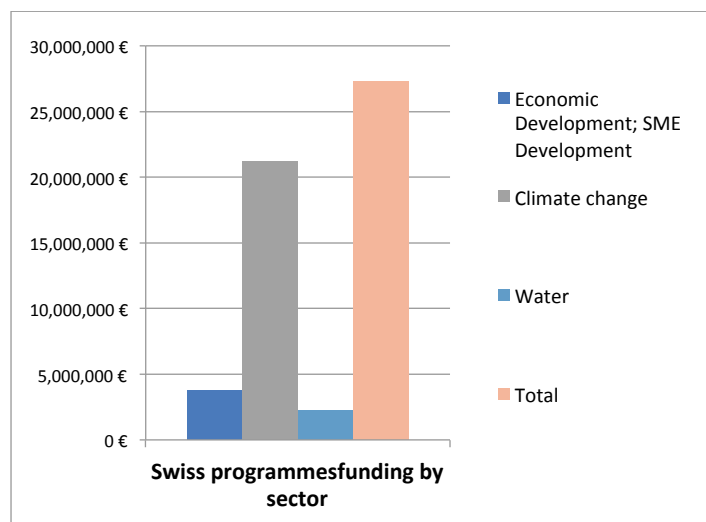


Fig. 3.13 Allocation of Swiss SDC and SECO financing by sector

Diversification of funding by sector in percentages is given on the Figure 3.14 where the largest support is indicated for economy and sustainable businesses and next for energy efficiency.

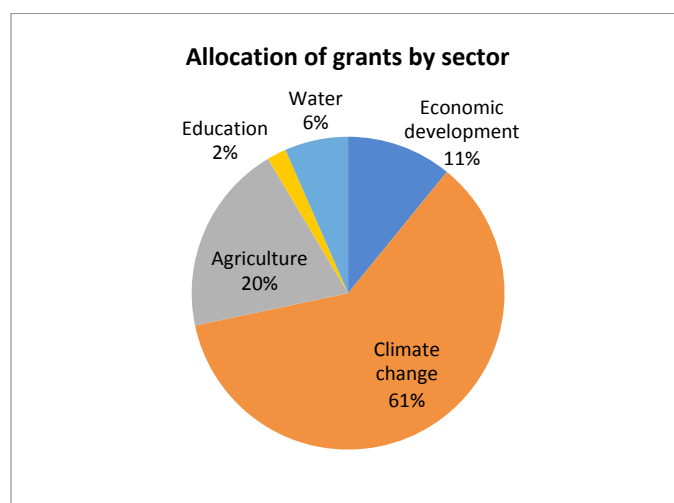


Fig. 3.14 Allocation of grants by sector

3.4 USAID Donor support in the Republic of North Macedonia

US Department of State (www.state.gov) and United States Agency for International Development (USAID) (www.usaid.gov) are two separate organisations under competence of the Secretary of State, whose cooperation is focused on both international short-term diplomatic issues and long-term institutional and capacity building efforts in North Macedonia. Since 1993, USAID has nurtured a deep partnership with the private sector, civil society and the government. USAID Mission in North Macedonia [58] is actively involved in three major areas:

- (1) advancing enterprise-driven growth and development;
- (2) supporting citizen-responsive governance; and
- (3) fostering social unity.

Through first area (1), USAID strengthens the competitiveness of SMEs in North Macedonia [59], with supporting services, as are: improving access to finance and promoting public-private partnership, as well as, with improving North Macedonia's energy system to align national legislation to EU and Energy Community requirements and to provide effective legal framework for improving energy efficiency and investment process for renewables.

For analysed period 2014-2020, North Macedonia has participated in **seven (7) national projects** financed by the USAID in the major area (1) with total financial resources of US\$10.260.515,00. These include 2 projects in environmental policy, 2 in energy policy, 1 in agricultural development and 2 in business development. Full list of granted projects is presented in *Annex 11*.

Distribution of grants by sectors is shown on the Figure 3.15 according to follow: US\$3.400.000,00 in business development (with 33%) , 3.335.074,00 in energy policy (with 33%), 2.448.815,00 in environmental policy (with 24%) and 1.076.626,00 in agriculture development (with 10%).

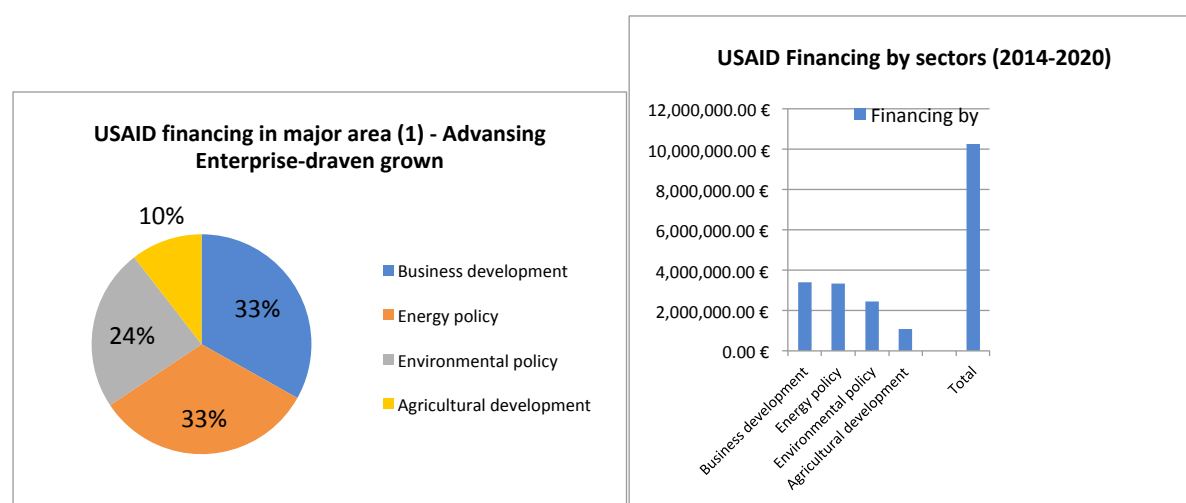


Fig. 3.15 Distribution of USAID grants by sectors in area 1-Advancing enterprise-driven growth

The full list of the national projects supported by USAID, given in Annex11, is shown that **three projects** are closely connected to innovation, technology transfer and R&D, directly or indirectly related to climate change (Business ecosystem project, Partnership for better business relationships and Development of regional energy market project). Those projects are mainly within the major area of economy grown according to the SDGs and connected to climate change, because of the concept to support business grown by the innovative technologies related to sustainable development.

3.5 World Bank financial support

World Bank (WB), as one of the specialised United Nations agencies, is one of the world leading institutions in the combat against poverty and improvement of living standards for people in developing countries [1]. WB focuses its efforts on implementation of the Millennium Development Goals, agreed by the UN members in 2000 and focused on sustainable reduction of the poverty [60]. The term ‘World Bank’ is particularly related to IBRD (International Bank of Reconstruction and Development) and IDA (International Development Agency).

WB operates by two types of lending instruments (investment long-term loans and development short-term policy loans) and limited number of grants for facilitation of the development projects, with different mechanisms through which the Bank allocates grants: Development market conditions, Development grant Facilitation, Grants for civil organisations, Global Environmental Fund (GEF), Japan Policy and Human Resources Development Fund Project (PHRD), Japan Social Sector Development Fund, Multilateral Fund for Implementation of the Montreal protocol, Small Grants Programme, Official Co-financing and Trust Funds.

3.5.1 World Bank support in the Republic of North Macedonia

WB in NM [61] works according to development Country Partnership Strategy (CPS), last prepared for period 2019-2023 [62]. WB develops and funds projects according to the focus areas in **Country Partnership Framework (CPF)**, in close collaboration and at the request of the government of the country concerned with negotiations procedures for the project feasibility and loan condition assessments. WB, according to the CPF for NM, 2019-2023, has defined **three focus areas** that will help North Macedonia for faster, inclusive and sustainable grown:

- improve the environment for a dynamic private sector to enhance (I) export-led growth,
- strengthen human capital for (II) inclusive growth and
- build (III) sustainable growth.

Focus Area I aims to create competitive private sector through activities that support trade connectivity and strengthen local companies' technological uptake, innovation, access to finance, and capacities. Focus Area III supports environmental sustainability by helping accelerate the transition to cleaner energy generation and improved energy efficiency.

During analysed period for this Report (2014-2020), key engagement of WB in North Macedonia is the **Public Finance and Competitiveness Development Policy Loan** that supports the Government in reforms to improve transparency, sustainable economic growth and reforms in energy sector [63]. This instrument is used to cover the financing of the Economic Plan of the Government with complementing lending and technical assistance activities aimed at supporting economic growth and competitiveness, where the main implementer is the Fund for Innovation and Technologic Development (FITR) of the North Macedonia.

In resent period 2014-2016, the **Green Growth and Climate Change Analytic and Advisory Support Program** in FYR Macedonia was launched, with funding support from the World Bank and the governments of Norway and Sweden [64]. It is the basis of the new CPF. **Green growth** is about advancing economic growth and development without further contributing to climate change, environmental degradation and unsustainable use of natural resources. Essentially, this means economic development accompanied by reduced greenhouse gas emissions, improved energy and resource efficiency and protected biodiversity.

For the reported period **2014-2020**, World Bank as donor through IBRD or implementer of projects funded by other donors as multilateral schemes, has managed **14 projects**, where **10** of them are connected to the main topics for this research, development, innovation, technology transfer related to climate change (R&DITT to CC), covered by **different financial mechanisms**, lending instruments and loans. The full list of the projects, **9 national** and **1 regional** of Western Balkans, supported by WB is given in the **Annex 12**. According to [65], commitment amount for all 10 projects is about US\$ **662M** offered by different lending instruments coordinated by IBRD, as main implementing agency.

From the listed projects [65], it can be seen that more of them are **multi-focal projects** with covering more than one sector and inter-sectoral policy. Those projects are infrastructural and technical connected to energy and transport, but mainly within the focal area of climate change, because of the CC mitigation concept supported by the innovative technologies and sustainable development.

The projects' **classification by sector** shows (Fig. 3.16): 3 projects connected to Transportation, 2 to Education, 2 to Urban and rural development, 1 Public sector, 6 to Environment, 2 to Energy and 4 to Industry and trade.

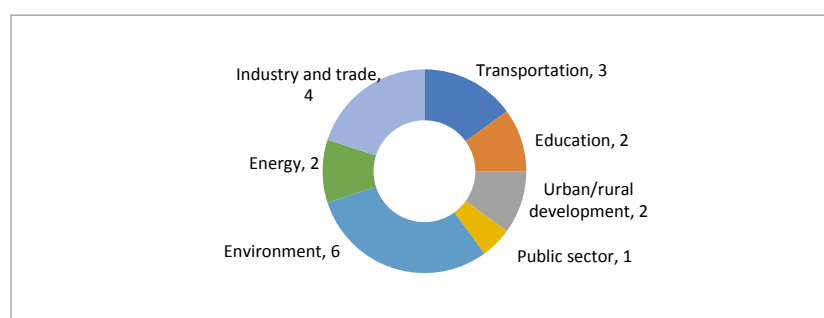


Fig. 3.16 Multi-sectorial dimension of teen financed projects under World Bank

The projects' **classification by policy of focal areas** gives the follow (Fig. 3.17): 3 projects connected to Private sector development, 3 to Rural and inter-urban roads, 4 Natural resources management, 2 to Energy efficiency, 6 to Climate change, 2 to Human development, 4 to Economic policy, 1 to Water Supply, 1 to Waste Management.

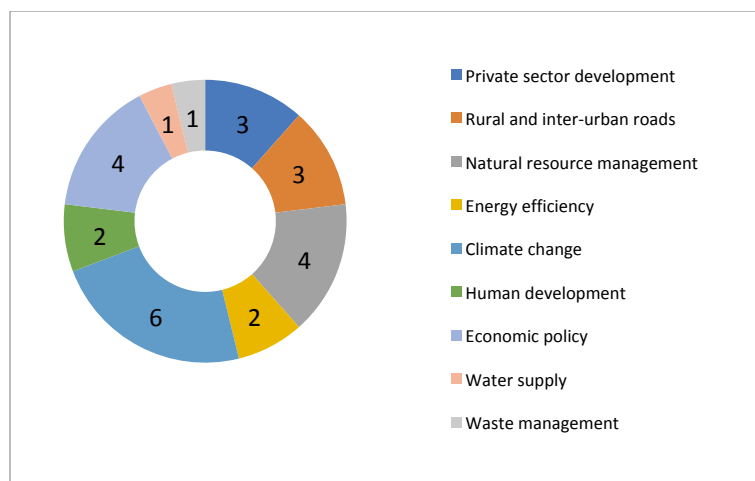


Fig. 3.17 Multi-policy dimension of teen financed projects with classification based on number of projects by policy

3.6 UNDP

UNDP is central to the United Nations Sustainable Development Group (UNSDG), as a network that spans 165 countries and unites the 40 UN funds, programmes, specialized agencies and other bodies working to advance the 2030 Agenda for Sustainable Development and support the implementation of the SDGs. The following UN units are relevant to support climate change mitigation activities for environmental sound technologies (ESTs) development and their technology transfer for sustainable development: UNEP (United Nation Environment Programmes), FAO (Food and Agriculture Organization of the UN), IFAD (International Fund for Agricultural Development), UNIDO (UN Industrial Development Organization).

UNDP receives its funding through various financing instruments:

- Financing by partners - funding from bilateral or multilateral contributions of specific programmes, Member States, multilateral partners, private and philanthropic sectors and International Financial Institutions (IFIs), as KfW, World Bank Group and other, in direct grants or in indirect contributions to support government leverage.
- Government financing - funding by country governments contribution (either from their own revenue or loans) for investments in their own countries.

- Vertical funds - intended for specific development areas and manage by different entities, GEF (Global Environment Facility), Global Fund, GCF (Green Climate Fund), Montreal Protocol, GAVI, Adaptation Fund and Forest Carbon Partnership Facility.
- Regular resources – offer flexible and rapid responses to development needs by support countries to leverage financing for SDGs for delivering the Strategic Plan and results.

As one of the world's largest multilateral development agencies, UNDP works with country governments bodies, where is present, in order to help them access different forms of development finance for country-driven priorities and strategies, with a sustainable balancing of human and environmental priorities.

From the assessment of the UNDP transparency portal [66], it is evident that UNDP is present in North Macedonia during reporting period, 2014-2020. UNDP is mainly implementing agency focused on climate change capacity building projects, biodiversity requirement projects and resources saving projects. UNIDO is involved in implementing activities focused on technology transfer projects for capacity building, ESTs development and energy efficiency in industrial entities. UNEP national activities are focused on biodiversity, land degradation and natural resources. All those projects directly or indirectly are connected to climate change aspects and have R&D and TT components.

