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EVALUATING GENDER PERSPECTIVES IN ENERGY EFFICIENCY PROGRAMS: A CASE STUDY OF THE MUNICIPALITY OF BRVENICA

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ABSTRACT

This study analysis the Energy Efficiency Program of the Municipality of Brvenica, examining its budgetary aspects through the lens of gender-responsive measures. The program, spanning 2022-2024, allocates funds for diverse energy efficiency projects but falls short in addressing residential households and lacks ambitious renewable energy measures. The absence of gender-disaggregated data underscores a gap in understanding the impact on women and men. Recommendations urge aligning the program with gender equality policies, expanding goals, and consulting the Commission for Equal Opportunities. The study advocates for gender-sensitive measures, citizen involvement, and increased funds for household energy efficiency. Budgetary analysis reveals a disconnection between the program and the municipal budget, emphasizing the need for better integration. Challenges include the absence of gender-

specific data and limited consultation during program development. Recommendations stress enhanced budget transparency, increased financial allocations for gender-responsive initiatives, and collaboration for ecological heating awareness. The study underscores the imperative of comprehensive gender integration in energy policies for equitable outcomes and effective mitigation of energy poverty.

Key words: gender responsive budgeting, energy efficiency, local policy, energy poverty, North Macedonia

INTRODUCTION

Energy poverty is a serious concern in our society and globally, gaining increasing attention during the period of global energy crisis. Energy is no longer a luxury service that provides a higher standard of living; it is an essential good whose absence can exclude people from participating in society (European Union, 2016). According to the Handbook on Energy Poverty, "energy poverty is commonly understood to be when a person or household is not able to heat or fuel their home to an acceptable standard at an affordable cost" (European Union, 2016, p. 21). In reality, the concept encompasses a much broader set of essential activities. It may indicate not only an inability to adequately heat homes but also an inability to cool homes in warm weather. It can also mean that people cannot afford to cook warm meals, or have secure hot water for baths and washing clothes, or use basic household appliances (washing machines, irons, televisions, computers, etc.) (European Union, 2016).

Common causes of energy poverty are often low incomes, inadequately constructed housing with poor thermal efficiency, and high energy costs. The most vulnerable citizens in society, such as people with disabilities or illnesses, the elderly, single-parent families (most of which are women), and single-person households (especially older single individuals) are at the highest risk and are victims of energy poverty (Farrugia, 2020).

In addition to poverty, energy efficiency is closely linked to environmental protection. The use of unclean energy poses a threat to the natural environment at the local, regional, and global levels. This threat can be mitigated through more efficient use of conventional energy sources and their replacement with renewable energy sources. Gender-related issues play a significant role in all these matters, and we will briefly illustrate them through an analysis of the energy efficiency program of the Municipality of Brvenica, addressing questions that we consider crucial when discussing the gender aspect in energy matters, including energy efficiency, energy poverty, and environmental protection.

The difference between men and women in implementing energy policies is an important aspect of energy efficiency, particularly in addressing energy poverty. The main message is that gender considerations should not be overlooked, as the forefront of energy policy represents a convergence of its energy, economic, and environmental aspects. The social aspect of gender cannot and should not remain in the shadow of planning and implementing activities for a just energy transition and energy efficiency.

The high poverty and unemployment rates in the Republic of North Macedonia contribute to the worsening of the energy poverty situation. The poverty rate in North Macedonia for 2018 was 17.90%, a decrease of 1.6% compared to 2017 (Macrotrends, 2022). Data in Table 1 indicate that 22.6% of the population was at risk of poverty from 2012 to 2020,

which is higher than the EU average of 16.9% but slightly lower than the average of other Balkan countries. The unemployment rate in the first quarter of 2022 was 14.8%, compared to the EU's 6.2% for the same period. From a gender perspective, EU women have, on average, a higher risk of poverty by 1.2 percentage points compared to men, while in North Macedonia, women have, on average, a slightly lower risk of poverty than men by 0.8 percentage points from 2012 to 2020.

Year/Country		2012	2013	2014	2015	2016	2017	2018	2019	2020
European Union	Total	6.9%	6.8%	7.3%	7.4%	7.5%	6.9%	6.8%	6.5%	6.6%
	Men	6.3%	6.3%	6.8%	7%	6.8%	6.3%	6.2%	5.8%	5.8%
	Women	7.6%	7.3%	7.7%	7.8%	8.1%	7.5%	7.5%	7.1%	7.4%
Montenegro	Total		5.2%	4.1%	4.4%	4%	3.6%	3.8%	4.5%	2.6%
	Men		4.9%	4.2%	4.4%	4.5%	4.2%	4.1%	4.9%	3%
	Women		5.4%	3.9%	4.5%	3.6%	3.0%	3.5%	4.0%	2.2%
North Macedonia	Total	6.2%	4.2%	2.1%	1.5%	1.9%	2.2%	1.9%	1.6%	1.8%
	Men	6.9%	4.6%	2.3%	1.5%	2.1%	2.4%	1.8%	1.1%	1.7%
	Women	5.5%	3.9%	1.9%	1.5	1.6%	2%	2%	2.0%	1.9%
Albania	Total						3.7%	3.4%	3%	1.8%
	Men						3.5%	3.0%	2.2%	1.4%
	Women						3.9%	3.8%	3.8%	2.3%
Serbia	Total		4.5%	5.0%	6.7%	5.9%	5.7%	4.3%	3.2%	1.7%
	Men		4.9%	5.6%	7.5%	6.3%	5.4%	4.6%	2.7%	1.3%
	Women		4.1%	4.4%	6.0%	5.5%	6.0%	4.0%	3.6%	2.1%
Kosova	Total							7.9%		
	Men							7.2%		
	Women							8.3%		

Table 1 At-risk-of-poverty rate by poverty line, age and sex, 2012-2020

Source: Eurostat (EU-SILC and ECHP surveys)

One of the main issues with energy poverty in the Republic of North Macedonia is the inability to adequately heat living spaces. From 2010 to 2020, 23.6% reported that they cannot heat their homes appropriately (Figure 1), compared to the EU average of 9.1% (Eurostat, 2022). During this period, the highest rate was in 2019 at 33.1%. In 2020, North Macedonia ranks third (almost 24% reported inability to heat their homes adequately), following Albania

(35.8%) and Bulgaria (27.5%), reporting worse situations in their respective countries (Eurostat, 2022).

