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Analysis of Gender Policies and Data in Connection to Climate Policies for BTR /NDC (2020-2024)

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DISCLAIMER:

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List of abbreviations

AFOLU	Agriculture, Forest and Land Use Change
ASEEIM	The Association of Societies of Engineers, the Engineering Institution of Macedonia
BUR	Biennial Update Report
BTR	Biennial Transparency Report
CBIT	Strengthening institutional and technical Macedonian capacities to enhance transparency in the framework of the Paris Agreement
EEA	European Environmental Agency
EC	European Commission
EnC	Energy Community
ETS	Emissions Trading System
EU	European Union
GHG	Greenhouse gas
GSP	Global Support Programme
HVAC	Heating, Ventilation, and Air Conditioning
ICEIM-MANU	Research Center for Energy, Informatics and Materials within Macedonia Academy for Sciences and Arts
IPA	Instrument for Pre-Accession Assistance
IPCC	Intergovernmental Panel on Climate Change
IPECC	Institute for good governance and policies in environment and climate change
IPPU	Industrial Processes and Product Use
QA/QC	Quality Assurance/Quality Control
LTSCA	Long Term Strategy on Climate Action
MoEPP	Ministry of Environment and Physical Planning
MRVA	Monitoring, Reporting, Verification and Accreditation
MRV	Monitoring, review and verification
NAP	National Adaptation Plan
NC	National Communication
NDC	Nationally Determined Contributions
NECP	National Energy and Climate Plan
PPP	Public Private Partnership
RES	Renewable Energy Sources
STEM	Science, Technology, Engineering and Mathematics
UDG	University “Goce Delchev”
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WG	Working Group

Introduction

Climate change affects men and women differently due to their roles, access to resources, and representation in decision-making.

Climate change is one of the greatest threats to human rights of our generation and poses a serious risk to the **basic right to life**, health, food and an adequate standard of living of individuals and communities around the world. Gender equality and climate change are interlinked policy domains. Climate change impacts women and girls, men and boys in each society differently due to social roles, economic participation, and access to resources and other intersectional demographic characteristics such as age and location. Gender inequality due to gender roles, discrimination and cultural norms increase the negative effects of climate changes on women and girls. Persistent exclusion, unequal access to land, water and productive assets, and unequal participation in decision-making processes continue to constrain women and men from equally participating in, contributing to, and benefitting from projects and programs for mitigation and adaptation of climate changes.

Advancing gender equality in the context of the climate crisis and disaster risk reduction is one of the greatest global challenges of the 21st century. At international level, requirements for gender responsive climate actions are becoming stronger, particularly since Lima Gender Action Plan under the UNFCCC. There are also commitments made as part of the Green Agenda for the Western Balkans (funding provided by European Union, International Funding Institutions, domestic budget funding) and the NDCs under the Paris Agreement. There are strong demands for gender justice in climate actions and improved reporting on gender mainstreaming in development and implementation of climate change responses by the state parties. Furthermore, the vision encompassed in the 2030 Agenda for Sustainable Development views **all women and men as active agents of change** and thus focuses on ensuring that those marginalized and left behind are empowered and have the agency to make decisions over their lives and participate in the development of their societies.

Understanding the risks and different impacts of climate change on women and men is essential in addressing those risks and achieving sustainable development. To do this, their different needs and interests must be identified, and women's as well as men's contribution to developing solutions must be encouraged. This inclusive approach will result in more effective and sustainable outcomes. To ensure a gender responsive implementation of the national climate agenda, the countrie should ensure that gender equality is considered systematically and in a mutually reinforcing way. A gender perspective needs to be taken into account when developing resource mobilization strategies, applying climate finance instruments, and ensuring equal participation in the deployment of financial resources, particularly at the local level[1].

Given that the gender perspective enables more targeted, fair and efficient policies, integrating gender perspectives in climate reporting under the Biennial Transparency Report

[1] Gender and Climate Change Finance | UNFCCC

(BTR) and National Communication (NC) is not only an equity obligation but also improves the effectiveness of mitigation and adaptation actions.

This document provides a comprehensive overview on national policies regarding gender mainstreaming in climate policies, identify policy gaps at national and local level, and provide gender analysis of climate-relevant data for North Macedonia (2020–2024), drawing on sex-disaggregated statistics from education, employment, research, innovation, and Sustainable Development Goal (SDG) indicators. It highlights gender gaps in climate-relevant sectors and proposes gender-responsive indicators for monitoring and evaluation.

1. Legal and policy framework for Gender Mainstreaming in Climate Change actions

1.1. International Commitments for Gender Mainstreaming

North Macedonia's commitment to gender equality in climate action is anchored in a comprehensive array of international agreements and policy frameworks. The United Nations Framework Convention on Climate Change (UNFCCC) and its Lima Gender Action Plan serve as a foundational mandate, aiming to advance knowledge and understanding of gender-responsive climate action and ensure women's full, equal, and meaningful participation. the Paris Agreement and subsequent UNFCCC decisions emphasize gender equality and women's empowerment as cross-cutting principles for climate action. Including gender-disaggregated data, gender-responsive indicators, and reporting on institutional mechanisms helps improve accountability and ensures that climate action contributes to broader sustainable development goals.