Follow section provides the dataset of projects under UNDP as an implementing agency realized in Republic of North Macedonia, for reported period 2014-2020, There are presented the overviews for the analysed period within: number of supported projects per year, overall budgets for all projects per year and list of top donors contributions.

For 2020, 18 projects are planned for realisation under UNDP with overall budget of \$17.69M (Fig. 3.18). Main donors, listed by highest contributions are: Switzerland, Government of NM, Sweden, GEF, EU, Norway, UNDP Regular Resources, Multi Partner Trust Funds.

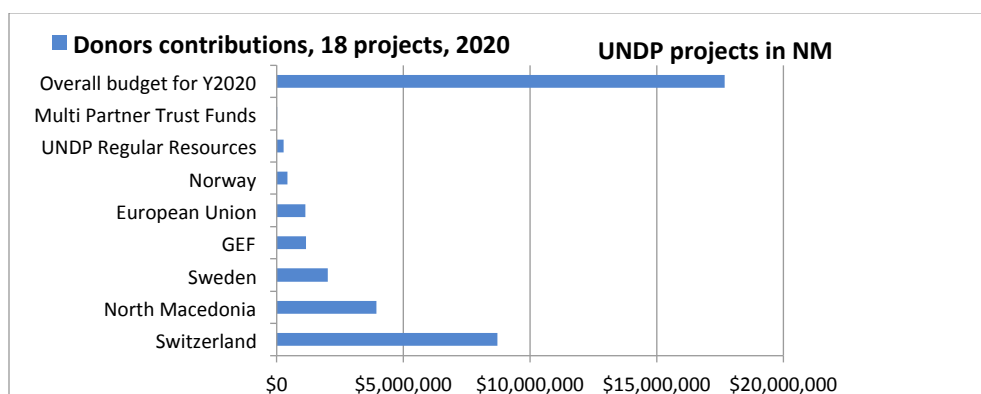


Fig. 3.18 Projects funded in 2020 by different donors, implemented under UNDP

For 2019, 22 projects have realised under UNDP with overall budget of \$17.88M, Fig. 3.19. Main donors, listed by highest contributions are: Government of NM, EU, Switzerland, UNDP Regular Resources, Norway, GEF, Sweden and MPTF.

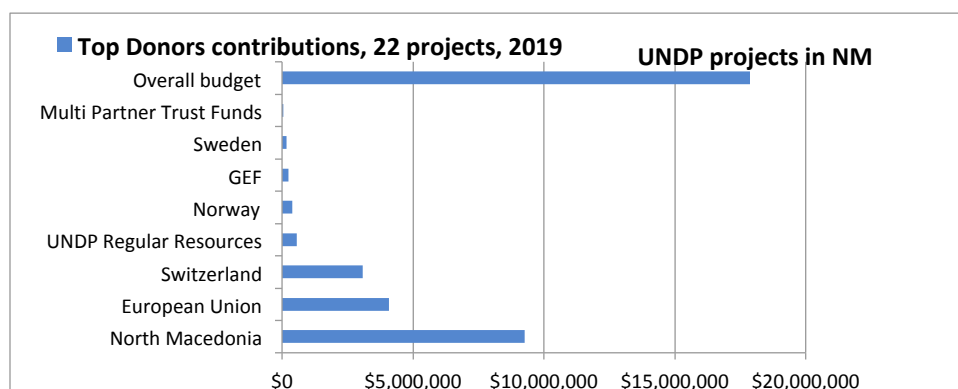


Fig. 3.19 Projects funded in 2019 by different donors, implemented under UNDP

For 2018, 27 projects have realised under UNDP with overall budget of \$17.85M, Fig. 3.20. Main donors, listed by highest contributions are: Government of NM, EU, Switzerland, Japan, Norway, UNDP Regular Resources, GEF and MPTF.

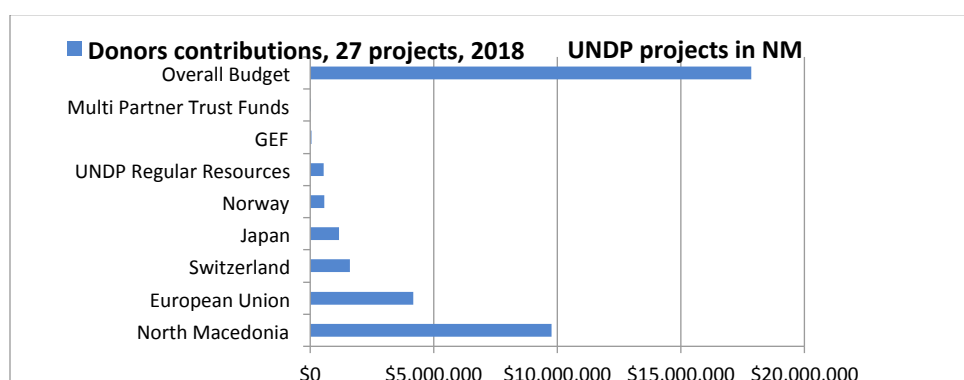


Fig. 3.20 Projects funded in 2018 by different donors, implemented under UNDP

For 2017, 18 projects have realised under UNDP with overall budget of \$17.69M, Fig. 3.21. Main donors, listed by highest contributions are: Government of NM, EU, Switzerland, Japan, Norway, UNDP Regular Resources, GEF and MPTF.

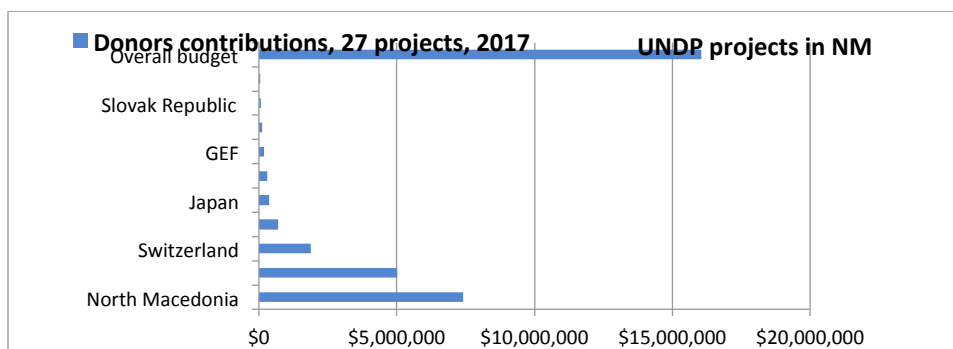


Fig. 3.21 Projects funded in 2017 by different donors, implemented under UNDP

For 2016, 29 projects have realised under UNDP with overall budget of \$12.8M, Fig. 3.22. Main donors, listed by highest contributions are: Government of NM, EU, Switzerland, UNDP Regular Resources, Japan, GEF, Netherlands and Norway.

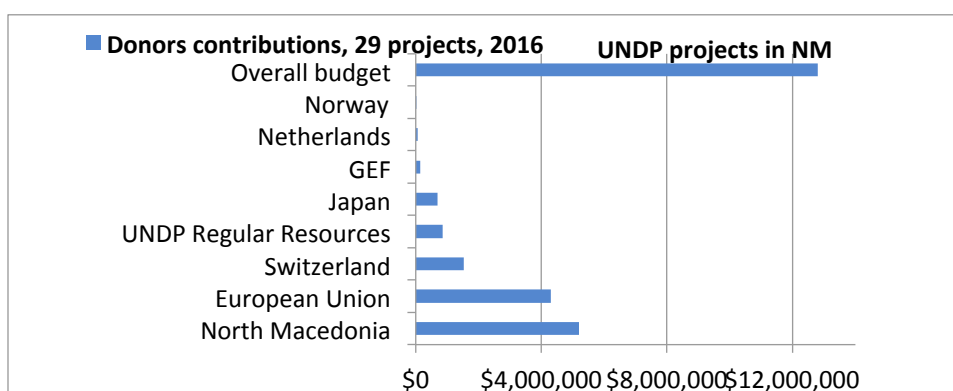


Fig. 3.22 Projects funded in 2016 by different donors, implemented under UNDP

For 2015, 18 projects have realised under UNDP with overall budget of \$7.08M, Fig. 3.23. Main donors, listed by highest contributions are: Government of NM, Switzerland, UNDP Regular Resources and GEF.

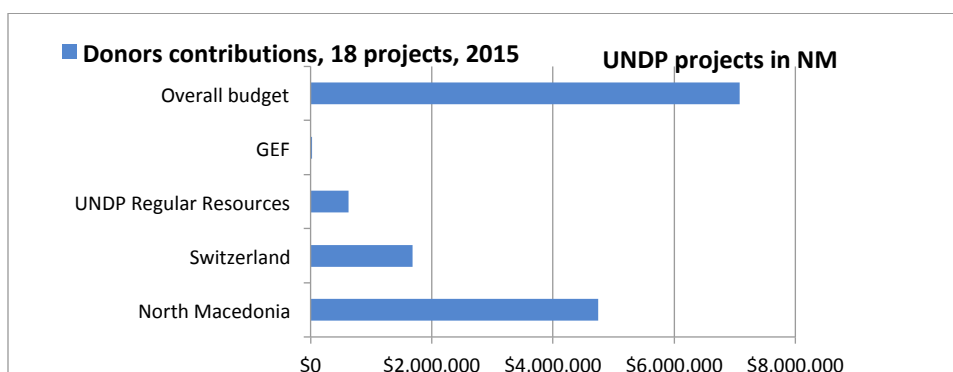


Fig. 3.23 Projects funded in 2015 by different donors, implemented under UNDP

For 2014, 17 projects have realised under UNDP with overall budget of \$8.05M, Fig. 3.24. Main donors, listed by highest contributions are: Government of NM, Switzerland, UNDP Regular Resources, GEF, Norway, Nederland and National Private Sector.

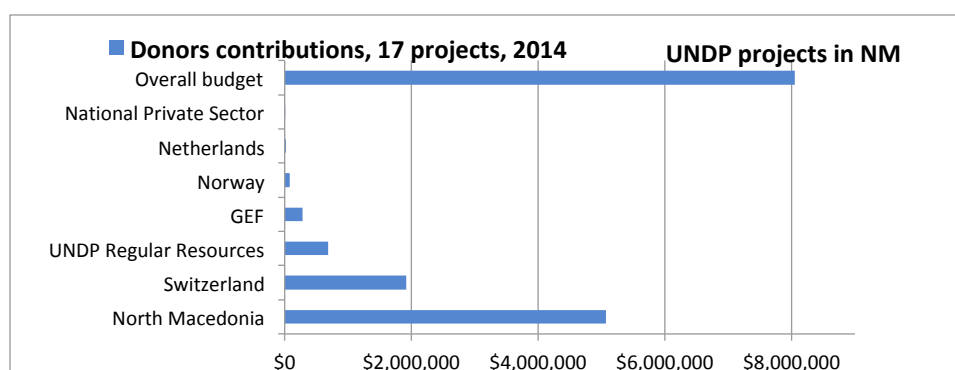


Fig. 3.24 Projects funded in 2014 by different donors, implemented under UNDP

Since 2014 to 2020, the country has received an indicative allocation of about \$100M, with national government contribution of about US\$40M, to realize projects under implementation activities done by UNDP (Tab. 3.5). The total number of projects for indicative period is 22, since data given above consists over looping of multi year's projects, 1 national and 4 regional projects.

Tab. 3.5 Allocated budgets under UNDP (2014-2020)

Budgets under UNDP implementing agency, period 2014-2020		
Year	Overall budget	Number of Projects
2020	\$17.69M	18
2019	\$17.88M	22
2018	\$17.85M	27
2017	\$17.69M	27
2016	\$12.8M	29
2015	\$7.08M	18
2014	\$8.05M	14
Total	\$99.04M	

Twelve **(12) projects**, implemented by UNDP during the 2014-2020, are closely connected to innovation, technology transfer and R&D, mainly within the focal area of climate change, because of the supporting climate change mitigation concept by the innovative technologies and sustainable development activities[67].

These 12 projects are covered different areas: 4 projects in Climate Change, 4 in international waters, 2 in resources saving and 2 in multi-focal areas (Fig. 3.25). Full list of those projects connected to R&DITT to CC implemented by UNDP is presented in *Annex 13*, where is indicative overall allocated budget of about US\$31.4M by all donors involved in funding. Co-funding of the Macedonian Government in this amount is US\$1.643.546,00, or funding of the different donors in the country with US\$29.731.078,00.

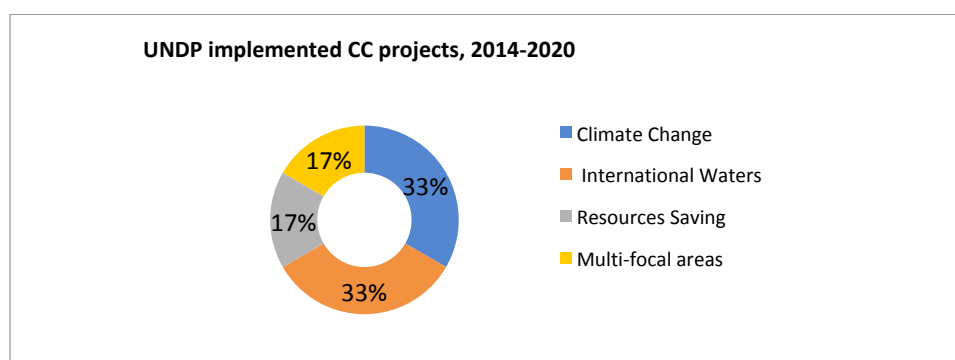


Fig. 3.25 UNDP implemented projects related to CC in North Macedonia (2014-2020)

3.7 National authorities contribution

3.7.1 Funds for research and development of the Ministry of Education and Science

The analysed period 2014-2020 is characterized by a lack of supporting activities in research where **Ministry of education and science** (MoES) haven't opened national calls for supporting the national science and development activities through R&D projects.

Despite several bilateral programmes for scientific cooperation, only biannual calls of two bilateral scientific and development cooperation programmes between North Macedonia-Austria and North Macedonia-China were opened. Analysis the priority areas of two bilateral programmes, almost all

covering climate change as one of the focal areas. The priorities are related to environment, energy efficiency, renewable energy resources, new technologies and materials where the research can be connected directly or indirectly to climate change. Analysis of dataset for supported projects has shown funding of 25 climate change projects in research, innovation and technology development, with biannual budget of €6.500,00 or with total funding of €162.500,00.