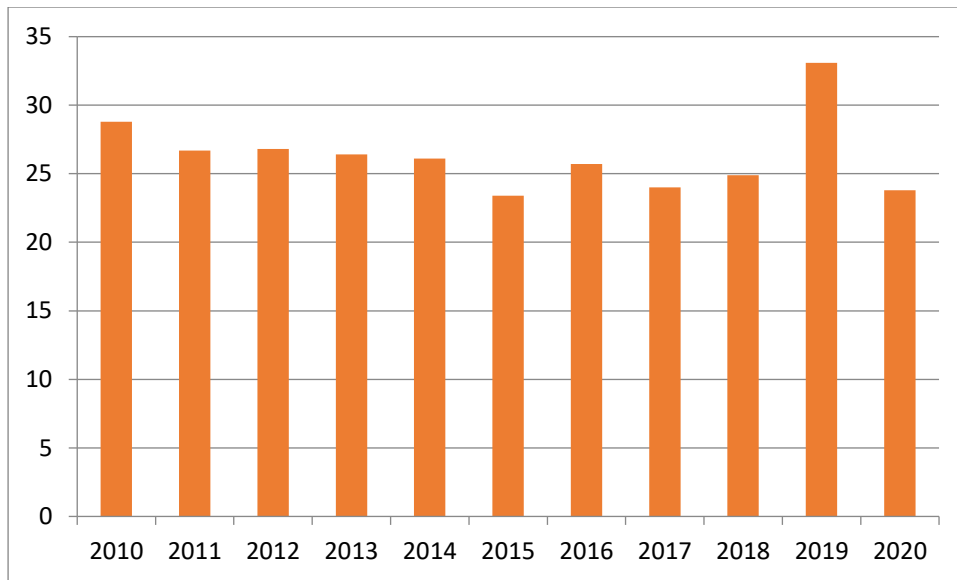


Figure 1. Population unable to keep home adequately heated by poverty status, Republic of North Macedonia, 2010-2020

Source: Eurostat

North Macedonia, as a candidate country for EU membership, should adhere to the Regulation for the Governance of the Energy Union and Climate Action. The energy development strategy and the Energy Law prioritize "reducing energy poverty and protecting vulnerable consumers" (The Climate Herald, 2020).

According to the Energy Efficiency Law of the Republic of North Macedonia, "energy efficiency" is the ratio of the result of services, goods, or energy delivered to the input of energy (Energy Efficiency Law, 2018, Article 3, paragraph 1). The goal of this law is to achieve a high level of efficiency in energy use through measures for efficient energy use in the Republic of North Macedonia (Energy Efficiency Law, 2018, Article 2, paragraph 1).

The rest of this paper is structured as follows. The next section introduces the municipality of Brvenica takes as a case study in this research. Section three describes the research methodology applied in the study. It is followed by the analysis of the energy efficiency program in the municipality of Brvenica, an examination of the budget from the perspective of gender equality, and an analysis of the results from interviews/focus groups with the nominated contact persons from the municipality and the survey with end-users. The conclusion discusses the findings in terms of their relevance and proposes recommendations for improving the integration of gender perspectives in the planning and budgeting of the selected program.

OBJECTIVE AND METHODOLOGY

It is crucial for this study to identify conditions related to gender equality and to formulate recommendations aimed at enhancing the integration of gender perspectives in the planning and budgeting of the energy efficiency program. Building on a mapping of practices in this field, the study highlights initiatives that appear to be "promising practices" for gender equality with the aim of socio-economic development in the municipality. The analysis is then supplemented by the results of the user questionnaire.

The research employed a two-fold methodological approach:

Office Research:

We have conducted an analysis of existing literature and strategic documents on gender equality and gender-responsive budgeting. In addition, we undertook an in-depth gender budget analysis of the energy efficiency program in the municipality of Brvenica.

Field Research:

Facilitated a focus group discussion in November 2022, involving 9 participants (5 women, 4 men), including the coordinator of the commission for equal opportunities, members of the commission, heads of departments (including the Local Economic Development (LED) program for energy efficiency), and advisors. The discussion was based on a pre-prepared questionnaire (Annex 1), but participants faced challenges due to the absence of an action plan, impacting activity realization.

In addition, a survey was conducted in November 2022 with 40 randomly selected citizens of the municipality of Brvenica. The questionnaire, comprising 18 questions in two parts (Annex 2), aimed to gain insights into biographical details and inquire about energy poverty and energy efficiency. The survey sought to understand energy consumption patterns, decision-making related to energy sources, and preferences for energy efficiency improvements or heating system upgrades. The gender perspective focused on discerning potential differences in attitudes, habits, and needs between women and men concerning energy-related matters and combating energy poverty.

MUNICIPALITY OF BRVENICA

The municipality of Brvenica, located in the northwest of North Macedonia, covers 164.3 km² and is part of the fertile Polog region. With an elevation of 580 meters, it experiences a continental and Mediterranean climate. Despite lacking its own energy sources, Brvenica relies on the national electricity grid and has the potential to harness solar energy. The main economic sectors include trade, vehicle repair, manufacturing, and construction, with 290 active businesses in 2020, mostly micro-enterprises (Durmishi & Huseini, 2022).

The municipality oversees various public facilities, such as schools, kindergartens, administrative buildings, and sports halls. The municipal budget covers some or all of the costs for these facilities. Data from the municipality's website indicate that there are 200 staff members employed in three primary schools and one kindergarten, but gender-specific statistics are not provided. The total number of pupils and children in these educational institutions in the academic year 2021/2022 was 1390, with 671 girls and 719 boys.