The vision of the 2030 Agenda for Sustainable Development, which views women and men as active agents of change, also frames the national effort. This is complemented by the Beijing Declaration and Platform for Action, which specifically call for signatory states, including North Macedonia, to actively involve women in environmental decision-making at all levels.

The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) is a particularly important legal instrument, as it obligates the country to integrate a gender perspective into its national legal and policy frameworks. The CEDAW Committee's first statement on Gender and climate change recommends all stakeholders to ensure that climate change and disaster risk reduction measures are gender-responsive, sensitive to indigenous knowledge systems and respect human rights. Women's right to participate at all levels of decision-making must be guaranteed in climate change policies and programs. Another important document in the gender equality and climate change agenda is the General Recommendation No. 37 from the CEDAW Committee on Gender-related dimensions of disaster risk reduction in the context of climate change. CEDAW Committee emphasizes that situations of crisis exacerbate pre-existing gender inequalities and also compound intersecting forms of discrimination against women in all their identities. Therefore, the objective of this general recommendation is to underscore the urgency of mitigating climate change and to highlight the steps that need to be taken to achieve gender equality as a factor that will

reinforce the resilience of individuals and communities globally in the context of climate change and disasters.

These international obligations collectively establish a clear and binding mandate for North Macedonia to move beyond gender-neutral policies toward genuinely gender-responsive climate action.

1.2. National Strategic and Legal Framework for Gender Mainstreaming

The country has adopted a series of strategic and legal documents that set the legal and strategic framework that obliges the state for gender mainstreaming in the creation of all public policies, including policies connected with climate changes.

The Law on Equal Opportunities for Women and Men[2] is the basic legal document that regulates gender equality in our country. It promotes gender mainstreaming as a principle that should be applied in all areas, including the creation of strategic documents and programs. Although it does not specifically mention climate actions, this law is the basis for all further obligations. The Law on Equal Opportunities for Women and Men sets the basis for protection against discrimination based on gender, and promotes the establishment of equal opportunities for women and men in the political, economic, social, educational, cultural, health, civil and any other area in the society, including environment. The Law provides for general and special measures for the establishment of equal opportunities for women and men (articles 5-7) and regulates the obligations of all entities (articles 9-18) for gender mainstreaming. However, it remains a challenge to ensure effective implementation of the obligations of the law in a way that recognizes and addresses the specific barriers that limit women's access to education, employment, health services and participation in public life. There is a special article (art.18 - Presentation of statistical data) that provides that all entities are obliged by law to collect, record and process statistical data, are obliged to present this data by sex and to submit it to the State Statistical Office.

Law on Prevention and Protection against Discrimination[3] was adopted in October 2020 (the former was adopted in 2010) regulates the prevention and prohibition of discrimination, the forms and types of discrimination, the procedures for protection against discrimination, as well as the composition and work of the Commission for Prevention and Protection against Discrimination - CPPD. The aim of the law is to ensure the principle of equality and prevent and protect against discrimination in the exercise of human rights and freedoms (article 2) in all areas of life (article 3). Also, Article 3 establishes a public sector equality duty and provides for data collection segregated according to all discriminatory grounds provided by the Law.

[2] Службен Весник на Република Македонија" бр. 6/2012), бр. 166/2014 https://www.mtsp.gov.mk/content/pdf/zakoni/2017/precisten%20tekst%202015%20na%20ZEM_nov.pdf

[3] Official Gazette no. 258/2020.

The Law on Budget[4] includes gender equality as one of its key principles, with gender-responsive budgeting being contained in the articles related to the financial plans of budget users. The law regulates the obligation to adopt a "Gender Responsive Budget Statement" as a document for the inclusion of gender equality in the area covered by the selected program that is the subject of analysis. It also establishes an obligation to formulate "Gender Indicators" for the purpose of monitoring gender differences, gender-related changes characterized in accordance with different time periods and measuring progress in achieving gender-responsive goals.

The National Strategy for Gender Equality (2022-2027)[5] provides a comprehensive framework for the promotion of gender equality and the empowerment of women in all spheres of society. Specific objective 2.3 links gender issues and climate change: Strengthened mechanisms for environmental protection and the creation of gender-responsive climate change policies and climate-resilient gender equality policies. The National Strategy for Gender Equality 2022-2027 identifies that the main challenges for gender equality in the field of climate change for the next period are:

- Lack of a systematic approach to addressing gender and climate change in national and local policies in order to create effective and sustainable mechanisms for gender equality and climate change;
- Lack of gender-disaggregated statistical data for the creation of efficient gender-sensitive climate actions;
- Need to strengthen administrative capacities for gender and climate change;
- Inclusion of gender indicators in the system for monitoring, reporting and verifying the degree of implementation of the foreseen climate actions in the strategic documents of the state;
- Lack of gender-responsive mechanisms for access to new technologies for mitigating and adapting to climate change. There is an absence of gender-responsive mechanisms for access to new technologies for mitigating and adapting to climate change.
- Low representation of women in mechanisms for creating climate-responsible agricultural policies and practices.