3.7.2 Domestic Universities own research funds

Starting from 2013, “**Ss. Cyril and Methodius**” University in Skopje has allocated financial resources in own fund for supporting research and development activities of the faculties members. At the annual basis, there are supported 25 research projects, each with duration of one year and funding of about €4.000,00.

For the period 2014-2020, there are financed in total **150** projects in all scientific fields with total allocated budget of €600.000,00. According to analysis of the dataset for the period 2014-2020, there are financed in total **22** research, development, innovation and technology development projects related to climate change in fields of technical and natural sciences with allocated budget of **€88.000**.

3.7.3 Fund of Innovation and Technology Development

Fund for Innovation and Technology Development (FITD), established in December 2013, supports innovation activities in micro, small and medium-size enterprises (MSMEs) in order to achieve technological development based on the knowledge transfer, technology transfer, research& development and innovation that contribute to economic grown and job creation, while developing competitive capabilities of the companies [68]. The Fund’s operations are based on financial support from the state budget and World Bank lending schemes.

Support **instruments** of FITD are co-financed grants with following funding opportunities [69]:

- **INS1** - commercialization of innovation in MSMEs for enlarging research& development activities in private sector, as well as cooperation with academia, in order development, transfer and implementation of new, innovative or improved technologies, processes and products (for micro and small-sized enterprises co-financing up to 70% of the project’s budget and for medium-sized up to 60% with maximum amount of €325.000),
- **INS2** - grown of start-ups and spinoffs based on technology development and innovative activities (co-financing up to 85% of the project’s budget, with maximum amount of €30.000),
- **INS3** -technology development and extension of SMEs with new technologies and processes (co-financing up to 30% of the project’s budget, with maximum amount of €150.000),

- **INS4** - development and investment in business-technology accelerators (co-financing up to 75% of the project's budget, with maximum amount of €500.000), and
- **INS5** - new planned instrument for technology transfer in first phase supporting the private companies within the knowledge transfer in academia-industry cooperation (co-financing up to 70% of the project's budget, with maximum amount of €20.000).

Starting from 2015, FITD has opened set of call in above mentioned instruments through co-financing schemes and supported 340 projects in MSMEs with allocated co-financing budget of about €55M.

According to analysis of data set for co-financed projects in regards to climate innovation & technology transfer projects, the FITD has financed **63** climate change related projects mainly under instruments of innovation with commercialization (INS1), technology development (INS3) and grown start-ups (INS2), with financial contribution and co-financing of **€7.554.747,00**. The companies have participated for those projects with own co-financing budget of €4.593.688,00 (Fig. 3.26). The full list of projects is enclosed in **Annex 14**, for FITD financial support.

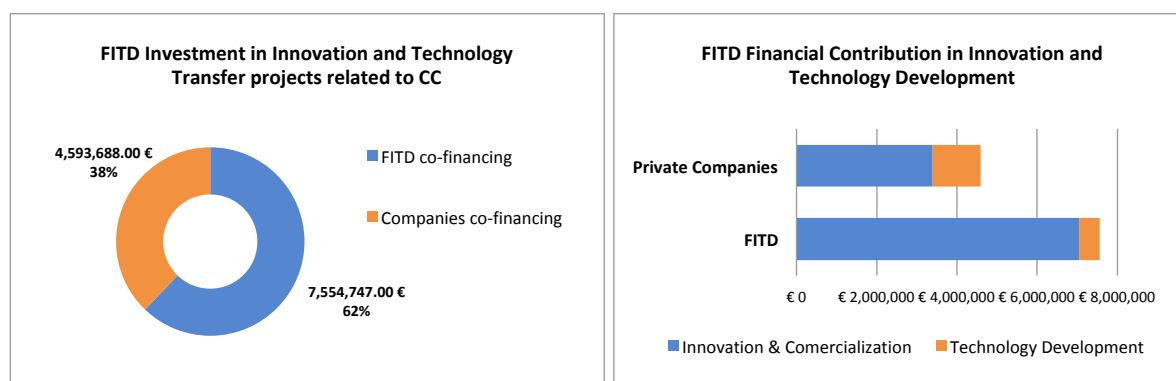


Fig. 3.26 FITD Investment in Innovation and Technology Transfer projects related to CC

The granted private companies with CC related innovation or technology development projects are sited in different regions of the country, as is evidently by chart for distribution of FITD contribution by regions, shown on the Figure 3.27. Even the more businesses are concentrated in the capital city of the country, Skopje, co-financed companies for their innovative and technology transfer activities are situated in different cities/regions around the country.

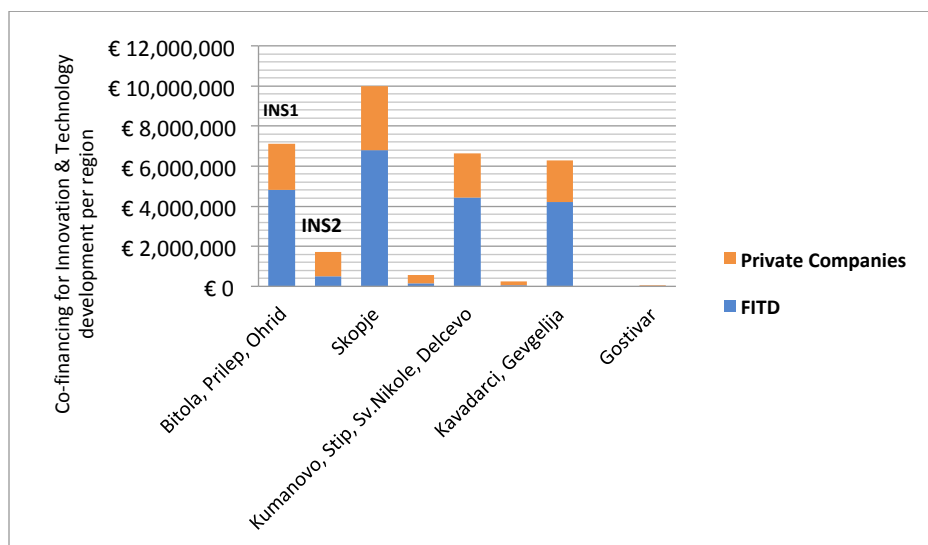


Fig. 3.27 Distribution of FITD and private companies' contribution in INS1, INS2 and INS3 by regions in the country for R&DITT to CC projects

Under the instrument for development and investment in business-technology accelerators (INS4), FITD has co-funded establishing of first three accelerators in the country: BAU-Business Accelerator UKIM, X Factor Accelerator and Seavus Accelerator. Under FITD financing, the accelerators are established at the beginning of 2019 and work on pre-feasibility and investment programmes in innovative business ideas in order to support sustainable growth and development of the economy.

3.8 PONT (Prespa Ohrid Nature Trust)

PONT is a transboundary conservation trust fund. As a trust fund, PONT's approach to conservation differs from the standard "project based" or "short-term" solutions. PONT's funding is long-term and designed to ensure the sustainable management of the Prespa-Ohrid ecoregion. This model emphasizes long-term commitment, transparency, accountability and collaboration.

PONT combines investment income from its endowment with other available capital and annual donations to generate grant-making resources for the protected areas and environmental actors, including civil society, municipalities and science/academic institutions addressing nature protection in the region.

PONT was established in 2015 with funding from MAVA Foundation and the German Ministry for Economic Cooperation and Development (BMZ), which is working through KfW Development Bank to support the increasing environmental needs of the Prespa-Ohrid region and respond to the lack of sufficient funding for conservation efforts [70].

As a conservation trust fund, PONT will be able to provide long-term sustainable financing to the region's national parks and local environmental actors. PONT provides grants to the national parks and civil society organizations working to conserve the Prespa Ohrid ecoregion.

Initially PONT focuses its funding on the Prespa lakes basin, including the six protected areas surrounding them. This area covers the most significant biodiversity features of the Prespa lakes and their surroundings. PONT aims to expand its work beyond the Prespa region to include the Ohrid lake basin, this step will be based on available resources and in line with PONT's mission and objectives [71].

From the annual report for the first full year in operation 2016, it could be noticed a solid funding base for the forthcoming few years' period. The funding committed between late 2015 -2016 from the KfW Development Bank (KfW)—mandated by the German Federal Ministry of Economic Cooperation and Development (BMZ) and the MAVA Foundation was total of €28.2 million. However, in order to provide long term annual support of €2 million to the full Prespa region, €80 million is required, extending to €95 million to also cover the Ohrid area. To achieve this programme goal, PONT actively seeks additional donors who can contribute per country, actor, region, with project based funding or capital donations to the fund [72].

The main funds are granted to the locally-based environmental actors with proven track record and capacity which are strategic partners to PONT, as framework agreements and phased approach (one year performance-based grants of pre-selected grantees). Occasionally they announce calls for other cooperation partners to fill-in the identified gaps. For instance, recently, joint call for proposals to environmental actors on Prespa funded by PONT and CEPF COOPERATION ON PRESIPA was announced. The overall budget available under this Call is €200,000.00 (€100,000.00 from PONT and €100,000.00 from CEPF – Critical Ecosystem Partnership Fund).

CHAPTER 4:
Summary of the support received in
North Macedonia for research,
development, innovation and
technology transfer related to climate
projects

According to results analysed above for the period 2014-2020, it can be concluded that North Macedonia receives significant financial, capacity building, technical and technological support by international donor organisations, developed countries and international financial institutions for research, development, innovation and technology transfer related to climate projects. The country, through its national and local institutional budgets, has funded number of R&DITT projects with direct or indirect impact on the climate change mitigation and application of the country.

Table 4.1 provides summarized information about the support received from international donors and financial institutions, containing brief overview of data about total amount allocated and total number of R&DITT to CC projects by donor.

Tab. 4.1 Summarized overview of support from international sources received in North Macedonia

Reporting period 2014-2020					
Dataset (in €)		Number of R&DITT to CC projects	Allocated amount for Macedonian beneficiaries	Total amount for selected projects (missing data per partner institution or missing data for national co-financing)	Lending instruments
Donors					
EU Programmes multilateral donors					
1	EU H2020	52		€ 5,681,192.00	
2	EU COSME	5	€ 586,514.00		
3	ERASMUS+	42	€ 7,106,660.00		
4	CIF	1	€ 100,000.00		
5	LIFE	0			
6	IPA I	21		€ 283,730,393.00	
7	IPA III	52		€ 309,502,995.00	
8	IPA CBC	49		€ 21,513,784.00	
9	Balkan Med	8		€ 9,512,215.00	
EU Countries multilateral & bilateral donors					
10	German GIZ	7	€ 14,302,000.00		
11	Swiss SECO	15	€ 27,318,670.00		
12	Norway Grants	4	€ 15,320,000.00		
13	Swedish SIDA	*under implementing agencies			
US multilateral & bilateral donor					
14	USAID	7	€ 9,439,673.80		

International implementing organisations					
15	UNDP	12	€ 832,686.00		€ 29,731,078.00
16	WB IBRD	10			€ 609,040,000.00
Multilateral financial institutions					
17	GEF	10	€ 36,350,987.56		€ 296,663,011.40
18	GCF	1			
19	EU EBRD	*under implementing agencies			
20	POND	1			€ 95,000,000.00
National sources					
21	FITD	63	€ 7,554,747.00		
22	MoES	25	€ 162,500.00		
23	UKIM	22	€ 88,000.00		

CHAPTER 5:
**Legal framework, institutional set-up
and relevant capacities in the country**

5.1 Legal framework

5.1.1 Laws, policies, strategic documents and measures

The main directions provided by the **Programme of the Government** of Republic of North Macedonia, retrospectively for the periods 2012-2015 and 2017-2020, closely are connected to the focus of this assessment, as well as are dedicated to achievement, among other, of the overall goals for economic growth, sustainable growth and high quality education, by the following measures:

- To support economic growth by development of domestic enterprises with improving the business climate, linking domestic with foreign companies operating in technological and industrial zones;
- To support several measures for increasing efficiency and productivities by supporting industry-academia cooperation and technology development for new/improved products/services/processes based on innovation, development of new technologies, technology transfer and knowledge transfer activities;
- To support R&D, innovation and technology development by investment in science and research;
- To support infrastructure, environmental, energy and agricultural sectors, as well as ICT society to provide sustainable growth.

The realization of the priorities connected to the above mentioned overall goals and their research and development (R&D) policy goals, innovation policy goals, as well as technology transfer policy goals is supported by the legal framework expressed by the laws, the policies, the strategic documents and the measures.

5.1.2 Legal framework of R&D Sector

The more focused R&D policy goals are specified in the following legal acts:

- Law on the Scientific and Research Activities,
 - National Programme for Scientific R&D Activities (2012-2016),
- Law on Encouragement and Support of Technological Development,
 - National Programme for Encouragement and Support of Technological Development (2012-2015),
- Law on Higher Education,
 - National Strategy for Education (2018-2025),
- Law on the Macedonian Academy of Sciences and Arts,
- Law on Industrial and Intellectual Property Protection, and several regulations and instructions.

The **Law on the Scientific and Research Activities** is adopted in 2008 along with the changes of the law adopted in 2012, 2013, 2014, 2015 and last in Official Gazette 53/2016. The **Law on Encouragement and Support of Technological Development** is adopted in 2011 (Official Gazette 47/2011) and in 2015 was repealed with the adoption of the Law of Innovation activity. According to these two laws, the R&D policy goals and directions are the following:

- cooperation within the entities in scientific research and with the education;
- cooperation between institutions in charge of R&D and technology development;
- development of national and international cooperation into knowledge transfer, research, training and technology transfer;
- promotion the use of research results into development of new technologies, products and services;
- improving the institutional effectiveness and competitiveness of national entities involved in technology development;
- sustainable development and environmental protection;
- support for entrepreneurship;
- increasing the take-up of knowledge and creativity;
- participation in international research and technology development programmes.

New **Law on Higher Education** is adopted by the Government in May 2018 (Official Gazette 82/2018), developed by the Ministry of Education and Science. Between the goals of the HE, the Law underlines focus of the HE sector to develop the science, R&D and technology development in order to be applied for society development. The system of scientific activities involves scientific research, qualification and training of personnel for research work and research infrastructure.

National Programme for Scientific R&D Activities (2012-2016) is oriented to create knowledge based society with strengthening the coordination, implementation and financing scientific R&D activities, international cooperation and synergy with business sector. Focus thematic areas are in development of competitive economy based on: information society, low carbon society, sustainable development and national innovation system.

National Programme for Encouragement and Support of Technological Development (2012-2015) promotes smart, sustainable and inclusive development of the country, based on knowledge transfer, R&D and innovation.