Comparing gender representation among teachers nationally, there is a higher proportion of female teachers than male teachers. In the academic year 2021/2022, there were 13374 female teachers and 5764 male teachers nationally. Similarly, in Brvenica's primary schools, there are more female teachers (129) than male teachers (73) out of a total of 202 teachers.

As indicated above problem of the population in the Republic of North Macedonia, and also in the municipality of Brvenica, is unemployment. According to the Employment Agency, in the municipality of Brvenica in 2013 there were 719 unemployed persons active jobseekers, but the data of the ESA are not gender structured, i.e. there is only a total number of active jobseekers at the municipal level, but for the same at the local level public no gender statistics available. As a result of unemployment, there is a highly pronounced migration, considered

within the entire Polog region, which is particularly visible in the last decade. The program in the area of local economic development foresees several project activities to improve conditions and towards dynamic and sustainable development of the municipality, its organizational development and strengthening of capacities that will provide better services to citizens, equally for women and men, according to the competences and the established development and structural priorities. One of the programs for local economic development is the Energy Efficiency Program of the Municipality of Brvenica 2022-2025, which is the objective of the analysis of this study. With the development of the Energy Efficiency Program of the Municipality and its implementation, the municipality of Brvenica aims to rationally and efficiently use all types of energy and thus achieve savings in the budget, through reduced energy consumption up to 30% in 2025 (Durmishi & Huseini, 2022).

This program should be for the benefit of all members of the public equally as well as for the benefit of all employed women and men and persons residing in the public facilities that are subject to improvement of their energy efficiency defined in the program. Equality between women and men is a fundamental principle for all aspects of social life and gender impact assessment is one of the methods for including gender aspects in mainstream policies. In order to implement the program based on this principle, it is necessary to apply gender-responsive budgeting. It is the mechanism for choosing priorities according to the needs and priorities of women and men, distribution of resources, means by which the state/municipality intervenes in the economy and directs resources (Hadžiahmetović, Đuric-Kuzmanović, M. Klatzer, & Risteska, 2013).

The standard budgeting process is based on prevailing economic opinion, it does not take into account gender, class, age or ethnicity and is exclusively market oriented and extends beyond specific historical geographical and social contexts. Gender budgeting is a process of gender-sensitive analysis of public finances and government budgets conducted through procedures for incentivizing the budget process resulting in gender-sensitive (gender-aware or gender-responsive) budgets (Sharp & Elson, 2012).

Participatory and gender-responsive budgeting at the local level represents the inclusion of local citizens (women, men, marginalized and vulnerable categories of citizens) in the process of preparing the municipal budget and its priorities, together with the municipal administration. The municipality of Brvenica so far has integrated a gender perspective in the creation of strategic documents only (Through Gender Lenses, 2021). When defining the goals and priorities, it should be analyzed to what extent gender equality was taken into account. This analysis includes a gender budget analysis of this program, in fact it was analyzed: who participates in preparing the program, is the process transparent and inclusive, is there gender parity in it, how many women and how many men will benefit from the implementation of the program, how many women and how many men will be directly involved in the implementation of the program, how many funds are allocated for each activity, from where and for whom, and the involvement of the Commission for Equal Opportunities in creating the activities of the program.

DESCRIPTION OF THE PROGRAM FOR ENERGY EFFICIENCY OF THE MUNICIPALITY OF BRVENICA

The aim of the Energy Efficiency Program of the Municipality of Brvenica is to enable the municipality to reduce energy costs and, consequently, alleviate the burden on the municipal budget. Specific objectives to be achieved for the reduction of energy costs include:

1. A decrease in energy consumption in municipal buildings by 30% by 2025;

2. A reduction in greenhouse gas emissions by 144% by 2025;
3. Increased use of renewable energy sources by 20% by 2025;
4. Improved street lighting services in the municipality to achieve 100% illumination according to standards by 2025, along with a 50% reduction in street lighting costs by 2025;
5. A decrease in the share of energy expenses in the municipal budget by 30% by 2025.

The sectors included in the energy efficiency program are water, public lighting, buildings (municipal buildings), and transport (used for the needs of the Municipality of Brvenica). The decision to include a specific sector in the energy efficiency program is made based on the following criteria:

1. The importance of the sector in the municipality;
2. The availability and credibility of the provided data;
3. The level of municipal control.

In the water sector, approximately 90% of the population is connected to the water supply system, and 65% to the wastewater system. One of the major challenges is the high percentage (around 80%) of unpaid water, prompting the need for improved efficiency. The program aims to achieve energy savings of up to 25% per month by replacing outdated water pumps with modern, energy-efficient alternatives.

Concerning public lighting, the municipality covers 164.5 km² with 117 km of streets, and around 90% of the streets are illuminated. However, the existing street lighting system, mainly composed of inefficient sodium lamps, poses a significant cost to the municipality. The annual electricity costs for street lighting constitute 1.34% of the municipal budget. The plan includes upgrading the street lighting system to meet standards and reducing costs by 50% by 2025.

In the buildings sector, the municipality owns and maintains 14 public buildings with a total conditioned area of about 9860 m². These buildings consume around 694.50 MWh annually, representing approximately 6.32% of the municipal budget. Increasing energy costs are primarily attributed to higher energy source prices. All buildings, in a moderate physical state, incur significant energy expenses due to the use of local heating systems with oil and solid fuel. Heating systems in all buildings, with few exceptions, are outdated and have been in operation for over 20 years without temperature regulation or energy loss measurements.

Regarding the transport sector, the municipality lacks organized public transportation, and there is no public transport enterprise. The municipality owns five vehicles, categorized as M1 and N1 pickups, with an average age of 10.4 years and an average mileage of 815,094 km.

The environmental impact assessment emphasizes the need to reduce greenhouse gas emissions, particularly CO₂. The municipal buildings sector is identified as a significant emitter, followed by the water sector.