A key priority in the field of climate change is the inclusion of a gender perspective in policies, measures and strategies adopted at the national and local levels. To this end, greater participation of women in decision-making structures is needed, as well as the participation of gender experts who will highlight the different impacts of climate change on women, especially women from vulnerable categories, thus establishing early intervention and risk reduction

[4] https://portal.mdt.gov.mk/post-body-files/budzet-i-finansiranje-na-els-file-guwl.pdf
[5] Стратегија за родова еднаквост (2022 – 2027), Сл.весник на РСМ, бр. 170, јули 2022 https://www.mtsp.gov.mk/content/pdf/2022/strategija_/%D0%A1%D1%82%D1%80%D0%B0%D1%82%D0%B5%D0%B3%D0%B8%D1%98%D0%B0_%D0%B7%D0%B0_%D1%80%D0%BE%D0%B4%D0%BE%D0%B2%D0%B0_%D0%B5%D0%B4%D0%BD%D0%B0%D0%BA%D0%B2%D0%BE%D1%81%D1%82_2022_2027.pdf

measures that will be targeted at them. It is particularly important to take into account the differences in the needs and demands of women and men in agriculture, energy, water resources, telecommunications, transport, management of protected areas and tourism. It is also important to strengthen the capacities of policymakers and climate change mitigation measures to include a gender perspective.

Regarding climate changes, the country's main policy document is the Strategy for Climate Action (2022-2050). While this strategy recognizes the low participation and employment of women in climate-related sectors, its integration of a gender perspective is limited and partial. It is intended to be implemented in conjunction with the National Strategy for Gender Equality (2022-2027), which identifies critical challenges such as the lack of a systematic approach, a deficit in sex-disaggregated data, and a need for stronger administrative capacities. Similarly, the Fourth Action Plan on Climate Change contains a separate section on gender, but a thorough gender perspective is not mainstreamed throughout the document's other sections.

The Government of the Republic of North Macedonia during 2024 published the Draft Law on Joint Climate Action, which envisages the so-called Framework for Climate Action, which includes planning for climate action and harmonizing strategic and planning documents from other sectors with the basic planning documents for climate action. It is obvious that by this legal act, the Republic of North Macedonia intends to establish a strategic approach for undertaking climate action in order to mitigate climate change and adapt to the undesirable effects of climate change, following the obligations and recommendations arising from international documents and agreements for greenhouse gas reduction.

Important aspect of the proposal is the article 87, which sets an obligation the bodies of the state administration in the promotion of the climate policy to include gender aspects and the specific needs of the most vulnerable groups, including young people. According to this article, the bodies of the state administration should promote the participation of vulnerable groups, including young people in climate-related decision-making. However, the proposed law does not mainstream gender equality on sufficient level.

These national frameworks demonstrate a conceptual recognition of the link between gender and climate, but gender is not consistently mainstreamed into climate laws and planning documents.

1.2.1 Between Policies and Practice -Analysis of Institutional Capacity and Policy Integration

1.2.1.1. The Central-Level Institutional Gap

The assessment of institutional capacities at the central level for the integration of gender equality in the activities of the institutions related to climate issues conducted in 2024, reveals a significant deficit in the mechanisms and human resources required for effective gender mainstreaming in climate and environmental policy. The low response rate to the questionnaire—only 16 respondents from nine out of 42 institutions—serves as a primary indicator of a general lack of institutional interest and awareness regarding gender-climate linkages.

The assessment showed lack of knowledge about gender equality in nearly half of the respondents and general lack of knowledge on the connection between gender equality and climate change in most of the respondents. Considering capacities on gender mainstreaming and the tools for integration on gender into policies and daily work the situation is slightly worse, especially because there are no procedures or practicums for gender mainstreaming in place in more than a half of the institutions that are part of this assessment. At the same time, the authorized persons who should integrate these tools in the policies, are not trained for their practical application.

Institutional capacity gaps include weak coordination, lack of gender focal points in climate institutions, and irregular training on gender–climate linkages. During the period of performing the assessment (march -april 2024), both MLSP and MEPP are institutions who do not have appointed coordinators for equal opportunities between men and women nor focal points for climate and gender equality that especially affects the coordination on activities for gender equality, environment and climate change. Furthermore, the previous experience shows that one person in each institution is not enough for building institutional capacities and institutional memory on gender equality and climate change. Also, these institutions should be linked with the other institutions in the system who are very important for this topic, especially with Ministry of Agriculture, Forestry and Water, Agency for encouraging the development of agriculture and rural development, the Biro for Hydrometeorological Affairs are represented, the Directorate for Protection and Rescue, the Crises Management Center. Ministry of Internal Affairs.