National Strategy for Education (2018-2025), prepared by the Ministry of Education and Science through IPA technical assistance project, between other, consists strategic pillars for high education (HE) development oriented to follow priorities: improving the quality, efficiency and financing of the HE, as well as strong support to research and innovation for technologies development.

5.1.2.1 Governmental Bodies for R&D Sector

According to the Constitution, the state has an obligation to encourage and support the technological development of the country. The governmental body in charge of R&D policy in the Republic of North Macedonia is the **Ministry of Education and Science** which has the responsibility to organise, finance, develop and promote the HE, science, R&D, technological development, technical culture, informatics and information systems as well as the international cooperation related to these issues.

Within the governmental sector, it should be mention the activities of the other ministries responsible for activities related to the science, R&D and technological development in specific sectors. There are:

- Ministry of Agriculture, Forestry and Water Economy,
- Ministry of Environment and Physical Planning,
- Ministry of Economy,
- Ministry of Health and
- Secretariat for Foreign Affairs with coordination of the foreign aid dedicated to R&D.

5.1.3 Legal framework of Innovation and Technology Transfer Sector

Issues related to innovation and technology transfer (TT) are regulated by specific laws and legal acts:

- Law of Innovation Activity of the Republic of North Macedonia,
- Innovation Strategy of the Republic of North Macedonia,
- Industrial Policy of the Republic of North Macedonia,
- Policy of Small and Medium Enterprises of the Republic of North Macedonia,
- Regional Strategy for Innovation R&D of Western Balkans.

Law on Innovation Activity, adopted by the Government in May 2013 (Official Gazette 79/2013) along with the changes of the law adopted in 137/2013, 41/2014 и 44/2015, determines the innovation activity, as well as principles for commercialization of the results of the innovation activity, the scientific research activity, the technical and technological knowledge and of the inventions. The law envisions establishment of a public body entitled **Fund for Innovation and Technological Development (FITD)**, established in December 2013, which coordinates finance and logistically support the innovative projects in order to improve the competitiveness of Macedonian companies through development of new technologies, products or services based on innovation, knowledge transfer and technology transfer.

The Innovation Strategy of the R. Macedonia for 2012-2020 was adopted by the Government in October 2012 (Official Gazette /2013). The strategy was prepared by the Ministry of Education and Sciences and the Ministry of Economy with support from the Organization for Economic Co-operation and Development (OECD). One of the main strengths of the policy is the involvement of all relevant stakeholders from the country in its preparation. Strategy Europe 2020 for smart, sustainable and inclusive growth. In the document, there are noted the four main weaknesses between the stakeholders in the national system for innovation: (1) Research and development in research institutions are limited by the substantial lack of finances, (2) Weak propensity of business sector to innovate, (3) Weak framework for knowledge transfer and (4) Structural challenges of the national system of policies making. From there reasons, document defines the **four strategic objectives** of the policy concerning to:

- Strengthening of the propensity of business sector to innovate,
- Strengthening of the human resources to innovate,
- Strengthening of environment for innovation,

- Straitening of knowledge transfer between innovation stakeholders.

Under for objective for straitening of knowledge transfer between innovation stakeholders, the Action plan of the Innovation Strategy consists the action for establishing Centers for **Technology Transfer** at the lead universities in the country with coordination to the MOES and State office for industrial property rights in order to support industry – academia cooperation through knowledge transfer, technology transfer and straitening commercialization of R&D and innovation results.

The lending from World Bank has supported realization of the activities planned in this Strategy as are: financing the FITD, as well as establishing and financing Office for Technology Transfer in the FITD and starting the process for development of Scientific-Technology park.

The Industrial Policy of the Republic of North Macedonia 2009-2020, prepared by the Ministry of Economy, the Government and the World Bank (Official Gazette /2009), is national strategic document for enhancing the competitiveness of Macedonian industry and the economy in general, through coordination of the competitiveness policies. The Industrial Policy is focused on the five strategic objectives (areas of intervention), as drivers of the competitiveness:

- International Cooperation and Foreign Direct Investments enhancement;
- Research, Development and Innovations;
- Environmental Sound Technologies, Products and Services for Sustainable Development;
- SME Development and Entrepreneurship;
- Collaboration in Clusters and Networks.

Effects of this policy are on the long run, through strengthening the competitiveness of Macedonian industry based on knowledge transfer, innovation and technology transfer, better informed companies, increased internalization, and initially better utilization of the EU Funds for projects for enhancing and development of competitiveness.

There are two more national strategic documents. **Strategy of competitiveness 2016-2020** is a document for development of the framework as an “umbrella strategy” for efficient using of funds from EU contribution through IPA II Programme. **Strategy for SMEs 2018-2022** is a document for development of the dynamic ecosystem of entrepreneurship and innovation in order to encourage Macedonian competitiveness by increasing entrepreneurial and the innovative capacity of SMEs.

Industrial Strategy of the Republic of Macedonia 2018-2027 with Action Plan [73], prepared by the Ministry of Economy and the Government (Official Gazette /2018), based on the revision of the Industrial Policy, is the biggest national strategic document for enhancing the innovation framework conditions for Macedonian industry and SME development in order to attracting the region for new investment and new jobs creation.

The Industry Strategy enforces development of the new national Smart Specialization Strategy (3S) [74], according to the European Platform for 3S [75], in order to detect the key potential technologies of national industry sector as a focus to fostering the economic grown of the country and the region.

Within the Action plan of this Strategy and strategy goal No.2 to increase productivity, innovation and TT there are planned five measures. First one, relevant for this assessment, is the **measure** for straitening the institutional level for TT within support of production industry [73]. The **National Technology Transfer Office (NTTO)** will be established either as a separate institution or as part of the FITD (to be determined). NTTO will plays a key role in the conversion of science, R&D and

innovation results into competitive products and processes and will direct research to the needs of industry.

Related to the legislation connected to the innovation and technology transfer in the country, it is important to mention the **Western Balkans Regional R&D Strategy for Innovation** [76], the document for those issues provided as an umbrella for WBs region in October 2013, under technical assistance of the World Bank and the European Commission. The strategy has been aimed to strengthen the region's research capacity, enhance intraregional cooperation, promote technology transfer collaboration with business sectors and explore possibilities for financing R&D from EU funding schemes and other external sources. Starting from fact that the sustainable impact of R&D expenditures on economic development depends on how effectively the research results are commercialized, this document promotes the opening and availability of intermediary organizations dedicated to commercialization of research& industry collaboration. As such organization, there are promoted technology transfer offices and science& technology parks for improving collaboration and providing soft support for transfer of knowledge and technologies.

5.1.3.1 Governmental Bodies and Legal Entities for Innovation and Technology Transfer

According to the Constitution, the state has an obligation to encourage and support the technological development of the country. The governmental body in charge to following the development and commercialization of the innovation is the **Ministry of Education and Science (MOES)** with **Sector for Innovation, Competitiveness and Tracking** of development and commercialization of the innovation. **MOES with Sector** has the responsibility to prepare strategy for innovation, three yearly action plans, transposing the European legislation and EU programmes for innovation, encourage cooperation between HE and industry and support implementation of technology infrastructure.

The Strategy of Innovation defines the **legal infrastructure** for support of innovation activities with legal entities approved by the MOES, as are:

- Business-technology accelerator,
- Business-technology incubator,
- Science-technology park,
- Entity for encourage innovation, commercialization and protection of property rights, within the priority areas of science and technology, identified by the Strategy of innovation and periodical action plans, and
- Center for technology transfer (CTT) is legal entity established by HE or research institution, as well as other legal entity with cooperation of HE or research institution, for TT activities and innovation application. CTT covers the search for ideas and TT partners, evaluation the commercial transfer potential, incentives for the realization and commercialization of TT, intellectual property protection, provision of capital funds at an early stage of development and assistance to the subjects of innovation activity.

Fund for Innovation and Technological Development (FITD), established in December 2013 by the Government, is public legal entity for coordination of financing in innovation activity. The FITD provides technical assistance and consulting services for start-up and MSM enterprises in order to increase the investment in innovation, as well as financing and co-financing of research and innovative projects. The Fund is developed in two phases, the first funded solely by the Government,

and the second phase additionally financed by the World Bank and IPA funding scheme. The FITD supports innovation and technology development in the country through five financial instruments, explained herewith above with realized support actions for period of five years.

Within the governmental sector, it should be mention the other ministries responsible for activities related to the innovation in specific sectors. There are:

- Ministry of Agriculture, Forestry and Water Economy,
- Ministry of Environment and Physical Planning,
- Ministry of Economy,
- Ministry of Transport and Communication,
- Ministry of Finance,
- Ministry of Health,
- State Office of Industrial Property.

5.2 Public sector

Republic of North Macedonia has 16 Ministries and 43 Government bodies which are part of the Ministries. In addition, there are several public institutions that are of interest in this context to provide innovative and R&D support and to assist climate change issues in the country. The following units could be suitable for NDE and should be further assessed:

- **Ministry of Environment and Physical Planning (MoEPP).** This Ministry is the highest national authority for governing the environmental and physical planning sectors, which are of great relevance for the environmental and climate change issues researched in this report. The Ministry possesses proven long-term expertise in the field, but also rich and various experience with implementation of many national and international projects. In cooperation with UNDP, the Ministry has developed and adopted National Strategy for Clean Development Mechanism of Macedonia for the first commitment period of the Kyoto Protocol, 2008-2012. From Ministry organizational structure, two departments are in special interest with their responsibilities and duties for this assessment.

Department of Sustainable Development and Investment under the MoEPP is responsible for and implementation of policies for sustainable development, environment and climate change, as well as preparation and implementation of Environmental Investment Programme with capital investments in the area of environment and needs for investments especially in the spheres of wastewater management and waste management, as well as remediation of industrial hot-spots in accordance with the Law on Environment. The Department attributes particular importance to the preparation and implementation of projects financially supported by donor community and EU's pre-accession assistance;

Department for International Cooperation under the MoEPP plays the role of coordinator of activities for the protection and promotion of the environment related to accession to global and regional international agreements; accession to international and regional organizations; concluding bilateral agreements; and coordinating international assistance. It is consisted of divisions for bilateral and multilateral cooperation in order to monitor the international

environmental movements and the status of implementation of obligations under international environmental conventions.

- **Bureau of Metrology under the Ministry of Economy (BoM).** The BoM is a legal entity responsible for the implementation of Laws on metrology; control the goods on precious metals, compliance with international agreements on technical regulations and similar issues. This institution is member of international relevant bodies and possesses somewhat experience with international projects.
- **Ministry of Agriculture, Forestry and Water Economy.** This Ministry is the highest national authority for the sectors of agriculture, forestry and water economy. It is consisted of 19 sectors, specific for various areas, among which: sector for international cooperation and sector for EU. The Ministry has somewhat experience with international donors and projects (there are three active projects and one twining project listed, one of which is supported by the UN relevant body).
- **Ministry of Education and Science (MoES).** This Ministry is the highest body in-charge for the educational sector, science and research in the country. Ministry, with the Sector for Science has the responsibility to organise, finance, develop and promote the HE, science, R&D, technological development, technology transfer, technical culture, informatics and information systems as well as the international cooperation related to these issues. Authority for development and upgrading the education in the ethnicities' tongues and National Educational Inspectorate.
- **Fund for Innovation and Technology Development (FITD).** FITD aims to encourage and support innovation activities in micro, small and medium-size enterprises (MSMEs) in order to achieve more dynamic technological development based on knowledge transfer, development research and on innovation that contribute to job creation, to economic growth and development, while simultaneously improving the business environment for the development of competitive capabilities of companies. FITD provides improved access to financial support for innovation and technological development and promotes innovation activities in North Macedonia from all variety of areas, including environment and climate change. According to Work Programme of FITD 2018-2020 [77] connected to Low for Innovation and new Industrial Strategy of North Macedonia 2018-2027 [73], FITD should open National office for Technology Transfer (NOTT) for supporting academia-industry cooperation and promotion of results from R&D as innovative activities for technology transfer in industry.
- **Agency for Foreign Investments and Export Promotion of Republic of North Macedonia (INVEST Macedonia).** The Agency is the primary Government institution supporting foreign investment in the country with main goal to win new investment projects and to support the expansion of the existing base of overseas companies. Foreign investments in the country are supposed to bring new technologies and knowledge and to support the R&D and Innovation in environmental issues.
- **Agency for Financial Support in Agriculture and Rural Development (IPARD).** This Agency is established under responsibility of EC Council Regulation (EC) No 1085/2006, from July 2006, to support implementation of IPA for the period 2007-2013. It is a National body accountable for the utilization and monitoring of the IPA-Component 5 for Agriculture and Rural Development (IPARD). The IPARD programme is supporting the agricultural sector in terms of transfer of innovative agricultural techniques and practices, knowledge

transfer, direct financial support for modernization of the agricultural equipment, as well as implementation of agricultural techniques supported by the renewable energy production.

- **Energy Agency of the Republic of North Macedonia.** The Agency was established to support the implementation of the energy policy of the Government, through the preparation of the energy strategies, development plans and programs, with particular emphasis on energy efficiency (EE) and usage of renewable energy sources (RES). EARM has a mandate to lead, give initiatives, to coordinate the preparation of studies and implementation of international projects for EE and RES, as well as implementing policy for improving the RES usage at country level and lead and monitoring the EE programmes at public and municipality level.
 - **Agency for Promotion of Entrepreneurship of Republic of North Macedonia (APERM).** The Agency was established in 2003 in order to support entrepreneurship and competitiveness of micro, small and medium-sized businesses in the country. It implements and coordinates state and international support for MSMEs, as well as for start-ups and promotes entrepreneurship through various forms of financial and non-financial support.
 - **Research Centre for Energy and Sustainable Development,** part of **Macedonian Academy of Sciences and Arts.** The initial name of the centre was Research Center for Energy, Informatics and Materials (ICEIM) and was founded in 1986 by Prof. Dr. Jordan Pop-Jordanov, with the aim to initiate, coordinate and perform fundamental and applied research in certain priority areas from its domain. The Center is a focal point for North Macedonia of the International Database of IAEA and the World Solar Process of UNESCO. Also ICEOR is the residence of the Macedonian National Committee of the World Energy Council and the National Committee for Climate Change as well as the Member of International Network of Centers for Sustainable Development.
 - **Ss. Cyril and Methodius University in Skopje, Faculty of Mechanical Engineering – Skopje (FME).** The Faculty is the largest HE institution with academic and research activities in the fields of mechanical, production, industrial engineering, as well as their application and technology transfer into industry and business sector. It offers large number of academic study programmes at all HE levels. It is main contracts partner to companies in fields of energetics, vehicles, production through long term cooperation. Faculty has two inspection bodies and two accredited laboratories with applied activities to business sector. The Faculty has implemented over 100 scientific and research projects, out of which many offices and centres relevant in this respect are established: Center for New Business Development, Center for Product Lifecycle Management, Center for Cleaner Production, Center for Energy Efficiency, Center for Industrial Design, etc.;
- CIRKO – Center for Research, Development and Continuing Education** – developed in 2002 as a model of technology transfer office at the Faculty of Mechanical Engineering supported by the GTZ project. As innovative and important model for academic society in the country, immediately has been established as a spin-off commercial entity by the Faculty in 2002 named CIRKO [78]. Until now, it conducts support of R&D and transfer of technologies to the industry and companies within all the fields of engineering covered by the Faculty with large number of realized projects, as well as coordinate professional trainings. It offers services of three inspection bodies and two accredited labs. From October 2010, CIRKO is registered as a Technology Transfer Center, included as a Technology Development Entity in the Register of Entities for Technology Development at the Ministry of Education and Science (MoES Decision No.13-416/1).