After reviewing the Program for Energy Efficiency of the Municipality of Brvenica, it can be observed that the focus is on legal entities, namely public facilities under the authority of the municipality. However, there are no measures for the household sector (and for citizens), specifically residential facilities, which are much more numerous than public facilities and are also significant energy consumers.

In one part of the policy text, it is mentioned that "by reducing energy consumption, and thus energy costs, we contribute to the improvement of services and the quality of life of citizens in the municipality." However, it is not specified for which citizens, what the benefits

will be, how the assessment was conducted, etc. It should not be forgotten that on a daily basis, a significant number of women make decisions that impact large amounts of resources being consumed. This is evident from the survey conducted among the citizens of the Brvenica municipality (data available in the results section).

What is noteworthy is that when defining measures to improve energy efficiency for facilities under the municipality's jurisdiction, there is no information on whether employed women and men in these institutions and other individuals who spend time there were consulted. This includes their perspectives on energy efficiency, their lighting needs, comfortable warmth, etc. Adding to this observation is the fact that the number of employed women in facilities under the municipality's jurisdiction is more than double the number of employed men. Therefore, it is imperative that they are consulted, and the results should be incorporated when updating the Program.

Looking through the energy prism and considering the policy projections and investment priorities in the field of energy efficiency, a significant number of women spend their working days in buildings that, in most cases, need to be reconstructed to enhance their energy efficiency. The involvement of women in the design, planning, and implementation of such measures, both from the user's perspective and the designer's perspective, is indeed a prerequisite for successful and lasting reconstruction of buildings/facilities.

BUDGET ANALYSIS

From the analysis of the planned budget in the Program for the implementation of priority investments in improving energy efficiency, it is observed that the Municipality of Brvenica is in a position to gain access to a large number of different sources of financing, which, although limited, have the potential to be used for the realization of investments in energy efficiency. In principle, the municipality has access to the following sources of financing:

1. Tax revenues - from state and local taxes;
2. Non-tax revenues – from local fees, fines, and duties;
3. Transfers and donations from the state budget and various donors;
4. Borrowing – from international and local creditors.

Of these revenues, some are intended for various expenses, and some can be used for various purposes, as chosen by the municipality. Considering that at the time when this research was conducted, there were still no reports available from the municipality on what was realized in the past year, and the program has not even been submitted to the Energy Agency (the obligation to compile a report is up to a month February of the current year, for activities carried out in the last year), we made a brief review of the planned budget for the implementation of the measures foreseen in the program, as well as the budget of the municipality of Brvenica for 2022 and 2023. From the projections made in the Energy Efficiency Program, the municipality is expected to allocate a total of 30,630,000 MKD (or 497,431.20 Euro) from its own budget for energy efficiency investments for the duration of the program, i.e., from 2022 to 2024.

In the first year, the municipality plans to allocate 3,350,000 MKD for capital investments, focusing on general use, public facilities, and public lighting. Additionally, there is potential funding from the planned sale of municipal property and available reserves. The budget also includes projections for higher-priority investments not related to energy efficiency, such as disaster recovery and infrastructure, with an allocated budget of 500,000 MKD for each in the second year.

The budget highlights specific energy efficiency projects, including educational institutions, administrative buildings, and water supply facilities. These projects involve thermal insulation, window replacement, and the installation of photovoltaic systems. The outlined initiatives demonstrate the municipality's comprehensive approach to improving energy efficiency across various sectors.

From the analysis it is observed that the Program is not directly linked to the municipality's budget, i.e., the budget itself, and the quarterly reports lack a narrative section describing all programs, their correlation with adopted local strategies or plans, as well as the correlation between programs and the budget. A similar observation applies to the planned budget of the municipality for 2023, making it unclear whether the envisaged investments in improving energy efficiency are reflected in the annual municipal budget.

In order to obtain relevant and credible information about gender-responsive budgeting at the local level, its application, measures taken, persons involved, etc., we conducted a focus group with representatives from the municipal administration and the municipality council. We also directly asked the female and male residents of this municipality to hear their original views and needs in the field of energy efficiency. The findings from the focus group and the survey are provided in the next section.

MAIN FINDINGS FROM THE FOCUS GROUP

The Municipality of Brvenica has made efforts to address gender equality through its Action Plan for Equal Opportunities for Women and Men and considerations of various priorities. However, the municipality's website lacks a dedicated section/tab for equal opportunities, and there is no system in place for recording and displaying statistical data by gender. Although the 2022 budget allocates funds for energy efficiency, implementation depends on overall budget revenues. Several projects have secured funds for environmentally friendly initiatives, such as replacing heaters and implementing timer restrictions on street lighting.

The Energy Efficiency Program, while positively reviewed by the Energy Agency, did not involve consultation with the Commission for Equal Opportunities during its creation. Forums organized by the municipality to determine citizens' needs lack specific identification of gender-specific concerns. Despite these challenges, the municipality has established policies, measures, and indicators to monitor the implementation of activities outlined in the program.

While Brvenica municipality collaborates with NGOs from other municipalities to achieve gender equality, there is no registered NGO in this local area. The Environmental Inspectorate's involvement in the energy efficiency program is recommended, addressing issues related to waste materials for household heating and promoting awareness among citizens about ecological heating.

The municipality has a gender balance in leadership positions. To enhance gender-responsive budgeting, participants recommend allocating more financial resources, organizing awareness-raising forums, and ensuring the realistic functioning of the Commission for Equal Opportunities, beyond a mere formal existence.

MAIN FINDINGS OF THE CONDUCTED SURVEY

Table 2 describes the characteristics of the respondents. In this sample, the percentage of women (62.5%) is higher compared to men (37.5%), while most of the respondents are aged

36-45. The questionnaire was mainly answered by respondents of Albanian ethnic origin (60%, of which 72% are women), while 40% declared themselves Macedonians (of which 28% are women), which corresponds to the ethnic structure of the population in this municipality. All the women declared that they are married and have university education, while 33.3% of the men are not married and 26.7% have completed secondary education. Most of the respondents, both women and men, are employed and have 5-6 members in their family. Analysing the economic situation of the respondents, the data reveal that only 20.5% (16% of women and 28.6% of men) achieve a total family net monthly income of over 51,000 MKD.