There is a limited scope of trainings available on gender equality and climate change, including on-line trainings on the official languages used in the state. This situation fundamentally affects the expressed low level of participation in such trainings and the awareness how the environment and climate change related topics disproportionally affect men and women.

1.2.1.2. *Disconnected Policies at the Local Level*

At the local level, municipalities are recognized as playing a significant role in addressing the consequences of climate change and implementing mitigation measures. An Analysis of the inclusion of a gender perspective in the planning and implementation of climate actions at the local level conducted during July-August 2025, corroborates the findings at the central level, revealing a widespread lack of inter-sectoral knowledge and collaboration that undermines the integration of gender and climate policies at the sub-national level. The findings indicate that a significant majority of the municipalities surveyed (77%) do not include climate-related activities in their gender equality programs, and vice-versa, confirming that respondents show limited recognition of gender–climate links.

At the local level, only about 42% of municipalities reported collecting and using sex-disaggregated data in climate-relevant planning. Most of this use was limited to social services, not environmental or infrastructure measures.

The analysis of survey responses further highlights a critical barrier: a fundamental lack of understanding among municipal staff regarding the basic concepts of long-term strategic planning versus operational annual programming. This conceptual confusion is a key obstacle to systematic gender and climate integration, as it prevents the consistent and evidence-based planning required for effective action. For example, some respondents who have plans for

waste management and energy efficiency still stated that they had no measures for climate change. This indicates that they fail to recognize the direct link between these activities and broader climate goals.

The lack of correlation and mutual awareness between departments is a core issue; for instance, male respondents from urban planning departments were often unaware of the municipality's gender equality strategies. This "sectoral thinking" means that even if a municipality has a climate plan and a gender plan, the two streams of work rarely, if ever, intersect. This leads to climate policies that are gender-blind because they are designed without input from social departments that understand gender dynamics, and social policies that fail to account for climate-induced vulnerabilities. This is a crucial point of failure that prevents the country from achieving its goals in a holistic and equitable manner.

2. Analysis of sex desegregated data

The purpose of this part is to deliver a multi-faceted analysis of gender gaps in different domains of climate changes. The scope of this investigation is defined by the latest official statistical data, covering the period from 2020 to 2024. The data originates from the State Statistical Office.

2.1. Overall Workforce Composition (2020-2024)

The overall workforce in North Macedonia maintains a consistent male majority. This trend has been stable over the five-year period under review, serving as a fundamental benchmark for understanding the national labor market. For example, in 2024, males accounted for 399,164 employees, representing 57.5% of the total workforce of 694,506 individuals. Females constituted the remaining 295,342 employees, or 42.5%. The slight but persistent male majority suggests that the gender gap is not a temporary statistical anomaly but a structural characteristic of the economy. This implies that the challenge is not solely a lack of available female workers but a lack of accessible and equitable opportunities for them.

The most striking feature of the national workforce is the extreme concentration of men in specific industries, which reflects deeply ingrained cultural norms and significant barriers to entry for women. Industries that are physically demanding or technologically specialized are overwhelmingly male-dominated.

- **Agriculture, Forestry, and Fishing:** This sector is highly vulnerable to climate impacts like droughts, floods, and extreme weather. The data shows a significant declining of percentage of employed women (8% of all employed women in 2024) and men (9,7% of all employed men in 2024) in this sector. Job security and livelihoods here are directly threatened by climate change, and these risks are compounded by existing gender inequalities, as women are often more reliant on local natural resources for subsistence and have less access to financial resources to adapt. Securing jobs in this sector is crucial for survival, especially in rural areas. The declining trend in overall employment suggests a shift, which may be accelerated by climate pressures.
- **Construction:** This sector stands out with a disproportionately high male representation. Over the entire period, male employees consistently comprised over 90% of the

workforce, reaching as high as 93.1% in 2022. The number of female employees in this sector remained low, with 9,7% in 2024 (90,3% male in 2024). While highly exposed to physical risks from extreme heat and weather events, this sector is also expected to be a major source of **"green jobs."** These include building resilient infrastructure and installing renewable energy systems. The male dominance in this sector may lead to a disproportionate advantage for men in securing these new opportunities.

- **Mining and Quarrying:** This sector also exhibits extreme male dominance, with male employees consistently making up more than 90% of the workforce each year.
- **Transport and Storage:** This industry is strongly male-dominated, with male employees comprising between 83,3% and 82.4% of the total workforce from 2020 to 2024.
- **Other highly segregated sectors** include Electricity, Gas, Steam and Air Conditioning Supply, and Water Supply; Sewerage, Waste Management and Remediation Activities, where male representation consistently exceeds 74% and 80%, respectively. **Electricity, gas, steam and air conditioning supply** sector is foundational for transitioning to renewable energy. The data shows a decreasing total number of employees, with a consistent and high male majority.
- **Information and communication sector** that is also central to the green transition, remain largely male-dominated. The data shows women's participation in this sectors is slightly over 30%, and male participation about double.