- **Ss. Cyril and Methodius University in Skopje, Faculty of Computer Science and Engineering (FINKI).** This faculty is the largest and most prestigious faculty in the field of computer science and technologies in the country. It maintains contact with the domestic business sectors in the field of information and communication technologies (signed contracts for collaboration with 68 different companies, and has participated in 48 applicative national projects). The Faculty has rich and valuable experience in implementation of numerous national and international projects.
Regional Hub for Social Innovation launched in 2013 at the Faculty of Computer Science and Engineering in coordination with UNDP. The Hub is established as pilot Center for technology transfer, in order to make the technologies to tackle social challenges and advance human development by encouraging development of innovative ICT solutions to social and economic problems. The Hub promotes new partnerships between the private sector, policy-makers, academia and other players interested in promoting social innovation. Projects aiming at environmental protection and mitigation of the climate change are among the priorities.
- **Ss. Cyril and Methodius University in Skopje, Faculty of Electrical Engineering and Information Technologies (FEIT).** Faculty is the largest HE institution with academic and research activities in the fields of electronics, automation, energetics and telecommunication engineering. It offers large number of academic study programmes at all HE levels. FEIT has one inspection body and two accredited laboratories with applied activities to industry and works on stimulating the efficient transfer of knowledge and expertise from academia to industry. More than 100 scientific and R&D projects are realized with results in new research equipment, new labs and centers, as well as transfer of knowledge and technology to the industry. One of those centers (INNOFEIT) is in focus for the assessment in this research.
Center for Technology Transfer and Innovations – INNOFEIT, established at the FEIT as unit of the University, during 2002 as a model of office for technology transfer supported by GTZ project. [79] It serves a hub for interaction among faculty's staff, students and industrial partners that will foster connections, match-making of highly skilled scientists with companies and transfer of technologies as well as novel innovative ideas that will aid the economic growth of the sector and the society in general. The Center has experienced in leading R&D and innovation projects with companies for knowledge transfer and new technology development where some of them are funded by the FITD instruments.
- **Centre for Applied Research and Permanent Education in Agriculture (CIPOZ), Faculty of Agriculture and Food Sciences, Skopje.** The Center CIPOZ was established within the Faculty of Agricultural Sciences and Food – Skopje in 2002 supported by GTZ project and have contributed for the informal education and training in agriculture [80]. CIPOZ has realized many projects and trainings in various agriculture, rural development and environmental protection. As part of its activities, it has realized significant activities in the areas of R&D, knowledge transfer and application of modern technology through training programs and seminars.

5.2.1 Educational curricula related to Climate Change Research, Development, Innovation and Technology Transfer

The assessment of the educational curricula about the education for climate change and sustainable development has showed that it is incorporated in the educational system at a different levels to a different extend, but still not adequately incorporated in the national educational system with systematic approach for wider climate change issues.

Concerning the state universities curricula there is four state universities with their faculties that have undergraduate, postgraduate and PhD levels programmes accredited and active now, connected to climate change and sustainable development issues. Furthermore the climate change accent of these programmes is not strictly emphasized in the programme naming as an educational focal point.

The tables below briefly present:

- the hosting university/faculties and the principal coverage of the programmes,
- the names of accredited HE study programmes (curricula) at different level of studies that are closely connected to climate change and sustainable development, or
- the names of subjects connected to climate change and sustainable development issues incorporated in different study programmes.

The assessment of the study programmes and subjects concerning CC issues at different faculties at “**Ss. Cyril and Methodius**” University in Skopje is presented from Table 5.1 to Table 5.5.

Tab. 5.1 “Ss. Cyril and Methodius” University in Skopje, Faculty of Mechanical Engineering – Skopje

Education level	Study programme	Subject in different study programmes
Undergraduate level	Energy and Ecology	Environmental Management Energy Efficiency Sustainable Development Eco-Products Risk Management for SD
Postgraduate level	Sustainable Energy and Environment	Sustainable Development
	Energy and Ecology	Energy Efficiency
	Management of Product Lifecycle Management	Circular Economy
	Engineering of Environment and Natural Resources	Cleaner Production Eco Sustainability Energy Management Intelligent Transport
PhD level	Different subjects at the study programmes: Mechanical Engineering Industrial Engineering and Management	Environmental Management Energy Efficiency Sustainable Development Product Lifecycle Management

Tab. 5.2 “Ss. Cyril and Methodius” University-Skopje, Faculty of Electrical Engineering and Information Technologies

Education level	Study programme	Subject in different study programmes
Undergraduate level	Power engineering, automation and renewable energy	Energy and Sustainable development Photovoltaic systems Renewable energy sources Wind Power Plants Smart grids Energy Efficiency and Environmental Management
Postgraduate level	Renewable Energy Sources	
	Energy Efficiency, Environment and Sustainable Development	
PhD level	Different subjects at the study programme: Electrical Engineering and Information Technologies	Eco-Legislation Energy Efficiency Environment Protection from Energy Systems Energy Sustainable Development

Tab. 5.3 “Ss. Cyril and Methodius” University in Skopje, Faculty of Technology and Metallurgy

Education level	Study programme	Subject in different study programmes
Undergraduate level	Inorganic Engineering and Environment Protection	Environmental Protection Impact of CC on the water and soil characteristics Pollutants Cleaner Production Chemistry of atmosphere Energy and Environment Industry Zero Emission
Postgraduate level	Environmental Engineering	
	Inorganic Engineering and Environment Protection	
PhD level	Different subjects at the study programmes: Technology Metallurgy	Energy and Environment, Environment Impact Assessment, Industry Ecology, Processes in Environment Engineering, Sustainable Development, Air Pollution and Prevention

Tab. 5.4 “Ss. Cyril and Methodius” University in Skopje, Faculty of Agricultural Sciences and Food

Education level	Study programme	Subject in different study programmes
Undergraduate level	Eco Agriculture	Ecology Agro Climatology

Postgraduate level	Management of Renewable Sources and Environment	
PhD level	Management of Renewable Sources and Environment Protection in Agriculture	Bio Climate Analysis Bio Technologies

Tab. 5.5 “Ss. Cyril and Methodius” University in Skopje, Faculty of Natural and Mathematical Sciences

Education level	Study programme	Subject in different study programmes
Undergraduate level	Ecology	Environmental Protection
	Biology	Climatology and Climate Changes
	Geography	Plant ecology
Postgraduate level	Ecology and bio-systems	
	Geographic Information Systems	
PhD level	Different subjects at the study programmes:	

Here below is provides the overview for the “**St. Kliment Ohridski**” University in Bitola. The assessment of the study programmes and subjects concerning CC issues at different faculties is presented from in Table 5.6.

Tab. 5.6 “St. Kliment Ohridski” University of Bitola, Faculty of Technical Sciences

Education level	Study programme	Subject in different study programmes
Undergraduate level	Engineering of Environment and Work Protection	Energy Efficiency Renewable Energy Sources
Postgraduate level	Engineering of Environment and Work Protection	Contemporary Energy Technologies Systems for Environmental Protection
PhD level		Sustainable Energetics Energy Systems and Environment Sustainable Infrastructure Sustainable Transport Systems

Here below is provides the overview for the University “**Goce Delcev**” in Stip. The assessment of the study programmes and subjects concerning CC issues at different faculties is presented from the Table 5.7 to the Table 5.8.

Tab. 5.7 University “Goce Delcev” of Stip, Faculty of Natural and Technical Sciences

Education level	Study programme	Subject in different study programmes
Undergraduate level	Environment Engineering	Geo Ecology Ecology and Eco Systems
Postgraduate level	Engineering of Environmental Protection	Environment Modelling Natural Resources Environmental Impact Assessment

Tab. 5.8 University “Goce Delcev” of Stip, Faculty of Electrical Engineering

Education level	Study programme	Subject in different study programmes
Undergraduate level	Energetics and Renewable Energy Sources	Sustainable Energy Development Environment Protection
Postgraduate level	Nonconventional Energy Sources and Technologies	Energy and Ecology Renewable Sources

Here below is provides the overview for the **State University in Tetovo**. The assessment shows one study programme concerning CC issues and one Institute, as an entity focused on the research fields, and it is presented in Table 5.9.

Tab. 5.9 State University of Tetovo, Faculty of Natural Sciences and Mathematics

Education level	Study programme	Subject in different study programmes
Undergraduate level	Ecology	
Research Level	Institute of Ecology and Technology	

Concerning the climate change related issues in the educational curricula on the private universities there is a subjects in frame of study programmes on the private **International Slavic University**. The details about this educational program are given below in the Table 5.10.

Tab. 5.10 International Slavic University, Faculty of Safety Engineering

Education level	Study programme	Subject in different study programmes
Undergraduate level	Work Safety	Industry ecology Management of Natural Sources Environmental Monitoring
Postgraduate level	Work Safety	

It line with the above conclusions based on the finding it is recommended that effective mechanisms and strategies are needed in order to incorporate the climate change and sustainable development concepts in the high education curricula, which is lately considered as an elementary concept of the natural and technical sciences. Additionally it is recommended to emphasize the attention on climate change in the existing and the forthcoming educational programmes, due to the increased national and international attention on the climate change topic and possibility for increased interest for this high educational curricula.

5.3 NGO/CSO sector

The sector of NGOs was quite complicated to be analysed, because many of the organisations operate in multiple thematic areas, and not all of them are relevant in this context. In essence, it is difficult to be determined the scope of the activities under the relevant thematic areas of operation. Moreover, the assessment of the financial long-term capability and sustainability of the organisations is also not an easy task to be performed.

Most of the actions for lowering the carbon footprints and greenhouse gas emissions are initiated by the ecologists. On the other hand, the actions for popularisation and raising awareness, as well as the ‘soft climate technologies’, such as gaining skill and competence for new environmental sound technologies development or technology transfer, are mainly initiated and implemented by NGOs operating in multiple thematic areas. The NGOs with significant potential for NDE from former and latter are listed below:

- **Regional Environmental Center in North Macedonia** – This multinational organisation is present in the country since 1993. Its development programmes have been designed to promote the key processes, such as: waste management planning, strategic environmental assessment, water resources planning, environmental protection etc. They have proven expertise in environmental education, financing and implementing actions and measures. Within this area of expertise, the REC supports the implementation of the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement. It contributes to regional, national and sub-national efforts to develop and implement low-emission development strategies and to build resilience to climate change. The REC provides good-quality data for decision makers; promotes dialogue and international cooperation among different stakeholder groups; disseminates low-carbon development knowledge; builds the capacities of national and sub-national stakeholders; and facilitates active public participation in policy making [81].
- **MACEF (Center for Energy Efficiency of North Macedonia)** – It is a scientific association established in 2002 that aims to increase the energy efficiency and environment protection through strengthening the capacities, promotion of measures and expertise on energy efficiency in collaboration with governmental and local institutions, donors and activists at national and regional level. MACEF is actively involved in energy policy making and resources planning. This center possesses experience in project implementation from the area of energy efficiency [82].
- **Macedonian Ecological Society** – This organisation is dedicated to ecology, education, nature conservation and environment protection for five decades. Their work is divided in several thematic programmes, among which the programme “Nature and environment protection polices” is the most relevant for this research. As part of this programme, they organise various workshops and awareness raising activities [83].
- **Eco-Svest** - Eco-Svest is a civil association founded in 2002, and in 2008 it changed its name to "Center for research and information environment eco-consciousness" in order to best reflects its activities, mission and vision. The main objective for the establishment of the association lies in the need to increase public awareness of the necessity of caring for the

environment in North Macedonia, through information, education and advocacy. Although they implement activities from the areas relevant for this research, they do not have extended experience with international projects [84].

- **Bidi Zelen** - Go-Green is a civil organization funded in 2010 dedicated to sustainable development by work and projects that promoting youth eco-activism for environment protection, increasing the education on climate change and working toward green economy and encouraging green jobs. This organization possesses experience in large number of initiatives and in working of the few projects [85].
- **Elektromobilnost MK** – This NGO is registered in 2013 oriented to campaigns for new technologies, green energies and transport, from zero CO2 emissions to support society in the field of sustainable development as well as transportation with electrical, hybrid, hydrogen and other types of vehicles. It organizes education panels, workshops and initiatives in order to increase awareness for electrification of the transport [86].
- **Centar za klimatski promeni** – NGO Center for Climate Change (CCC) is established in 2008 and aims to protect environment, raising public awareness and implement activities combating climate changes and improving the environment. The Center is directing its activities towards industrial energy efficiency, industrial pollution and prevention control, waste management, climate change mitigation and adaptation measures and energy and environmental management. This Center [87] possesses experience in international project implementation from the area of waste management, recycling and climate change actions.

5.3.1 National good practices (NGOs for supporting Technology Transfer)

The national and international NGOs structure has significant influence in the process of the establishment of the national innovation, TT and R&D infrastructure. The entities, NGOs, in this structure are mainly developed as results of successfully realized international projects and as instrument of its sustainability. This important stakeholder also presented extraordinary outcomes of the implementation of the innovation, TT and R&D activities in the country and presented the national best practice in many thematic areas including climate change and sustainable development. Several good practices in the country are outlined below:

- **Climate Change Communication e-Platform.** Nowadays digital revolution brings digital dimension of the society and digital platforms become stronger and faster in mobilizing the people than other types of organization. That is the reason to list National Climate Change Communication e-Platform in the best practices (klimatskipromeni.mk) [88]. Established by support from UNIDO and GEF, CCC e-Platform represent the initial point for sharing climate change and climate action information in our country, at the national but, also at the local level. Information shared between society presents climate change from a Macedonian perspective in order to show efforts to facilitate adaptation and to straighten public awareness for CC actions. Dealing with climate change assisted by international partners, this e-platform

coordinates climate actions at all level in the country, improving capacities to accomplish the global climate goal with involving all stakeholders: Government institutions, NGOs, business, science, media and national climate change leaders. CCC Platform provides updated national information related to the implemented climate actions, survey, projects, institutional and legal framework and national communications for climate change.