Characteristics	Men	Women	Total
Gender	37.5%	62.5%	100%
Age			
At the age of 20-35 years	33.3%	24.0%	27.5%
At the age of 36-45 years	33.3%	64.0%	52.5%
At the age of 46-55 years	20.0%	12.0%	15.0%
At the age of 56-65 years	13.3%	0.0%	5.0%
Ethnicity			
Macedonian	60.0%	28.0%	40.0%
Albanian	40.0%	72.0%	60.0%
Marital status			
Not married	33.3%	0.0%	12.5%
Married	66.7%	100%	87.5%
Education			
Secondary education	26.7%	0.0%	10.0%
Higher education (Bachelor's degree)	73.3%	100%	90.0%
Employment status			
Employed (with salary and pension and health insurance)	80.0%	92.0%	87.5%
Employed on a contract basis	6.7%	8.0%	7.5%
Self-employed	6.7%	0.0%	2.5%
Retired	6.7%	0.0%	2.5%
Family: How many members does your family have?			
Up to 2 members	20.0%	0.0%	7.5%
From 3 to 4 members	20.0%	24.0%	22.5%
From 5 to 6 members	60.0%	72.0%	67.5%
More than 6 members	0.0%	4.0%	2.5%
Net monthly income in the family			
10- 18 000 MKD	7.1%	4.0%	5.1%
19-35 000 MKD	28.6%	44.0%	38.5%
36-50 000 MKD	35.7%	36.0%	35.9%
over 51 000 MKD	28.6%	16.0%	20.5%
Number of observations/respondents	15	25	40

Table 2. Characteristics of respondents (%)

Analyzing the survey data leads to the following insights:

An important indicator of the (non) involvement of women in the decision-making process in the family is the registration of ownership. To analyze the owner of the apartment, we asked respondents who owns the house/apartment you live in. In this case, 90% answered that the owner of real estate is a male member of the family, 7.5% stated that the ownership belongs to a female member of the family and 2.5% stated joint ownership of the spouses (Table 3).

In order to evaluate the energy efficiency in households, we asked the respondents if there is thermal insulation in the building where you live. In this case 65% answered yes to this question, and a higher percentage of positive answers were given by women (72%). More than half of the respondents are satisfied with the quality of heating in their household, and 47.5% heat the entire building in the winter period and heat with wood (Table 3). Only 14.2% of men and 4% of women think that the air quality in their home during the heating season is bad, while others rate it as good or satisfactory.

Who owns the building you live in?	Men	Women	Total
A male family member	80.0%	96.0%	90.0%
A female member of the family	13.3%	4.0%	7.5%
Both	6.7%	0.0%	2.5%
Is there thermal insulation in the building you live in?			
Yes	53.0%	72.0%	65.0%
No	46.0%	28.0%	35.0%
How do you rate the quality of heating in your household?			
Not enough	20.0%	40.0%	32.5%
Enough	80.0%	60.0%	67.5%
How much space in your home do you heat in the winter?			
One room	6.7%	8.0%	7.5%
Two rooms	20.0%	8.0%	12.5%
Three or more rooms	20.0%	40.0%	32.5%
All house/apartment	53.3%	44.0%	47.5%
What type of heating do you use in your household?			
Electricity	26.7%	16.0%	20.0%
Wood	53.5%	44.0%	47.5%
Pellet	6.7%	28.0%	20.0%
Electricity and wood (combined)	13.3%	8.0%	10.0%
Other, please specify	0.0%	4.0%	2.5%

Table 3. Energy poverty and energy efficiency

The citizens of the municipality of Brvenica responded to the question "Would you use credit funds for implementing certain measures to improve the energy efficiency of your home?" (Figure 2), stating that they would use credit funds more for replacing the heating system and insulating walls. On this question, the priorities of women and men differ; namely, men would invest more in ceiling and roof insulation, while women would prioritize replacing the heating system and insulating walls.

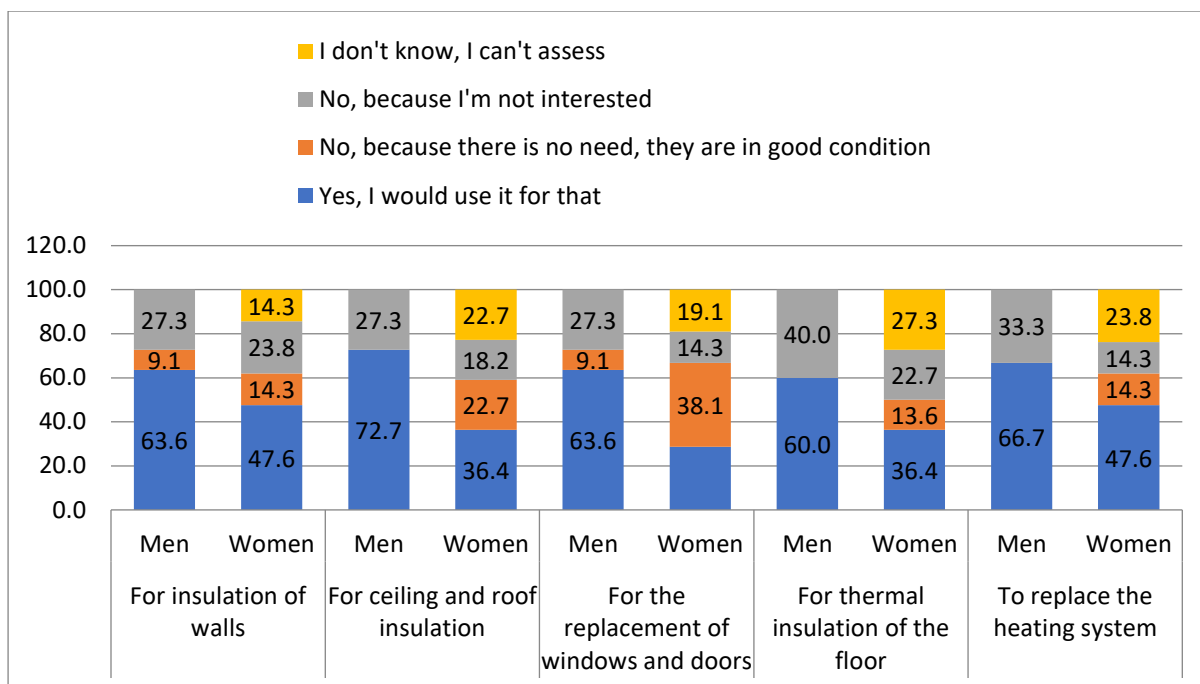


Figure 2. Would you use credit funds for implementing certain measures to improve the energy efficiency of your home?