This pronounced concentration of men in these fields is a clear indicator of structural segregation. The reasons for this extend beyond simple preference and may include a lack of inclusive infrastructure, hiring biases, and a work environment that discourages female participation. Women are under-represented in the very sectors where mitigation investments and adaptation infrastructure will be concentrated. This limits both their influence in decision-making and their access to climate-related jobs.

Table 1 shows the percentage of women (F%) and men (M%) in each sector over the five-year period.

Table 1: Percentage of women (F%) and men (M%) in each sector over the five-year period.

	2020		**2021**		**2022**		**2023**		**2024**	
Structure by gender in %	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**
Total	58,2	41,8	58,3	41,7	58,5	41,5	57,6	42,4	57,5	42,5
Agriculture, forestry and fishing	61,2	38,8	64,0	36,0	64,4	35,6	64,2	35,8	62,0	38,0
Mining and quarrying	91,9	:	89,0	11,0	90,5	9,5	91,0	:	90,4	9,6
Manufacturing	51,2	48,8	53,3	46,7	52,3	47,7	52,5	47,5	54,3	45,7
Electricity, gas, steam and air	83,4	16,6	82,6	17,4	74,8	25,2	78,4	21,6	76,2	23,8

conditioning supply										
Water supply, sewerage, waste management and remediation activities	87,8	12,2	82,9	17,1	82,4	17,6	80,4	19,6	83,9	16,1
Construction	92,6	7,4	92,7	7,3	93,1	6,9	91,9	8,1	90,3	9,7
Wholesale and retail trade, repair of motor vehicles and motorcycles	56,9	43,1	54,7	45,3	54,2	45,8	52,8	47,2	52,8	47,2
Transportation and storage	83,3	16,7	86,5	13,5	88,7	11,3	84,8	15,2	82,4	17,6
Accommodation and food service activities	65,8	34,2	64,8	35,2	65,4	34,6	67,4	32,6	63,3	36,7
Information and communication	63,4	36,6	62,9	37,1	66,3	33,7	66,1	33,9	67,6	32,4
Financial and insurance activities	37,7	62,3	37,5	62,5	43,6	56,4	45,2	54,8	39,2	60,8
Real estat activities	39,8	60,2	41,3	58,7	62,6	37,4	69,4	:	64,3	35,7
Professional, scientific and technical activities	42,7	57,3	43,4	56,6	43,6	56,4	38,5	61,5	46,5	53,5
Administrative and support service activities	56,1	43,9	57,6	42,4	57,9	42,1	53,7	46,3	59,3	40,7
Public administration and defence, compulsory social security	67,2	32,8	67,5	32,5	68,3	31,7	65,5	34,5	66,0	34,0
Education	34,7	65,3	36,0	64,0	38,3	61,7	35,4	64,6	34,6	65,4
Human health and social work activities	22,7	77,3	22,6	77,4	23,5	76,5	21,9	78,1	22,2	77,8

Arts, entertainment and recreation	57,9	42,1	50,0	50,0	50,7	49,3	54,4	45,6	52,9	47,1
Other service activities	53,5	46,5	55,7	44,3	52,1	47,9	57,4	42,6	52,7	47,3
Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	:	:	:	:	:	:	:	92,9	:	90,3
Activities of extraterritorial organisations and bodies	81,9	:	53,4	46,6	43,5	56,5	:	81,6	:	77,0

Source: State Statistical Office, Employed by activity of business entities and gender, annual. PxWeb

A female workforce is concentrated in a set of industries often associated with care, service, and administrative functions, a global phenomenon known as "pink-collar" segregation.

- **Human Health and Social Work:** This sector is heavily female-dominated, with women consistently making up between 77,3 and 77.8% of the workforce from 2020 to 2024.
- **Education:** This industry is another clear example of a female-dominated sector, with females representing between 61.7% (2022) and 65.4% (2024) of employees over the period.
- **Financial and Insurance Activities:** This sector is also female-dominated, with women making up a majority ranging from 54.8% to 62.5%. This finding is particularly notable as it contrasts with the male-dominated nature of this sector in many other economies and may indicate either genuine progress or a concentration of women in specific, high-volume, lower-level roles.

While these female-dominated fields are critical to the functioning of society, they are often undervalued and can lack the compensation and career advancement opportunities found in male-dominated industries.

Certain sectors, like **Manufacturing, Wholesale and Retail Trade**, Professional, scientific & technical activities demonstrate a more flexible gender dynamic. In Manufacturing, the male percentage ranged from 51.2% to 54.3% over the period, while in Wholesale and Retail Trade, the male share was between 52.8% and 56.9% . In Professional, scientific & technical activities**,** **w**omen's share was 53.5 **%** in 2024.