- **Innovation Lab in the City of Skopje.** It is UNDP funded project to create space with set of protocols that enable a coming together of citizens, the public administration, the private sector and civil society to brainstorm, develop and test ideas, experiment and learn from each other. Innovation Lab operates as a new model of Government – Citizen Collaboration in order to straitening public institution to deliver services efficiency and cost-effective and bring in additional resources and networks.
- **National Center for Development of Innovation and Entrepreneurial Learning (NCDIEL).** The Center was established in November 2009 with financial support from Austrian Development Cooperation Agency (ADA) [3]. NCDIEL supports the realization of innovative, technology-based and profit orientated ideas through the provision of capital for start-ups, coaching of established enterprises in order to strengthen the capacity and growth of newly established enterprises. NCDIEL's activities encompass providing start-up training, coaching and financial support to highly innovative business ideas and stimulating an innovative entrepreneurial culture [89].
- **European Information and Innovation Centre of Republic of North Macedonia (EIICM).** Established within the project funded by EU CIP Programme of Competitiveness Innovation. The EIICM, as a part of a large European Network (Enterprise Europe Network), provides services to the defined target groups (mainly SMEs, but also larger companies, universities and research centers) through dissemination of information on EU legislation, enabling business contacts with potential European partners, facilitating the technology and knowledge transfer as well as promoting the possibilities for participation in EU research programmes. EIICM is established with main office at the UKIM.
- **Foundation for Management and Industrial Research (MIR).** The Foundation contributes for supporting existing businesses and encouraging the growth of new businesses, for transfer of innovative technologies between all kinds of innovation players and provides advisory services for improving industrial performance and competitiveness to national business sector. Promoting sustainable environmental development and intelligent energy use is one of its goals. It supports green economy through eco-innovations and environmental services for generating business opportunities from environmental challenges, energy efficiency and green grown [90].
- **Gauss Institute – Bitola.** Foundation for New Technologies, Innovations and Knowledge Transfer, established in 2006. The role of the establishment of the foundation is through development and application of new technologies, innovations and knowledge transfer to contribute toward establishment of knowledge based society in the region. All activities Gauss Institute undertakes are solely directed to accomplishing the mission of creation of knowledge-based society, by using science and technology, that is eco-friendly and sustainable in the long-term.

5.4 Private sector

The private sector in the country is characterised with dominance of the small and medium enterprises (more than 99%). The companies operating in thematic areas that are relevant for the selection of the NDE are distributed across most of the industries. Although majority of these companies produce or sell eco-friendly materials, products or services, only tiny share of them conduct the research and development for the novel materials in-house. It is widely known that the SMEs in general, experience lack of capacities (both financial and human capacities) to carry out the research for the innovative products and services. The organisation that will be nominated for NDE should possess certain capacities for research and development, as well as appropriate availability of sufficient human resources. Therefore, it was decided that only the companies whose core area of operation is research and analyses of the ecological topics could be appropriate for nomination in this respect. To our knowledge, only the following two companies from the private sector are the companies that provide ecological consultations and analysis:

- **Pharmachem** – it is a private company for trade and consultancy established in October 1990 by Prof. Josif Tanevski, PhD and operates with its 40 employees. Pharmachem is the official representative and distributor of more than 20 world renowned companies. The main activities of the company are trade and environmental consultancy. They possess somewhat experience in implementing projects, experienced on the Swiss project “Nature Conservation Programme in North Macedonia” and have won several awards for sustainable development and corporate social responsibility [91].
- **EcoMosaic** - The environmental engineering and consultancy company EcoMosaic provides consultancy within environmental engineering science to the clients coming from different sectors. It offers integrated solutions, in line with the legal requirements, but also with the best EU and global practices, technical norms and standards in the area of: Environmental protection; Efficient use of resources (raw materials, water, energy) and use of renewable energy sources; Introduction and implementation of the cleaner production concept and analysis of the products’ life cycle; Sustainable production and eco design; Preventive pollution control of all environmental media; Preparation of investment documents in line with the national and EU requirements for project applications and project cycle. However, this company has limited experience in implementing international projects [92].

5.5 Brief analysis of the potential for nomination for NDE

In addition to the public sector, the sectors of non-governmental organisations (NGOs)/civil society organisations (CSOs) and private sector organisations play significant role in addressing the pressing issues on climate change, raising awareness and building appropriate human capacities for both, the

hard and the soft technology transfer of climate technologies. In general, the organisations from these sectors are more experienced in planning and implementing donor-financed projects and actions and they are more flexible in motivating the employees to engage themselves in the role of NDE with financial and other types of incentives. On the other hand, they possess limited experience and expertise in policy-making in respect to the public organisations, although some of the NGOs are making efforts for lobbying and influencing policies and measures.

The public and private sectors in the country are quite different and it is difficult the same procedure for evaluation the performance to be used in both cases.

However, in relation to the nomination of the NDE at a country level, it is of a greater importance the assessment of certain specific factors that will be common for both, the public and the private sectors, in order an overall rank list of organisations to be produced, rather than in-depth assessment of the public organisations' performance.

5.5.1 Common evaluation criteria for both sectors

The authors researched the evaluation criteria used in similar contexts for assessing the quality and suitability of public or private institutions. Throughout the literature, it was pointed that every assessment should be developed independently, taking into account all relevant circumstances. The characteristics of both sectors of interest, the public and the private/NGO sector are quite different.

Therefore, it was decided for the needs of this stage of the assessment, only the most important criteria that are applicable for both sectors to be selected. Further in the process, if there are needed more precise determination of the most suitable NDE on a national level, a qualitative methodology consisted of in-depth interviews and focus groups should be proposed. The examination in this report will result in development of independent cases for the highest-rated institutions within this stage, which could be proposed as an input to the experts group that will nominate the NDE for the Republic of North Macedonia.

The following criteria are proposed as primary factors that should be researched at this stage:

- Relevance of the main field/sector of operating with the technology sectors (both, hard and soft technology are included)
- Inter-sectorial collaboration
- National coverage
- Experience with policy-making
- Experience with implementing granting schemes
- Experience with working on international projects
- Availability of the personnel and possible motivation for becoming NDE.

The organisations selected from each of the three sectors: public, private and NGO/CSO are assessed by each of the selected criteria (Tab. 5.11). The criteria are graded with marks from 1 to 5, where 1 is the weakest/lowest mark and 5 is the highest mark. The received marks are summed up, which results

with an overall assessment mark for the examined organisation. The overall marks are ranked and the highest ranked organisations are promoted as organisations that possess significant potential for NDE. In the next phases if it is needed, further assessment with qualitative research methods (in-depth interviews and focus groups) of the promoted organisations in this first project phase should be conducted. This research will result with selection of the most suitable organisation for NDE that will represent the Republic of North Macedonia in the UNFCCC society and CTCN network and will serve as national focal point for the development and transfer of climate technologies.

Tab. 5.11 Assessment of the most appropriate organisations for NDE

Organisation	Relevance	Inter-sectoral collaboration	National coverage	Experience with policy-making	Experience with granting schemes	Experience with projects	Availability and motivation	Overall mark
Ministry of Environment and Physical Planning	5	5	5	5	4	4	1	29
Ministry of Agriculture, Forestry and Water Economy	3	4	5	5	4	2	1	24
Ministry of Education and Science	4	4	5	5	4	3	1	26
Fund for Innovation and Technology Development	4	5	5	4	5	5	5	33
CIRKO – Center for Research, Development and Continuing Education (Faculty of Mechanical Engineering (MFS), UKIM)	4	5	5	3	4	5	4	30
INNOFEIT – Center for Technology Transfer and Innovations, at the Faculty of Electrical Engineering and Information technology (FEIT), UKIM	4	4	4	3	5	5	5	30
Regional HUB for Social Innovation, at the Faculty of Computer Science and Engineering (FINKI), UKIM	3	4	4	3	4	5	4	27
RCESD – Research Centre for Energy and Sustainable Development, part of Macedonian Academy of Sciences and Arts (MANU)	5	4	5	3	4	5	4	30
Regional Environmental Center (REC)	5	4	5	3	4	5	3	28
MACEF	5	3	4	2	4	5	2	25
Macedonian Ecological Society	5	4	4	3	4	2	3	25
Eco-Svest	5	3	4	3	4	2	2	23
Center for Climate Change	5	3	4	3	4	5	4	27
Bidi Zelen	5	3	4	3	3	3	4	25

National Center for Development of Innovation and Entrepreneurial Learning (NCDIEL)	3	4	5	3	4	5	4	28
Foundation for Management and Industrial Research (MIR)	3	3	5	3	4	5	3	26
Pharmachem	5	2	3	2	3	4	5	24
EcoMosaic	5	4	4	3	4	2	3	25

The overall marks are ranked and the highest ranked organisations are promoted as organisations that possess significant potential for NDE. The top 10 organisations are listed in the table 5.11.

Tab. 5.12 The top 10 most appropriate organisations for NDE

Organisation	Overall mark
Fund for Innovation and Technology Development	33
RCESD – Research Centre for Energy and Sustainable Development, part of Macedonian Academy of Sciences and Arts (MANU)	30
CIRKO – Center for Research, Development and Continuing Education (Faculty of Mechanical Engineering (MFS), UKIM)	30
INNOFEIT – Center for Technology Transfer and Innovations, at the Faculty of Electrical Engineering and Information technology (FEIT), UKIM	30
Ministry of Environment and Physical Planning	29
Regional Environmental Center (REC)	28
National Center for Development of Innovation and Entrepreneurial Learning (NCDIEL)	28
Regional HUB for Social Innovation, at the Faculty of Computer Science and Engineering (FINKI), UKIM	27
Center for Climate Change (CCC)	27
Foundation for Management and Industrial Research (MIR)	26

CHAPTER 6:

Conclusion and recommendations

6.1 Conclusion

The purpose of this report, which is part of the project “Macedonia’s Fourth National Communication (NC) and Third Biennial Update Report (BUR) on Climate Change under the UNFCCC (4th NC/3rd BUR)” implemented by UNDP and the Ministry of Environment and Physical Planning, was analysing the UNFCCC TT: Clear Mechanism, especially the possibilities for its utilization in the country, outlining initial foresights about the sectors of the Macedonian society relevant for nomination of the NDE, as well as providing basic assessment and preliminary nomination of the top 10 most potential organisations.

In 2010, the Technology Mechanism TT: Clear, as an instrument for transfer of technology and technological and institutional development between the member states of the UNFCCC was established to facilitate the implementation of enhanced action on technology development and transfer to support action on mitigation and adaptation in order to achieve the full implementation of the Convention. Today, TT: CLEAR serves as the web platform for all things related to climate technology. It houses information on the Technology Mechanism, the Technology Executive Committee and Technology Needs Assessments. Also, various technology projects from around the world could be discovered, accompanied by opportunities and ways for support and connecting with the people behind them. In addition, ongoing and competed climate change technology negotiations could be followed, policy recommendations from the Technology Executive Committee could be researched and connections with climate solutions via the Climate Technology Center and Network (CTCN) and with climate-related technology events could be established.

Macedonian government has not nominated a National Designated Entity under this UNFCCC mechanism for climate technology yet. The initial investigation of the potential of numerous organisations in the public and private sector resulted with nominating the top 10 organisations: (1) Fund for Innovation and Technology Development (FITD); (2) RCESD – Research Centre for Energy and Sustainable Development, part of Macedonian Academy of Sciences and Arts (MANU); (3) CIRKO – Center for Research, Development and Continuing Education (Faculty of Mechanical Engineering (MFS), UKIM); (4) INNOFEIT – Center for Technology Transfer and Innovations, at the Faculty of Electrical Engineering and Information technology (FEIT), UKIM; (5) Ministry of Environment and Physical Planning; (6) National Center for Development of Innovation and Entrepreneurial Learning (NCDIEL); (7) Regional Environmental Center (REC); (8) Regional HUB for Social Innovation, at the Faculty of Computer Science and Engineering (FINKI), UKIM; (9) Center for Climate Change; and (10) Foundation for Management and Industrial Research (MIR). In case that there is need more deep analysis, these organisations should be examined in more details with an appropriate research methodology, in order the most suitable national institution that will act as a national focal point to be nominated and the county to be able to maximize its benefits from the utilization of the TT: Clear mechanism.

According to this ranking investigation, the **highest ranked** organisation should be promoted as organisation that possesses significant potential **to be nominated as NDE** in Republic of North Macedonia. Hence, this assessment Report has indicated that the Fund for Innovation and Technology Development (**FITD**) is the highest ranked institution according to above listed selection criteria.

From the other hand, the analysis of the national legislation provided in the Chapter 5 of this Report has indicated **two similar measures**:

- the Action plan of the Industrial Strategy 2018-2027 provides measure to establish NTTO (National Technology Transfer Office) as part of the FITD or either as a separate institution in order to straitening the institutional level for TT; and
- Work plan of FITR (2020) provides the measure to establish NTTO with the same goal.

That NTTO should play a key role in the conversion of science, R&D and innovation results into competitive products and processes in industry, as well as should tackle climate change actions, green and sustainable development issues.

At the **second place** of ranking within this assessment analysis are ranked two Technology Transfer Centers established in the technical campus of the UKIM. More precisely, CIRKO is technology transfer center established from the Faculty of Mechanical Engineering with rich experience and long term collaboration with industry and transfer of knowledge and technologies through academia-industry link. Among the few, **CIRKO** is registered as an official TT Entity in the Central State Register established and run by the MoES. **INNO FEIT** is technology transfer center in frame of the Faculty of Electrical Engineering and Information Technologies, projects oriented, with good experience of running the applied projects with industry. Also, **RCESD** – Research Center for Energy and Sustainable Development at the MANU is ranked at the second position according to the experience in coordinating fundamental and applied research in certain priority areas of CC and as a national focal point for several organizations related to energy and environment.

6.2 Current state of development of R&D, innovation and technology transfer for climate change

This Report was prepared with deep assessment analysis for the current state of research, development, innovation and technology transfer national conditions related to climate change activities. The analysis was made in close collaboration of the national R&D scientific institutions, policy makers, projects implementing agencies, as well as the donor programmes in the country. According to the assessment of the current state in the recent years, Republic of North Macedonia has made a significant movement to enable environment for **development of ecosystem** with innovative and R&D infrastructure, as an good basis for the continuous improvement of the national conditions, which is essential for the country international EU and worldwide aspirations and commitments.