According to respondents' answers to the question “Who pays the utility bills in your family/household?” a male member of the family pays the bills in 73.3% of the cases when the respondents are men, while according to women this percentage is 54.2%.

Most of the men (73.3%) and women (75.0%) declared that they are able to regularly pay the costs of utility services, specifically energy costs, whereas, 60% of the male respondents and 81.2% of the female respondents stated that they often adhere to the rational use of household appliances. Unlike men with 33.3%, a 77.3% of women avoid expenses that are not necessary (cosmetics, hobbies, cultural events, etc.) in order to provide enough funds to pay the energy bills (Figure 3).

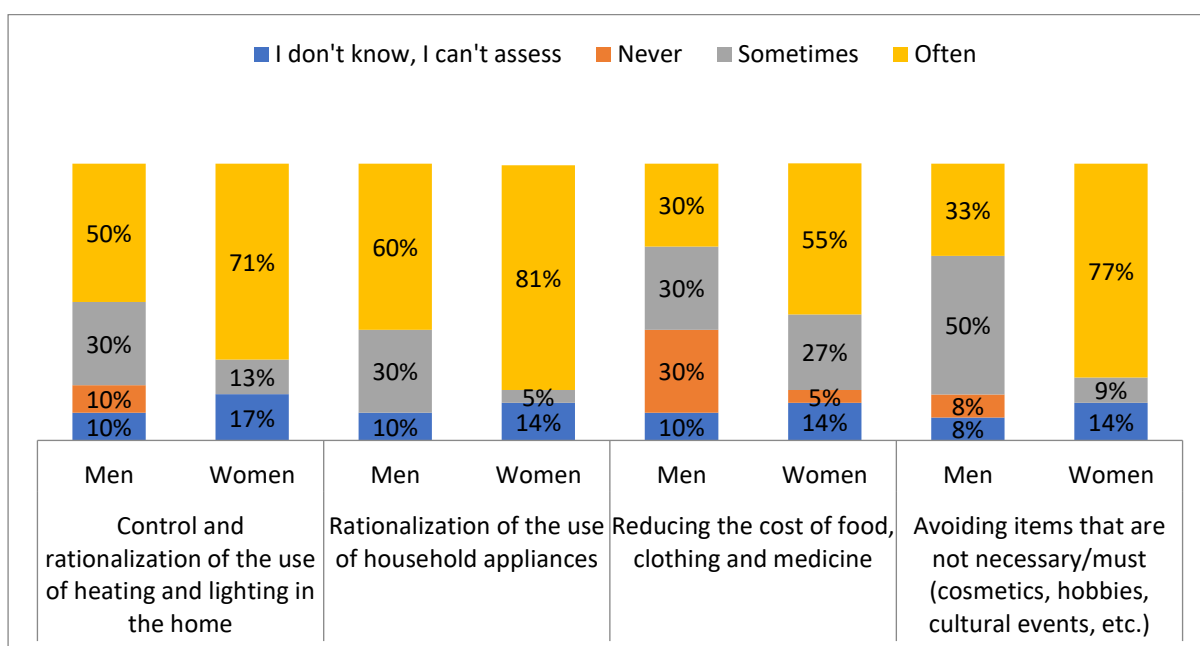


Figure 3. What measures do you take to ensure you have enough funds to pay your energy bills?

The decisions for the purchase of household appliances shown in Figure 4 are mostly taken together. However, it is noteworthy that 17% of women indicated that men make decisions independently, particularly regarding items like a heating oven/stove. On the other hand, men reported a higher percentage of joint decisions or decisions made by women. Men did not mention in any case that a male member of the household solely decides on the purchase of household appliances.