The relatively even distribution in these foundational economic sectors suggests that traditional gender roles may be more fluid in certain work environments, making it a critical area for promoting equitable reskilling and upskilling opportunities.

The analysis from 2020-2024 reinforces the point that traditional gender roles persist across industries. Women are concentrated in low-emission service sectors, while men dominate high-emission and climate-critical sectors (energy, transport, construction).

The data shows that the majority of technical expertise and decision-making power in sectors that drive mitigation technologies and adaptation strategies are concentrated among men. While sectors on the front lines of climate change are at risk, the fast-growing "green jobs" are often in fields where women are currently underrepresented. This creates risks of gender-blind mitigation transitions, where women may be excluded from green job opportunities. This data highlights the need for targeted policies to ensure that the transition to a sustainable economy is not only environmentally sound but also socially equitable.

When combining employment data (2024) and innovative firm data (2020–2022), a clear gendered pattern emerges: **women are concentrated in sectors with low innovation intensity**, while **male-dominated sectors concentrate both innovation and climate relevance (energy, construction, transport)**. This structural inequality risks widening if not addressed through targeted gender-responsive climate finance, training, and entrepreneurship programmes.

Sector	Female share in employment (2024)	Innovative firms (2020–2022)
Agriculture, forestry, fisheries	38% (23,670 of 62,287)	26% (29 of 113)
Mining and quarrying	≈10%	20% (9 of 44)
Energy supply (electricity, gas, steam)	24%	52% (11 of 21)
Water supply & waste management	19% (3,408 of 17,924)	41% (39 of 96)
Construction	10% (4,509 of 46,384)	30% (54 of 181)
Transport and storage	17.6% (6,355 of 36,184)	≈25–30% (est.)
Professional, scientific & technical activities	53% (10,430 of 19,503)	36% (226 of 636)
Education	65% (29,423 of 44,994)	Low
Health & social work	78% (37,853 of 48,657)	Very low

Male-dominated, high-innovation sectors such as energy supply, construction, mining, and transport concentrate both greenhouse gas emissions and climate mitigation potential. For example, energy has one of the highest innovation rates (52% of firms) but employs only 24% women; construction is 90% male with 30% innovative firms. This demonstrates that climate innovation is being driven primarily in male-dominated spaces, risking the exclusion of women from green transition opportunities.

Female-dominated sectors (health, education, social services) are critical for adaptation and resilience but show low or very low innovation rates. In 2024, women represented 65% of employees in education and 78% in health and social work, yet these sectors receive limited climate finance and innovation support. This creates a structural imbalance: women's capacities are concentrated in sectors undervalued in mitigation-focused policies.

Agriculture provides a mixed case. Women account for 38% of agricultural employment (23,670 of 62,287 workers), but only 26% of agricultural firms were innovators. While women play a crucial role in food security and climate adaptation, their under-representation in innovative firms highlights barriers to accessing finance, technology, and markets.

Professional, scientific and technical activities are an important entry point. Women are slightly the majority (53% of 19,503 employees) and the sector has a 36% innovation rate. This shows strong potential for promoting gender-responsive climate research and green entrepreneurship if properly supported.

2.2. The R&D Workforce

The R&D sector is not only inclusive of women but is also clearly female-dominated. This trend is consistent across all educational attainment levels and throughout the 2020-2023 period.

Table 2. Employees (number of persons) in the research and development activity

	2020		**2021**		**2022**		**2023**	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**
Total	1929	2248	1745	2093	1492	1869	1720	2092
Natural sciences	355	280	195	329	279	421	374	690
Engineering and technology	511	509	590	422	400	246	467	253
Medical sciences	228	584	267	531	210	522	183	367
Agricultural sciences	156	163	144	175	126	141	132	159
Social sciences	454	420	359	369	343	344	413	420
Humanities	225	292	190	267	123	185	151	203

Source state statistical office Employees (number of persons) in the research and development activity according to the type of employment, the level of education, the scientific field and the execution sector. PxWeb

In 2023, the R&D workforce was comprised of 2,092 females and 1,720 males, with women making up 54.9% of the total. This female majority is even more pronounced at the highest educational levels. In 2023, there were 1,154 female employees with a Doctorate compared to 1,057 male employees with the same qualification. This represents 52.2% of all doctoral-level R&D employees.

This evidence demonstrates that the women are not only entering but also excelling and dominating at the highest echelons of academia and research. The primary challenge is not the

production of female talent but rather the retention and translation of this talent into leadership roles and broader professional success within the segregated economy.