During the reporting period for analysis of current country stage, this process of improvement the research, development, innovation and technology transfer infrastructure related to climate change has

realized with receiving of **strong support from donors**, as is evident from analysed projects by donor programmes and their significant financial granting and lending schemes, presented in this Report. As recommendation from this assessment, it will be noted that there is important to develop **central platform (portal)** with comprehensive dataset of the projects by donors and implementing agencies, with mechanism for updating and reporting. CCC Platform (klimatskipromeni.mk), as an initial point for providing updated national information related to climate change, can matching with recommended central platform.

Concerning the assessment of the educational system and climate change curricula it is concluded that effective mechanisms and strategies are needed in order to incorporate the climate change and sustainable development concepts in the educational curricula. Additionally, it is recommended to emphasize the **attention on climate change** in the existing and the forthcoming **educational programmes** connected to this subject, due to the increased national and international issues on the climate change and sustainable development concepts. Those concepts should be included in the educational programmes at all level of studies, not only at the higher education, as well as appropriate in primary and secondary educational processes. Also, important issue is to offer a pool of programmes or courses for continuing education and lifelong learning, updated with the newest issues concerning climate change actions and sustainable development activities.

Continuous improvement of that infrastructure with a special consideration to the climate change components, as well as an ultimate focus of EU and worldwide commitments, needs building of the appropriate legal, and institutional set-up in the country. The summary of current country status for those aspects, together with the recommendations, is provided in next section.

6.3 Summary of the legal and institutional set-up and capacities appropriate for NDE

As a summary of this Report, important dimensions for underpinning legal institutional set-up and capacities in the country as appropriate for UNFCCC Technology Mechanism implementation should be analyses in three levels: macro, mezzo and micro:

- ✓ Dimension of the macro (worldwide) level is given by the UNFCCC Technology Mechanism;
- ✓ Dimension of the mezzo level defines the institutional capacities in the country to provide continuous transfer of technology and information about sustainable financing for R&D and innovation activities related to the climate change actions; and
- ✓ Dimension of the micro level covers the stakeholders, their networking and partnerships in CC actions providing, as end users in the country.

Macro level

- ✓ Connection with **Climate Technology Center & Network (CTCN)** (macro level) of the UNFCCC Technology Mechanism, hosted by UNEP and UNIDO

The CTCN (www.ctc-n.org) provides technical assistance (transfer of environmentally sound technologies for low carbon and climate resilient development) in response to requests submitted by developing countries via their nationally-selected focal points or **National Designated Entities (NDEs)**. Upon receipt of such requests, the Centre quickly mobilizes its global Network of climate technology experts to design and deliver a customized solution tailored to local needs. The CTCN does not provide funding directly to countries, but instead supports the provision of technical assistance provided by experts on specific climate technology sectors. This is very important line for activities of NDE, when it will be established in the country.

Mezzo level

- ✓ Regarding legal set-up in the country (mezzo level), **NDA to the Green Climate Fund** nomination is very important.

In accordance with the requirements of the **Green Climate Fund (GCF)**, the Government of the Republic of North Macedonia has nominated a **National Designated Authority (NDA)** as an official point of contact for communication with the GCF. NDA to the GCF is the Cabinet of the Deputy President of the Government of North Macedonia in charge of economic affairs and coordination with economic sectors. The NDA is established as a competent authority with a high strategic function and is linked to the country's national budget, economic policies, development priorities and plans as well as sustainable development policies. NDA responsibilities include:

- Strategic oversight and ensuring that the GCF activities in North Macedonia are aligned with the national climate and sustainable development objectives and frameworks.
- Convening public, private and civil society stakeholders to identify priorities to be financed by the GCF.
- Engaging with public, private sector and non-governmental entities seeking GCF accreditation and nominating such entities for direct access accreditation.
- Ensuring consistency of funding proposals with national climate change plans and priorities.
- Leading deployment of the GCF readiness and preparatory support funding in the country.

The NDA has started with the activities in the country supported by the GCF project “Support for the management of an effective national coordinative mechanism regarding the Green Climate Fund” implemented by the FAO where the first open call for climate change mitigation/adaptation projects was done. It will aim to keep key national stakeholders (national institutions, government agencies, private sector, civil society, academia, international organizations) up-to-date with the latest GCF activities at country-level in alignment with national priorities and other on-going climate change initiatives. The NDA is the contact point for the national entities interested in accreditation with the GCF and also the focal point for approval of GCF post-accreditation support, i.e. Readiness support provided to build the capacities of Direct Access Entities that received **GCF accreditation**. It will facilitate the country to have national and global impact and streamline a sustainable and green aspect to its economic development and to be able to create a **Country Work Programme (CWP)** for the GCF.

- ✓ Regarding legal set-up in the country (mezzo level), nomination of the responsible institution for technology transfer at national level (National Designated Entity - **NDE**), serving as a point of reference for TT with the UNFCCC, is very important.

NDE at national level will help for: enhancing partnerships between R&D, academia, industry MSMEs and institutions at the national, as well as at the regional level, creating better partnerships for assessment of applicability of CC policies into the national policies and exploring possibilities for public-private partnerships related to CC actions. Establishing the NDE will serve as a national focal point with ultimate scope to provide continuous transfer of technology, information about sustainable financing for R&D and Innovation activities in the country related to the climate change actions.

Micro level

- ✓ Covering the stakeholders, as end users in the country, manage their networking and partnerships in climate change actions providing.

At the micro level it will be helpful if NDE finds mechanism to develop instrument for networking the stakeholders with activities in research, innovation, TT and CC technologies development, as well as companies and start-ups. That instrument for networking will enhance partnerships between stakeholders, promote climate change actions and clean technologies between established businesses and support start-ups grow in those areas.

Such instrument can be network of **innovation hubs**, **CC hubs**, **CleanTech hubs** or co-working spaces, as organizations that support businesses and start-ups development in clean technologies areas. This assessment Report's ranking has indicated FITD, as the highest ranked institution for nomination of NDE that means, FITD should develop such instrument for networking of stakeholders, as a network of CleanTech hubs around the country. Realization of this idea can be supported by donor programmes as well.

According to the specific technology transfer mechanism in the agricultural area, the NDE should establish one separate instrument as a center for technology transfer in agriculture (**Agri TT Center**) that will promote research, innovation, TT and training for CC technologies between agricultural stakeholders. Namely, developing, testing and investigating the effects from new technologies in agriculture is time consuming process, usually more that year related to annual crop yields. From that reason, Agri TT Center connected to NDE, should provide instruments for supporting the advance farmers that usually are ready to accept, testing and implement new technologies, as early adapters of TT for CC. In the next phase of the stakeholders networking, early adapters as trainers will promote the new technologies between stakeholders, other farmers, providing training and real results at demonstration agricultural plots.

6.4 Recommendations and incentives

Based on the conducted analyses of the current country status of the research, development, innovation and technology transfer related to climate change on one hand, and the possibilities offered by the utilization of the UNFCCC technology mechanism on the other, it is more than evident that the country will benefit greatly from the utilization of this mechanism, which will significantly affect the development of the areas of environment and climate change in a very positive direction. Therefore, it is highly recommended the selection and nomination of the NDE as a focal point for this mechanism as soon as possible. The investigation also suggested that, as a main financial source for facilitating the NDE's functioning and operability, the **EU Green Deal's Investment Plan** should be considered. This investment plan foresees unlocking of at least €1 trillion of investments, through mobilising public and private sources.

For the establishing and reaching full operability of the NDE, it is necessary to be considered the following 5 main recommendations:

1. NDE should establish a **portal for** logging, tracking and reporting of all implemented and ongoing **environmental and climate change projects**. The system should be consisted of a database where the list of implemented/ongoing projects on a national level will be maintained and a user friendly interface which will facilitate the NDEs staff and/or implementing organisations to insert the required data for the projects. In addition to this, the portal should be equipped with certain number of functionalities that will enable manipulations with the records and generating different views and reports, such as filtering the projects per time period, theme/area, amount, region, type of action, programme etc., extracting the data of interest in various formats, such as word, excel, pdf, also providing certain analysis presented in charts and graphs, providing cumulative amounts of realised expenditures, and so on.

The purpose of this activity is threefold:

- It will enable the stakeholders, authorities and donors with an evidence-based reporting on the actual situation and the stage of development, that will further assist them in projecting and provisioning of new programmes and measures for enhancing the situation on a national level;
 - It will be valuable source for the implementing organisations for gaining information on available programmes, calls for projects, searching for appropriate partners for collaboration and boosting their inspiration and creativity in the development of new project proposals;
 - The portal will serve the media and the wider audience (citizenship) as well, in raising an awareness of the most pressing issues related to the climate change and pollution, promoting the implemented and ongoing projects and activities and motivating the citizens to take part in some of the ongoing initiatives or initiate new initiative that will be of a great benefit for the society.
2. NDE should **raise national funds for co-financing the donor financial opportunities**. Majority of the donor programmes for projects and grants require certain amount of co-

financing, which in most of the cases refers to the implementer's own funds. In certain cases analysed in Chapter 3 of this report (INTERREG CBC Programmes, some of the IPA programmes), the national authorities in charge for the specific area (e.g. Ministry of Local Self-government in the former case, and Ministry of Labour and Social Policy for IPA IV in the latter case) provide national contribution that covers the co-financing part. In respect to the dominant domains in this field, our recommendation is establishing a collaboration between the NDE and the Ministry of Environment and Physical Planning and getting them on-board in the strives for ensuring the national co-financing funds. Ensuring the national co-financing is crucial for the following:

- The co-financing from the recipient's country creates a strong bound between the donor and the national authority and synergizes the strives of both sides in achieving the projected objectives;
 - The initiative for co-financing the donor-initiated programme evidences the mutual understanding on the objectives addressed with the programme, which ensures that both, the donor and the recipient country are at the same level of understanding about the pressing issues that should be addressed by the programme objectives, as well as obliges both sides to put their all efforts for maximising the programme success and outcomes and benefits for the society;
 - Providing a funding source for the co-financing part is significant stimuli, especially for the smaller organisations which are less financially capable, to engage themselves in the programme and develop and submit proposals for projects and actions. Increasing the number of proposals and various beneficiary organisations which are part of the project consortia, raises competition and with that the chances for receiving higher quality of the proposed actions, which is an ultimate goal of the donor programmes.
3. NDE should **maintain list with various funding opportunities** that are available and forthcoming calls for proposals, which are either dedicated to addressing environmental and climate change issues, or beside the call primary objectives, also encourage activities that might tackle the environmental and climate change issues. Furthermore, the NDE should promote the calls widely and ensure that various types of organisations from different parts of the country participate in the project proposals, as well as to assist the beneficiaries in networking and selecting the most appropriate partner organisations. Ensuring that the calls are promoted widely and high interest among the community is raised, similarly to the previous point, could be also a guarantee for the overall success of the programmes.
 4. One of the key activities of the NDE is having a role of a **gateway to different climate-specific advanced practices and technologies** from the modern societies. For achieving this, it is highly recommended in addition to the UN initiatives (UNFCCC and TT: Clear mechanism), the NDE to **establish and maintain intensive collaboration with all other relevant initiatives** from various parts of the world. As a result, the NDE should keep up with the novel technologies implemented for climate change and should be able to provide assistance and advice to the Macedonian organisations in adopting these technologies and adjusting them to the local conditions and particularities.
 5. Last but not the least, the NDE should be a **strategic partner of the Macedonian Government** in its strategic strives to enhance the development of the environment and address the pressing issues with climate change, environmental protection and pollution, as

well as sustainable development goals. The NDE should act on a strategic manner by collaborating with the major stakeholders and national authorities, such as the Ministry for environment and physical planning on a daily basis. It should assist the Ministry in redefining the ongoing policies and measures, in creating and implementing the long term strategies and action plans for steering the development of the country in the right direction, as well as to keep up with the latest advancements in the field.

In addition to this recommendation, due to the interdisciplinary nature of the relevant area, the NDE should also **boost and promote the inter-sectoral collaboration** among various national, regional and local authorities, as well as among organisations from different societal spheres: citizenship, private, public and educational sectors. The NDE should assist the authorities in establishing a sustainable, long-term mechanism for motivating all of these sides to get on-board and synergize their efforts in achieving better environment and society.

In order to be more efficient in the process of utilization of the international financial support funds for the Climate Change related projects, actions, platforms and development capacities of R&D, innovation and technology transfer, it is very important to recognize **driving force** and to follow recommendations and incentives from good practices. This assessment Report gives the overview of international and bilateral **donor programmes** where, their **successful utilisations** are driving forces behind development of capacities for R&D, innovative and technology transfer CC activities and awareness growing for environmental and sustainable development.

The multilateral or bilateral **donors** usually use different approach having precise strategy and action plans, resulting with foreseen goals, achievements and target groups, with often defined policies, indicators and types of instruments, where climate and environmental awareness is on high level and are almost included in all donor policies.

The biggest obstacles for attracting business sector, **companies and industry**, in donor funded projects are: the long and administratively heavy procedures for project application, not seeing added value of participation in project consortia, the long period from project concept to implementation and complicated procedures that require lot of time.

Different types of **implementers** have different problems which are resulting with lack of donation absorption capacities. **Public institutions** have lack of skilled personal and even more lack of individual motivation for engaging in projects, especially in the project development phase. Business support organizations, especially the **chambers of commerce** have problem with the staff fluctuation and even more the narrow scope of activities and services. **NGOs** and foundations are very different in the way functioning and level of development, but in general those that are really independent and project funded, are successfully building their capacities in terms of knowledge and experience for further projects implementation. The **research institutions and academia** have the best results as implementers of donor projects with specific competitive advantage of knowledge, experience and networking for projects development and implementation. They include companies as a beneficiaries where the developed technologies or innovation are transferred, if the donor programmes' policies promote real influence in business environment.

Establishing the **NDE** will serve as a national focal point with goal to provide continuous information about financing through donor programmes for R&D and Innovation activities related to the climate change actions. Also, NDE will develop networking between implementers and beneficiaries (end users as are companies and industry) for technology transfer providing. In order to be more efficient in utilization of the international financing funds for the climate change issues related projects, established NDE should work on following **incentives**:

- To join Climate Technology Center & Network (CTCN) of the UNFCCC Technology Mechanism (at macro level), in order to receive technical assistance;
- To communicate with the National Designated Authority (NDA) (mezzo level), as an official point in the country for contact and communication with the Green Climate Fund;
- To establish cooperation, partnership and networking (micro level) between the potential stakeholders for CC actions providing, that are end users in the country;
- To apply and be active member in European Green Deal as a main future coming donor programme with contribution to the development of EU funded project related to climate change and sustainable development.