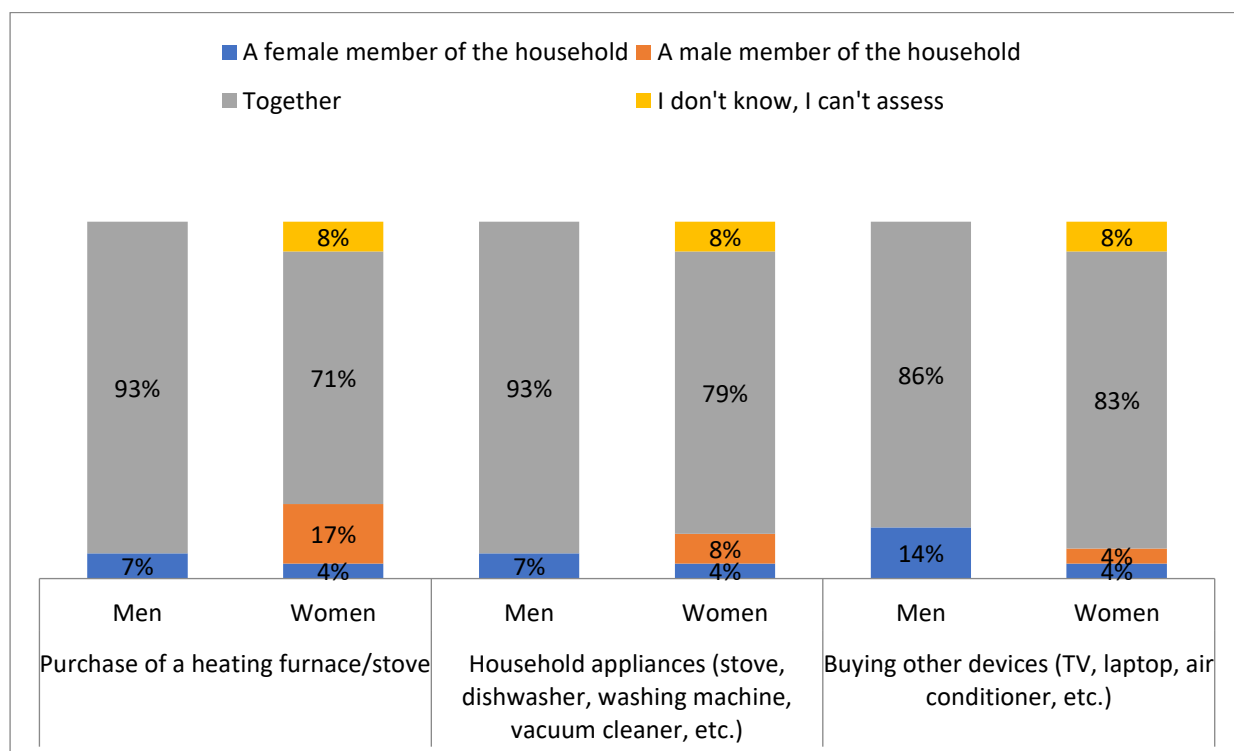


Figure 4. Who decides in your household about the purchase of the following things?

Nearly half of the respondents have stated that energy costs account for 10% to 30% of the total household income. As a result, all believe that households should receive specific support from the municipality in the direction of efficient energy use and increased energy efficiency (that is, the implementation of energy-saving measures as a public interest). For example, this support could include subsidizing heating appliances, renewable energy sources, subsidizing thermal insulation, and other related initiatives.

In summary, the field research uncovered significant gender-specific patterns in household energy dynamics within the municipality. Notably, 90% of respondents identified male family members as property owners, underscoring a pronounced gender disparity in property ownership. Dissatisfaction with heating quality was prominent among women, with 40% expressing discontent compared to 20% of men. While both genders exhibited general awareness of energy efficiency measures, men demonstrated a higher level of awareness, surpassing women by almost 30%. Women displayed a greater willingness to sacrifice comfort and cut costs, as evidenced by 77.3% often reducing unnecessary expenses and 54.6% frequently compromising basic needs to cover energy costs. Concerns about poor air quality during the heating season were raised by 14.2% of men. Results indicate that 81.2% of women and 60% of men responded that they often adhere to rational use of household appliances at

home. 80% of women avoid using household appliances or use them when electricity is cheaper to limit their energy costs. Given that the low tariff (cheap electricity) is during the evening and night hours, the question arises whether women stay up late at night to do laundry, cook, etc., potentially raising concerns about the quality of life and health. This may also suggest that women are more exposed to the potential negative effects of polluted indoor air and potential health issues as a result of prolonged exposure to pollution. Joint decision-making on appliance purchases was prevalent, but 16.7% of women reported independent decisions by men. The data also revealed a significant burden of energy costs, with 50% of respondents stating that energy expenses constitute 10% to 30% of their total household income. As mentioned above in the text, there are multiple definitions of energy efficiency, but if we consider the first definition from 1991, related to energy poverty in the United Kingdom, still unofficially used in some other countries, which states that "a household is in a state of energy poverty if it needs to spend more than 10% of its income on energy to maintain an adequate level of warmth," it opens the door for discussion about the condition of the surveyed citizens. These findings, supported by quantitative data, emphasize the necessity of considering gender-specific dynamics in formulating energy-related policies for more equitable outcomes.

CONCLUSIONS AND RECOMMENDATIONS

Introduction of gender equality in energy policies is necessary to achieve the Sustainable Development Agenda by 2030, both internationally and at national and local levels. Local energy poverty programs play a crucial role in initiating significant changes through small steps in our local environment. All solutions for energy efficiency must ensure that no one is neglected, prioritizing the needs and interests of both women and men, considering energy poverty and low incomes among women.

The importance of incorporating gender aspects in energy is emphasized in the Gender Equality Strategy of the Republic of North Macedonia (2022-2027). The strategy specifically notes the importance of addressing the differences in the needs and demands of women and men in agriculture, energy, and other sectors. One of the expected results is the integration of the gender aspect into national and local policies, including indicators such as the number of policies in energy that incorporate the gender aspect and the number of women receiving subsidies for energy-related activities.

However, in the case of Brvenica municipality, while respecting the legal obligation to create an energy efficiency program, the annual plan is missing, and no information has been submitted to the Energy Agency for program implementation in the previous year. The focus of the program is mainly on public buildings under municipal jurisdiction, lacking ambitious measures for renewable energy sources. Residential households, a significant energy consumer, are overlooked, indicating a gap in addressing local energy poverty.

The program lacks specific measures such as house insulation or studies related to households. Additionally, there are no campaigns to raise awareness of energy poverty and implement energy efficiency measures at the local level. The absence of gender-disaggregated data and a gender analysis within the program demonstrates a lack of consideration for the impact of proposed interventions on improving the situation of women and men at the local level.

From a gender perspective, it is crucial to emphasize that the program needs to focus more on gender-sensitive measures and involve the opinions and needs of both women and men, considering their roles at the local and national levels. The lack of information on

consultations with the Commission for Equal Opportunities for Women and Men raises concerns about the inclusivity of the program.

For the municipality, a challenge lies in maintaining gender-responsive statistics and records, which, in turn, create additional difficulties in conducting gender analysis. Despite having a Commission for Equal Opportunities, its members are not consulted in the development of local strategic documents, indicating a need for improved collaboration.