Year	Education Level	Total	Male	Female
2020	All	4,177	1,929	2,248
2021	All	3,838	1,745	2,093
2022	All	3,361	1,492	1,869
2023	All	3,812	1,720	2,092
Year				
2020	Doctorate	2,215	1,076	1,139
2021	Doctorate	2,078	991	1,087
2022	Doctorate	1,858	901	957
2023	Doctorate	2,211	1,057	1,154

Professional Roles in R&D

A more granular view of the R&D workforce, categorized by professional role, reveals a further layer of complexity. Women hold a majority of the researcher roles, with 1,222 female researchers compared to 1,059 male researchers in 2023. This aligns with the overall female dominance in the R&D workforce.

Table 3. Employees (number of persons) in research and development activity according to the execution sector

	2020		**2021**		**2022**		**2023**	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**
Total	1929	2248	1745	2093	1492	1869	1720	2092
Researchers	1154	1273	1068	1216	928	1048	1059	1222
Expert personnel	376	523	369	489	305	448	391	510
Technicians	184	245	121	221	128	219	126	187
Managers	55	45	37	38	42	27	46	44
Other	160	162	150	129	89	127	98	129

Source Employees (number of persons) in research and development activity according to the type of employment, working hours and the execution sector. PxWeb

PhD Graduates by Scientific Field

Data on new PhD graduates serves as a powerful leading indicator of the future R&D and professional workforce. The findings confirm that women are excelling in fields that are often considered part of STEM, but they also highlight where traditional barriers remain.

- **Natural Sciences and Mathematics:** The Faculty of Natural Sciences and Mathematics at UKIM has consistently produced more female PhD graduates than male graduates from 2021 to 2024. For example, in 2024, there were 9 female PhD graduates compared to 4 male graduates.
- **Engineering, Production, and Construction:** This is a field where traditional gender roles persist. The Faculty of Civil Engineering and the Faculty of Electrical Engineering and Information Technologies at UKIM have predominantly male PhD graduates, although a small number of female graduates have emerged in some years. A notable exception is the Faculty of Mechanical Engineering at UKIM, where female graduates constituted the majority in 2021 and 2022.
- **Information and Communication Technologies (ICT):** The gender split in this crucial field fluctuates. At the Faculty of Computer Science and Engineering at UKIM, female PhD graduates outnumbered males in 2021 and 2024. This finding is particularly promising, as it suggests a growing female talent pool in a high-value sector that is overwhelmingly male-dominated in the broader workforce.

North Macedonia has successfully built a robust female talent pipeline, and that as national asset that is currently not being fully realized in the broader economy. Women represented **59% of all graduates in 2020** and **57% in 2021** but their representation in STEM and technical fields relevant to climate change (engineering, energy, natural sciences) remains low (often <30%). A review of PhD graduates by university shows that female graduates outnumber males at several institutions in key years, such as the Faculty of Computer Science, UGD in 2020, and the Faculty of Contemporary Sciences and Technologies, JIE in 2021. The data suggests that the system fails to leverage this talent at the professional-career transition stage. While the overall workforce remains segregated, the promising signs of progress in R&D and ICT academic fields are valuable leading indicators. The gender imbalance in technical R&D reduces the diversity of perspectives in climate technology and innovation, potentially limiting inclusive adaptation and mitigation solutions. Addressing this disconnect is essential for achieving both social equity and long-term economic efficiency.

2.3. Socio-Economic Vulnerabilities

An analysis of gender-disaggregated socio-economic data reveals a series of pre-existing vulnerabilities that are likely to be exacerbated by the effects of climate change, disproportionately affecting women. The data shows that between 2020 and 2024, the

proportion of women in the inactive population due to "obligations"[6] was significantly higher than that of men, with women's rates ranging from 3.2% (2020) to 4.3% (2022) compared to men's rates of 0.1% to 0.2%. This stark gender gap indicates that a significant portion of women's time is dedicated to unpaid care work. When climate-related events such as floods, droughts, or heatwaves occur, the burden of care for children, the elderly, and the sick increases, falling primarily on women. This makes them more vulnerable to climate shocks and less able to participate in adaptation and mitigation efforts.

Data shows a persistent gender gap in the labor market. The employment rate for women aged 20-64 was 53.6% in 2024, compared to 71.7% for men. This is reflected in the gender gap in employment, which was 18.1% in 2024. Young women also face higher rates of being unemployed and not in education or training (NEET), with a 24% NEET rate in 2024 for women aged 15-29, compared to 21.4% for men. While the poverty rate after social transfers is roughly equal for men and women, with women at 22.6% and men at 23.1% in 2022, there is a notable disparity in the poverty rate for employed individuals, with a significantly higher rate for employed men (12.4%) than for employed women (4.2%) in 2022[7]. This indicates that women who are employed are less likely to be living in poverty than their male counterparts.