In order to improve the capacities and to create wider **network of partnership** between implementers, beneficiaries and donors, as well as to increase availability and eligibility of the researchers involved in the R&D projects, innovation and technology transfer activities regarding the climate change issues to the end users, the following **incentives** should be provide:

- Dissemination of the project results through workshops, seminars and conferences at national, regional and international level;
- Participation at the climate change related conferences and other events all over the world;
- Membership in regional and European initiatives for climate actions, established as different CC capacity building network oriented to the research, development, innovations and technology transfer, with goals to disseminate results from realized projects and to shear information about CC initiatives.

Literature

1. The United Nations Framework Convention on Climate Change. Retrieved 23 May 2016, https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf
2. Technology mechanism: Enhancing Climate Technology development and Transfer, UNFCCC Secretariat Bonn, Germany, 2015.
3. https://www.thegef.org/sites/default/files/publications/GEF_Instrument-Interior-March23.2015_1.pdf
4. <https://www.thegef.org/country/north-macedonia>
5. GCF official website: <https://www.greenclimate.fund/>
6. GCF Handbook: <https://www.greenclimate.fund/sites/default/files/document/gcf-handbook.pdf>
7. GCF at a glance: https://www.greenclimate.fund/sites/default/files/document/gcf-glance_0.pdf
8. <http://www.fao.org/europe/news/detail-news/en/c/1242813/>
9. Europe 2020 Strategy for smart, sustainable and inclusive growth, EC, Brussels 3.3.2010, COM(2010) 2020. (See: <https://ec.europa.eu/eurostat/web/europe-2020-indicators>)
10. Smarter, greener, more inclusive? Indicators to support the Europe 2020 Strategy, Eurostat book, European Union, 2019, DOI: 10.2785/379691.
11. EU Regulation No.1291/2013 of EU Parliament of 11.12.2013, Establishing Horizon 2020 – the Framework Programme for Research and Innovation (2014-2020), Publ. Official Journal of the European Union, L.347/104, 20.12.2013, p.104 (see: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ%3AL%3A2013%3A347%3ATOC>, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1291&from=EN>)
12. Horizon 2020 – Work Programme 2018-2020, EC Decision C(2017), C(2019)2575, (See: https://ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-intro_en.pdf)
13. Clean Energy for all Europeans’ package, EC, Brussels 11.11.2016, COM(2016) 763, (See: https://ec.europa.eu/energy/sites/ener/files/documents/1_en_act_part1_v6_0.pdf).
14. https://ec.europa.eu/research/horizon2020/index.cfm?pg=country-profiles-detail&ctry=North_Macedonia
15. Orientations towards the first Strategic Plan for Horizon Europe, European Commission, April 2019, (see: https://ec.europa.eu/info/sites/info/files/research_and_innovation/strategy_on_research_and_innovation/documents/ec_rtd_orientations-he-strategic-plan_122019.pdf).
16. EU Regulation No.1287/2013 of EU Parliament of 11.12.2013, Establishing a Programme for Competitiveness of Enterprises and small and medium-sized enterprises (COSME) (2014-2020), Publ. Official Journal of the European Union, L.347/33, 20.12.2013, p.33 (see: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ%3AL%3A2013%3A347%3ATOC>)
17. Official Journal of the European Union, 347, 20.12.2013, p.50 (see: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ%3AL%3A2013%3A347%3ATOC>).
18. Europe 2020: A strategy for smart, sustainable and inclusive growth, European Commission, COM(2010), 2020, 3 March 2010.
19. “Council conclusions on a strategic framework for European cooperation in education and training (‘ET 2020’)", Official Journal of the European Union, 119/2, 28.05.2009/C, p.22, (see: [https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52009XG0528\(01\)\)](https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52009XG0528(01))).
20. Amendment of the 2019 annual work programme for the implementation of “Erasmus+": the Union Programme for Education, Training, Youth and Sport, European Commission, C(2019), 997, 15 February 2019.
21. See: ec.europa.eu/programmes/erasmus-plus/projects/
22. Investing in European Network: Connecting Europe Facility (CEF) – Five years supporting European infrastructure, EC – Innovation and Networks European Agency, Brussels, July 2019.
23. See: <http://ec.europa.eu/environment/life/project/Projects/>

24. Council Regulation (EC) No.1085/2006 for Establishing an Instrument for Pre-accession assistance (IPA), Official Journal of EU, L210/82, July 2006. (See: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32006R1085>)
25. EU Implementing Regulation No. 231/2014 of the European Parliament for Establishing an Instrument for Pre-accession assistance (IPA II), Official Journal of EU, 123/32, March 2014. (See: https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/pdf/financial_assistance/ipa/2014/20140502-commission-implementing-reg-on-ipa2_en.pdf)
26. Council Regulation (EC) No.1085/2006 for Establishing an Instrument for Pre-accession assistance (IPA), Official Journal of EU, L210/82, July 2006. (See: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32006R1085>)
27. Sector Fiche – IPA National programmes / Component 1, (https://ec.europa.eu/neighbourhood-enlargement/instruments/funding-by-country/north-macedonia_en)
28. https://ec.europa.eu/neighbourhood-enlargement/instruments/funding-by-country/north-macedonia_en
29. Multi-annual Operational Programme for Human Resource Development for FYR Macedonia, IPA I 2007-2013, (https://ec.europa.eu/neighbourhood-enlargement/instruments/funding-by-country/north-macedonia_en)
30. Operational Programme under the EU Instrument for Pre-Accessing for Rural Development (IPARD), National plan for FYR Macedonia 2007-2013, (https://ec.europa.eu/neighbourhood-enlargement/instruments/funding-by-country/north-macedonia_en)
31. EU Implementing Regulation No. 231/2014 of the European Parliament for Establishing an Instrument for Pre-accession assistance (IPA II), Official Journal of EU, 123/32, March 2014. (See: https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/pdf/financial_assistance/ipa/2014/20140502-commission-implementing-reg-on-ipa2_en.pdf)
32. EC Implementing Decision C(2018) 5068, for adopting an Annual Action Programme for FYR of Macedonia for the year 2018, August 2018.
33. Sector Operational Programme for Environment and Climate Action in FYR Macedonia under IPA II, 2014-2020, (https://ec.europa.eu/neighbourhood-enlargement/instruments/funding-by-country/north-macedonia_en)
34. https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/pdf/the_former_yugoslav_republic_of_macedonia/ipa/2016/ipa_2014_037702_the_former_yugoslav_republic_of_macedonia_multi-annual_action_programme.pdf
35. Interreg: European Territorial Co-operation, European Commission official website: https://ec.europa.eu/regional_policy/en/policy/cooperation/european-territorial/
36. Programme “Interreg IPA CBC Bulgaria – The Former Yugoslav Republic of Macedonia” official website: <http://www.ipa-cbc-007.eu/>
37. Programme “Interreg IPA CBC Bulgaria – The Former Yugoslav Republic of Macedonia” manual: http://mls.gov.mk/images/ipa/Interreg_IPA_CBC_CCI2014TC16I5CB006_mk.pdf
38. Programme "Greece - Republic of North Macedonia 2014-2020" official websites: <http://www.ipa-cbc-programme.eu/> and: <http://www.ipa-cbc-programme.eu/old/>
39. Programme “IPA CBC Macedonia – Albania” official websites: <http://ipacbc-mk-al.net/> and <http://07-13.ipacbc-mk-al.net/>
40. Programme brochure: ipacbc-mk-al.net/assets/files/Programme%20brochure%202014-2020_ENG_FINAL.pdf
41. IPA II Cross-border cooperation programme. First annual report on implementation report 2016 <http://ipacbc-mk-al.net/assets/files/Annual%20Implementation%20Report%202016.pdf>
42. Cross-border cooperation between IPA II beneficiaries: MK-AL. Annual implementation report: 2017: <http://ipacbc-mk-al.net/assets/files/Annual%20Implementation%20Report%202017.pdf>
43. IPA II Cross-border cooperation programme Serbia – North Macedonia official website: <https://eu.rs-mk.org>

44. Announcement of the First call for proposals under the programme:
<https://webgate.ec.europa.eu/europeaid/online-services/index.cfm?do=publi.welcome&nbPubliList=15&orderby=upd&orderbyad=Desc&searchtype=RS&aofr=165171>
45. CBC Programme "Kosovo – the former Yugoslav Republic of Macedonia" brochure:
https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/pdf/the_former_yugoslav_republic_of_macedonia/ipa/2015/2014_-_2020_ipa_cbc_kosovo-the_former_yugoslav_republic_of_macedonia.pdf
46. 1st call for proposals: <https://webgate.ec.europa.eu/europeaid/online-services/index.cfm?ADSSChk=1581409766217&do=publi.detPUB&searchtype=AS&Pgm=7573840&zgo=35484&aot=36537%2C36538&ccnt=7573876&debpub=&orderby=upd&orderbyad=Desc&nbPubliList=15&page=1&aoref=156446>
47. 2nd call for proposals: <https://webgate.ec.europa.eu/europeaid/online-services/index.cfm?ADSSChk=1581409668810&do=publi.detPUB&searchtype=AS&Pgm=7573840&zgo=35484&aot=36537%2C36538&ccnt=7573876&debpub=&orderby=upd&orderbyad=Desc&nbPubliList=15&page=1&aoref=160622>
48. 3rd call for proposals: <https://webgate.ec.europa.eu/europeaid/online-services/index.cfm?ADSSChk=1581383959091&do=publi.detPUB&searchtype=AS&Pgm=7573840&zgo=35484&aot=36537%2C36538&ccnt=7573876&debpub=&orderby=upd&orderbyad=Desc&nbPubliList=15&page=1&aoref=163284>
49. INTERREG Balkan-Mediterranean 2014-2020 Programme official website <http://www.interreg-balkanmed.eu/>
50. Communication document from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Sustainable Europe Investment Plan – European Green Deal Plan, No. COM2020/21, Brussels, 14 January 2020,
https://ec.europa.eu/commission/presscorner/detail/en/fs_20_48
51. <https://www.giz.de/en/worldwide/301.html>
52. https://www.giz.de/projektdaten/index.action?request_locale=en_EN#?region=4&countries=MK
53. <https://eeagrants.org/resources/eea-and-norway-grants-2014-2021-blue-book-overview-supported-programme-areas>
54. <https://www.nordiskapoddrska.org.mk/en/onama>
55. Results strategy for Sweden's reform cooperation with Eastern Europe, the Western Balkans and Turkey 2014-2020, Ministry for Foreign Affairs Sweden, UD 14.013, Stockholm, 2014
56. https://www.eda.admin.ch/dam/countries/countries-content/north-macedonia/en/Cooperation-Strategy-Macedonia-2017-2020_en.pdf
57. <https://www.eda.admin.ch/countries/north-macedonia/en/home/international-cooperation/projects.filterResults.html?searchTerm=&filtersdctopic%253A=Selection&filtersdcsubtopic%253A=Selection&checkActive=Active&checkCompleted=Completed&fromDate=&toDate=>
58. <https://www.usaid.gov/north-macedonia>
59. <https://www.usaid.gov/north-macedonia/private-sector-growth>
60. World Bank official website: <https://www.worldbank.org/en/>
61. <https://www.worldbank.org/en/country/northmacedonia>
62. Country Partnership Framework for Republic of North Macedonia for period 2019-2023, Document of World Bank No. 135030-MK with IBRD, IFC and MIGA, March 2019, <http://pubdocs.worldbank.org/en/705311555590000225/North-Macedonia-CPF-2019.pdf>
63. An overview of the World Bank's work in North Macedonia "Country Snapshot", World Bank, October 2019, <http://pubdocs.worldbank.org/en/534531571341614509/North-Macedonia-Snapshot-Oct2019.pdf>
64. Green Growth and Climate Change Country Assessment for FYR Macedonia, The World Bank Group, No. ACS8179, March 2014, <http://documents.worldbank.org/curated/en/949621468090285546/pdf/ACS81790ESW0wh0h0Country0Assessment.pdf>
65. <https://projects.worldbank.org/en/projects-operations/projects-summary?searchTerm=north%20macedonia>

66. UNDP official website: <https://open.undp.org/>
67. <https://www.mk.undp.org/content/north-macedonia/en/home/projects.html>
68. FITD official website: www.fitr.mk
69. Rulebook on management of the support instruments of the Fund for innovations and technology development, FITR, 2019.
70. PONT official website: <https://www.pont.org/>
71. PONT Brochure: https://www.pont.org/wp-content/uploads/2018/05/2018_brochure_final_Online2.pdf
72. PONT Annual reports and financial statements for the period 2015-2018, available at: <https://www.pont.org/documents-grants-governing-reports/>
73. <http://economy.gov.mk/Upload/Documents/Finalna%20Industriska%20Strategija.pdf>
74. <https://s3platform.jrc.ec.europa.eu/north-macedonia>
75. <https://s3platform.jrc.ec.europa.eu/>
76. <https://www.worldbank.org/content/dam/Worldbank/document/eca/WBRIS%20Strategy10-21-13%20web.pdf>
77. http://www.fitr.mk/wp-content/uploads/2019/10/Srednorocna_programa_na_FITR_za_2018-2020_godina_konsolidiran_tekst.pdf
78. CIRKO official website: www.cirko.mk
79. INNO FEIT official website: inno.feit.ukim.edu.mk
80. CIPOZ official website: <http://www.cipoz.fzh.ukim.edu.mk/>
81. REC Regional Environmental Center official website: <http://mk.rec.org/index-eng.php>
82. MACEF (Center for Energy Efficiency of Macedonia) official website: <http://macef.org.mk/>
83. Macedonian Ecological Society official website: <https://mes.org.mk/en/>
84. Eco-Svest official website: <https://ekosvest.com.mk/>
85. Bidi Zelen official website: <https://www.bidizelen.org/>
86. Ekomobilnost official website: <http://elektromobilnost.mk/>
87. Center for Climate Change official website: <http://ckp.org.mk/>
88. Climate Change e-Platform in North Macedonia official website: <https://klimatskipromeni.mk/>
89. NCDIEL Center official website: <https://ncdiel.mk/mk/>
90. MIR Foundation official website: www.mir.org.mk/
91. Pharmachem official website: <https://www.farmahem.com.mk/?l=eng/>
92. EcoMosaic official website: <https://ekomozaike.com/>

Annexes