Recommendations:

For the specific policy:

1. In the introductory part of the program, it is stated that "the adoption of the Local Energy Efficiency Plan will be based on a sustainable energy policy to achieve coordination between the Energy Sector; Environmental Protection; Climate Change Mitigation, and Regional Development." When creating the next program, we recommend considering the municipal policies for gender equality and social protection because energy efficiency policy can be sustainable if the needs of both women and men are taken into account. Whether as private individuals using energy or as employees in certain institutions, their role should be considered. In preparing an energy efficiency policy, it is suggested that it be correlated with social policy, as creating an energy policy is not just a political issue but also an economic and social one.
2. In the section on goals, consider expanding and adding a goal oriented towards addressing the needs of women and men as energy users.
3. When preparing the next energy efficiency program, in addition to the documents and strategies consulted in the preparation of the current policy, consider including the Gender Equality Strategy 2022-2027. This strategic document of the Republic of North Macedonia establishes a framework for improving gender equality and advancing the status of women. Also, consider the local Program for Gender Equality in the municipality.
4. Consider and include gender statistics for both citizens and employees in the municipality and those employed in institutions under the municipality's jurisdiction. The text of the policy lacks gender-disaggregated data, and without such information, it is challenging to understand the gender structure, age structure, educational structure, and employment status (employed/unemployed). This type of data is crucial for understanding whether there is gender representation in certain institutions, which is essential for considering how a specific energy measure will affect the employees in that institution and individuals separately.
5. According to the information in the Energy Efficiency Program, the municipality has 15 objects under its jurisdiction, including 11 educational objects (central and branch primary schools) with a total area of 7781 m², 1 kindergarten with a total area of 562 m², and 3 municipal administrative objects (administrative building, sports hall, and Vardar local government building) with 1612 m². According to the program, common to all objects (except two school buildings) is the need for thermal insulation facades. Therefore, the recommendation in this regard is that when approaching the realization of this intended goal, consult with employed women and men (girls and boys).
6. It is recommended to monitor the comfort levels of employed men and women before and after the implementation of energy efficiency improvements. Therefore, gender differences in thermal comfort and lighting levels need to be considered when designing energy-efficient investments in municipal facilities. It is advisable to examine the experiences of employed women and men with thermal comfort and lighting levels.

The results of the analysis should be shared with the implementers of activities to choose the right design for energy efficiency investments.

7. International research indicates that inadequate indoor temperatures in places where people spend a significant amount of time lead to certain negative health impacts and reduced productivity. In response to such differences in thermal needs, female employees often seek individual solutions to avoid feeling cold during winter months. In summer, male employees have a stricter dress code than females (e.g., wearing suits and ties), leading to an increased need for cooling during this time.
8. The program should take into account the potential for energy savings in households according to common practices and the role that women and men play by involving households and citizens as users of the program. The municipality should consider projects for energy efficiency and renewable energy sources for households.
9. The program should be complemented and synergized with other programs, such as the gender equality program and social protection program, aiming to achieve better effects in reducing energy poverty and improving the economic and social status of women and men, especially those in poverty and vulnerable and marginalized groups.
10. The program should recognize energy poverty as a problem and its connection to energy efficiency and the gender perspective. It should include measures and activities to overcome energy poverty, taking into account the specific exposure of women to energy poverty.
11. Research shows differences in perceptions and attitudes toward energy efficiency between men and women. For example, women often associate energy efficiency with energy savings and believe they should sacrifice comfort to adopt energy-efficient behavior. Therefore, both women and men should be equally engaged in awareness-raising activities to dispel misconceptions that they must sacrifice comfort to achieve energy efficiency and to prevent the perception that energy efficiency is a burden on women.
12. Energy inefficiency and heating also have harmful effects on women's health. According to the World Health Organization, polluted indoor air is responsible for 4 million premature deaths worldwide.
13. A positive example that the municipality can apply when updating the current Energy Efficiency Program or creating a new one is the approach used in preparing the Local Economic Development Strategy. The municipality prepared a questionnaire for residents to help identify key issues in the municipality and jointly determined long-term development guidelines for the Brvenica municipality.
14. Allocating funds in the budget for investments in energy efficiency, especially to support women and men belonging to adult categories, particularly those living in older buildings, adult women living alone, single-parent families, women and men with low incomes, persons with disabilities, and members of other vulnerable categories.
15. Increasing the number of women and men with access to information, knowledge, and skills related to energy efficiency and renewable energy sources.
16. Increasing the number of citizens, especially those belonging to sensitive groups, with access to financial resources for investments in energy efficiency and renewable energy sources.
17. Analyzing the impact of security on women, men, and children in public spaces when planning energy-efficient lighting systems, especially in parks, bus stations, playgrounds, near schools, etc.
18. Greater attention should be given to information campaigns and raising awareness about what the municipality offers in this area.
19. For the Municipality:

20. The municipality should allocate subsidies for inverter heating devices for environmentally friendly and more efficient heating, ensuring gender balance in the allocation process.
21. Strengthen the capacities of the municipal administration to maintain gender-responsible statistics/records, enabling gender analyses of programs and policies, providing a clearer picture of the state of gender-responsive budgeting at the local level.
22. When updating the current Energy Efficiency Program and developing the next one (as well as in the creation of local strategic documents, policies, programs, and plans), consult the Commission for Equal Opportunities and consider its recommendations and suggestions.
23. Include data on the number of potential users, analyze the impact of activities on gender equality, correlate with other programs, and outline monitoring and evaluation methods for the effects of program implementation.
24. Provide training for preparing analyses, specifically for assessing the impact of individual programs promoting gender equality.

In Conclusion:

Typically, creating energy policy and making decisions in the field of energy are treated as political issues, but we can freely say that it is much more of an economic, social, and gender issue. Involving citizens in the creation of energy efficiency programs will lead not only to energy democratization and a better quality of life for all (both women and men) but will also contribute to reducing energy poverty, decreasing pollution, thus protecting people's health, improving the environment, and enhancing the overall quality of life for everyone.

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