In North Macedonia's agricultural sector, women face significant gender gaps in land ownership and decision-making[8]. In 2021, only 28.52% of the properties in the Republic of North Macedonia belong to women, while 71.48 % belong to men (MLSP, 2022) A very small percentage of women are owners of property rights, namely 4.07% of women are property owners, against 95.9% of men, 21.96%, their parents are the owners of the property. In terms of land ownership, 12.01% of women are land owners, and 87.99% of men are land owners. 50% of women who are land owners, are not active in the decision-making process for the activities related to the land.

Of the total number of active business entities in the country, over 90% are small and medium-sized enterprises[9]. Of the total number of employers in North Macedonia in 2021, only 19% are women. Similarly, 78% of self-employed workers are men while 22% are women. Data from the World Bank and OECD show that women entrepreneurs face even greater financial barriers – only about 7–10% of women entrepreneurs in the Western Balkans have access to credit lines for investments in green technologies.

Women's longer life expectancy (In 2023, women lived on average **78.6 years**, men **74.5 years)** but poorer perceived health increases their vulnerability to climate-related health impacts (heatwaves, vector-borne diseases). A review of health data from 2020 to 2024 shows a significant gender disparity in mortality rates from chronic diseases, which can be linked to climate-related issues such as air pollution. In 2024, the mortality rate for males from chronic diseases was 174.5 per 100,000 persons, while for females it was 103.7, indicating a substantial difference. This suggests a need for further gender-disaggregated analysis of health outcomes

[6] State statistical office, data for SDG 8
[7] State statistical office, data for SDG 8
[8] Study on the research, innovation and technology transfer capacities and on the recent agricultural policy developments in the context of the EU approximation process in the pre-accession countries
[9] State statistical office, Women and men 2023

in relation to environmental pollution, particularly concerning PM2.5 particles, which cause premature deaths[10].

2.4 Political Representation and Leadership

While there has been an increase in women's participation in politics and leadership, a gender gap remains. The data indicates that the percentage of women as members of the national parliament has increased from 35.8% in 2020 to 43% in 2022. Women's participation in national government positions also increased, from 16.7% in 2020 to 27.8% in 2023.

Their representation in high-level management positions in companies was 29.9% in 2023.

Following the 2024 national elections, the participation of women in the Parliament of the Republic of North Macedonia decreased, to 39.2%, representing 47 women out of a total of 120 Members of Parliament, a decrease of 4 from the previous composition, when the representation of women reached 42.5%.

Subsequent to the 2024 elections, the Government of the Republic of North Macedonia comprises only three women ministers out of a total of 18 ministries and five deputies to the President of the Government. This representation accounts for 12.5%, which is one woman less than the composition of the preceding Government.

3. Conclusion and Recommendations

The analysis demonstrates that while North Macedonia has a strong legal and strategic basis for gender equality, its integration into climate policy and practice remains inconsistent. The economy is characterized by deep gender segregation, concentrating men in climate-critical and high-innovation sectors while women dominate service and care sectors with low innovation intensity. Institutional capacities at both central and local levels are insufficient for effective gender mainstreaming, characterized by a lack of knowledge, poor coordination, and 'sectoral thinking.'

Key Gaps Identified:

- **Policy Gaps:** Gender is not consistently mainstreamed into climate planning documents.
- **Institutional Gaps:** Low institutional interest and awareness of gender-climate linkages as well as weak coordination regarding gender mainstreaming.
- **Data Gaps:** Lack of a systematic approach and a deficit in gender-disaggregated statistical data for creating efficient gender-responsible climate actions.

[10] State statistical office, data for SDG 3

- **Economic Gaps:** Women are structurally excluded from climate-critical and "green job" sectors, limiting their access to opportunities and decision-making power in mitigation efforts.
- **Vulnerability Gaps:** Pre-existing socio-economic vulnerabilities, particularly concerning unpaid care work and lack of land ownership, disproportionately affect women and compound climate risks.
- **Leadership Gaps:** National elections show a decline in women's political representation in the Parliament and Government.

Proposed Recommendations

1. **Systematic Gender Integration:** Ensure that gender equality is considered systematically and in a mutually reinforcing way across all national climate agenda implementation.
2. **Gender-Responsive Budgeting and Finance:** Integrate a gender perspective when developing resource mobilization strategies, applying climate finance instruments, and ensuring equal participation in the deployment of financial resources. Address barriers to women entrepreneurs accessing credit for green technologies.
3. **Strengthen Institutional Capacity:** Strengthen administrative capacities for gender and climate change. Appointment of trained gender and climate focal points in key climate institutions (e.g., MEPP, Ministry of Agriculture) to improve coordination.
4. **Data and MRV System Enhancement:** Incorporate gender indicators into the system for monitoring, reporting, and verifying (MRV) the degree of implementation of climate actions. Fully utilize the obligation to collect and present statistical data by sex.
5. **Targeted Green Job Policies:** Develop targeted policies to address the under-representation of women in male-dominated, climate-critical sectors (energy, construction, transport) and ensure women are included in "green job" opportunities. Leverage the female talent pool in R&D and ICT by supporting their translation into professional-career success.